



Final Environmental and Social Impact Assessment Report: Construction and Rehabilitation Project of the RN 32 - Guinea

Environmental and Social Impact Assessment Final Report

RN 32 construction-rehabilitation project

December 2025

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Acronyms and abbreviations

Acronyms	English	Français
AGEE	Guinean Environmental Assessment Agency	Agence Guinéenne d'Évaluation Environnementale
ADB	African Development Bank	Banque Africaine de Développement
AGEROUTE	Guinean Agency for Road Management	Agence Guinéenne de Gestion des Routes
CU	Consumption Unit	Unité de Consommation
CTAE	Technical Committee for Environmental Analysis	Comité Technique d'Analyse Environnementale
DB	Database	Base de Données
ECOWAS	Economic Community of West African States	CEDEAO (Communauté Économique des États de l'Afrique de l'Ouest)
EHS	Environmental Health and Safety	Santé, Sécurité et Environnement
ESIA	Environmental and Social Impact Assessment	Étude d'Impact Environnemental et Social
ESMP	Environmental and Social Management Plan	Plan de Gestion Environnemental et Social
GBV	Gender-Based Violence	Violences Basées sur le Genre
GHG	Greenhouse Gases	Gaz à effet de serre
HH	Head of Household	Chef de ménage
IDB	Inter American Development Bank	Banque Inter Américaine de Développement (IDB)
IGA	Income Generating Activities	Activités Génératrices de Revenus
IFC	International Finance Corporation	Société Financière Internationale
MEDD	Ministry of Environment and Sustainable Development	Ministère de l'Environnement et du Développement Durable
MITP	Ministry of Infrastructure and Public Works	Ministère des Infrastructures et des Travaux Publics
NES	Environmental and Social Standards (World Bank)	Normes Environnementales et Sociales (BM)
NP	Performance Standards (IFC)	Normes de Performance (SFI)
NTFP	Non-Timber Forest Products	Produits Forestiers Non Ligneux
OECD	Organisation for Economic Co-operation and Development	Organisation de Coopération et de Développement Économiques
PAP	Project-Affected People	Personnes Affectées par le Projet
PNAE	National Environmental Action Plan	Plan National d'Action Environnemental
PNHN / UNNP	Upper Niger National Park	Parc National du Haut Niger
RAP	Resettlement Action Plan	Plan d'Action de Réinstallation
RoW	Right of Way	Emprise
SBS	Social Baseline Survey	Étude de Base Sociale
SEP	Stakeholder Engagement Plan	Plan d'Engagement des Parties Prenantes
SH	Sexual Harassment	Harcèlement Sexuel
STI	Sexually Transmitted Infections	Infections Sexuellement Transmissibles

Acronyms		English	Français
TMP		Traffic Management Plan	Plan de Gestion du Trafic
VAC		Violence Against Children	Violences contre les Enfants
WB		World Bank	Banque Mondiale

Glossary

Term	Definition	Reference
Environmental and social risks	Refers to the combination of probability or frequency of certain dangerous situations and the severity of the impacts resulting from such situations.	NP 1 ndbp 2
Environmental and social impacts	Refers to potential or actual changes to the physical, natural or cultural environment. Also refers to impacts on surrounding communities and workers resulting from economic activities that must be pursued.	NP 1 ndbp 3
Environmental and social assessment	Is the process of analysis and planning used by the Borrower to identify, evaluate and manage the potential environmental and social risks and effects of a project.	NES 1 § 15 NO 15.1.a
Cumulative impact of the project	The impact of the project when added to the effect produced by other past, present and reasonably foreseeable developments and to the consequences of unplanned activities made possible by the project, which may take place at a later date or in a different location.	NES 1 ndbp 22
The Environmental and Social Management Plan (ESMP)	of the project (which may be a stand-alone document or whose content is integrated into the ESMP) sets out the objectives of the monitoring and the actions to be carried out in this respect with regard to the environmental and social impacts of the project and the corresponding mitigation measures.	NES 1 §45 NO 45.2.
Project	Means the activities for which the Borrower requests World Bank support as defined in the legal agreement between the Borrower and the Bank.	NES 1 § 8
	Means a specific set of commercial activities, including activities for which certain material aspects and/or certain physical components and facilities that may generate risks and impacts have not yet been identified.	NP1 § 4
Emergency situation	An unforeseen incident, resulting from both natural and man-made disasters, usually in the form of fires, explosions, leaks or spills, which may which may occur for a variety of reasons, including failure to follow operational procedures designed to prevent their occurrence, extreme weather events or lack of early warning systems.	NES 1 § 19

Summary non-technical

Description of the project

Brief presentation of the project

The project consists of the upgrading and paving of approximately 85 km of the national road RN 32, connecting Kouroussa to Niandakoro, in the prefectures of Kouroussa and Siguiri, Republic of Guinea. The road is currently unpaved and in a poor state of repair, which makes travel difficult, unsafe and highly dependent on weather conditions, particularly during the rainy season when some sections become almost impassable.

The project is promoted by the Ministry of Infrastructure and Public Works (MITP) of Guinea. The Ministry of Economy and Finance (MEF) acts as the borrower, while AGEROUTE, the national road management agency, will be responsible for the operation and maintenance of the road once construction is completed. QGMI has been appointed as the Engineering, Procurement and Construction (EPC) contractor.

The main objective of the project is to improve road connectivity, safety and transport conditions between Kouroussa and Siguiri, while supporting regional economic development and improving access to markets, services and social infrastructure. The project is part of the Government of Guinea's broader strategy to strengthen national road infrastructure, in line with Vision 2040 and the Interim Reference Programme (PRI 2022–2025).

The works will include widening and paving the road in accordance with ECOWAS standards, construction and rehabilitation of drainage structures, replacement of seven existing bridges, improvement of road junctions, installation of pedestrian facilities in villages, and road safety measures such as signage, guardrails and lighting in urban areas. Temporary facilities such as a construction camp, quarries and borrow pits will be developed for the duration of the construction phase.

The road is expected to remain operational over the long term due to the beneficial nature of the project; therefore, a decommissioning phase has not been considered.

Location of the project

The RN 32 project is located in Upper Guinea, between the towns of Kouroussa and Niandakoro, crossing mainly rural areas as well as villages and small urban centres. The road provides a strategic link between the prefectures of Kouroussa and Siguiri, offering an alternative route that avoids passing through Kankan.

The project area includes:

The existing RN 32 road alignment over approximately 85 km;

- Seven bridge locations crossing watercourses, including the Djoliba, Komba and Tinkisso river systems;
- A planned construction camp located between Norassoba and Fandia;
- A quarry site identified near the village of Kounkono, approximately 32 km from the main road;
- Several borrow pit locations to supply construction materials.

The project area is characterised by a mix of agricultural land, savannah landscapes, watercourses and settlements, with strong seasonal variations linked to rainfall. The exact locations of project components are illustrated in the project maps included in the ESIA.

Description of the initial state of the site and its environment

Physical environment

The project area is located in Upper Guinea, within a predominantly rural landscape characterised by relatively flat terrain shaped by the Niger River and its tributaries. Altitudes generally range between 350 and 500 metres along the RN32, with more pronounced relief in the Kounkono quarry area, where isolated hills linked to granitic formations reach higher elevations.

From a geological perspective, the area is composed of a mix of Mesozoic, Tertiary-Quaternary and Palaeoproterozoic formations. These include alluvial deposits associated with the Niger River and its tributaries, as well as older sedimentary and granitic formations. These geological characteristics influence both soil types and groundwater availability.

Several types of soils are present along the project corridor, including hydromorphic alluvial soils in low-lying areas near watercourses, ferruginous tropical soils, ferralitic soils on gently sloping terrains, and skeletal soils on rocky outcrops. Overall, soils are generally fertile but locally degraded due to human activities such as agriculture, bush fires, deforestation and artisanal gold mining. Soil analyses show the presence of naturally high levels of iron and aluminium, typical of lateritic soils, as well as traces of heavy metals in certain locations, particularly near gold-panning areas.

The climate of the project area is Sudano-Guinean, characterised by a marked rainy season from April/May to October and a dry season from November to March. Annual rainfall averages around 1,000 to 1,500 mm, with a peak in August, while temperatures are generally high throughout the year, occasionally exceeding 40°C during the dry season. Climate data indicate a long-term trend of increasing temperatures and decreasing rainfall, consistent with national climate change projections.

Hydrologically, the project crosses several permanent tributaries of the Niger River. River flows are highly seasonal, with high water levels during the rainy season and significantly reduced flows during the dry season, although most watercourses do not dry up completely. One localized flood-prone area was identified along the RN32 during the rainy season. Long-term data indicate a general decline in river flows, linked to reduced rainfall and broader climatic changes.

Groundwater resources in the area are limited and mainly associated with fractured aquifers of low productivity. Water quality analyses show that surface waters are generally suitable for agricultural and ecological uses, though traces of heavy metals are present in some areas influenced by artisanal mining. Groundwater is often acidic, turbid and microbiologically contaminated, making it unsuitable for drinking without prior treatment.

Overall, the physical environment of the project area is typical of Upper Guinea, shaped by climatic variability, river systems and human activities, and presents specific sensitivities that must be considered in the design and implementation of the project.

Biological environment

The project area is located in Upper Guinea, a region characterized by a mosaic of savannahs, open woodlands, gallery forests and wetlands associated with the Niger River and its tributaries. These ecosystems support a relatively rich biodiversity, although they are subject to significant human pressures.

Habitats and flora

Several habitat types were identified within the study area, including dense and open forests, wooded savannahs, grasslands on bowal (lateritic plateaus), riparian thickets, freshwater aquatic vegetation and anthropogenic formations such as agricultural fields and plantations. None of the habitats surveyed are considered intact; most are moderately to highly degraded due to shifting agriculture, bush fires, logging, artisanal gold mining and grazing.

Botanical surveys recorded approximately 190 plant species. Four plant species of conservation concern were identified according to the IUCN Red List, including one endangered species (*Pterocarpus erinaceus*) and three vulnerable species (*Khaya senegalensis*, *Azelia africana* and *Vitellaria paradoxa*). One plant species fully protected under Guinean legislation (*Anthocleista nobilis*) was also recorded. Two invasive species were identified (*Imperata cylindrica* and *Tectona grandis*).

Fauna

Surveys of large and medium-sized mammals recorded at least 23 species, including primates, ungulates, carnivores and rodents. One vulnerable species according to IUCN criteria, the hippopotamus

(Hippopotamus amphibius), was identified in the Niger River, as well as two near-threatened species (Patas monkey and Yellow-backed duiker). Interviews and field surveys did not confirm the presence of permanent chimpanzee populations in the study area.

Avifaunal surveys identified a high diversity of bird species (around 180 species), reflecting the diversity of habitats present. Three bird species of high conservation concern were recorded, including two critically endangered vultures (Hooded Vulture and White-backed Vulture) and one endangered raptor (Bateleur). Wetlands and floodplains play an important role for resident and migratory bird species.

Protected areas and sensitive zones

The study area is located near several protected and internationally recognised areas, including the Haut Niger National Park and Ramsar wetlands. Part of the project area overlaps with the Niger–Niandan–Milo Ramsar site, which is mainly protected for its aquatic ecosystems and associated biodiversity.

Overall assessment

Although the biological environment shows a relatively high diversity of species and habitats, it is already significantly affected by human activities. The presence of species and habitats of conservation importance requires particular attention during project implementation, especially in relation to habitat loss, disturbance of wildlife and impacts on aquatic and riparian ecosystems.

Human environment

The project area is located in Upper Guinea, within the Kankan administrative region, and crosses the prefectures of Kouroussa and Siguiri. It mainly concerns rural communes and villages situated along the RN32 corridor, where livelihoods are strongly dependent on natural resources and local economic activities.

The population of the project's area of influence is predominantly rural, young, and characterised by large households. Most inhabitants have lived in the area for several decades and belong mainly to the Malinké ethnic group, with Islam as the dominant religion. Social organisation is structured around traditional authorities, elected local councils, and community groups (youth, women, elders, professional groups).

Economic activities are largely based on agriculture, which is the main source of food and income for most households. Farming systems are mainly rainfed and low-input, with rice, cassava, maize and fonio as staple crops. Market gardening plays an important role, particularly for women, providing both food and cash income. Livestock rearing (cattle, poultry, sheep and goats) is widespread and serves both economic and social functions.

Artisanal gold mining is a key complementary activity, especially during the dry season, and represents a significant source of income for many households. Although income from gold mining is highly variable and uncertain, it helps households cope with agricultural losses and cover essential expenses such as food, health care, education and housing. However, this activity also raises environmental and land-use concerns.

Other livelihood activities include fishing, hunting, collection of non-timber forest products (such as shea, néré and honey), small trade, crafts and service-related activities. Women play a central role in household economies through market gardening, petty trade and processing of local products.

The area is affected by strong physical and economic isolation, mainly due to the poor condition of the road infrastructure, especially during the rainy season. This limits access to markets, public services and economic opportunities. Public infrastructure (administrative buildings, markets, social and cultural facilities) exists but is often limited in number and condition.

Household incomes are generally modest and highly dependent on agriculture and natural resources. Many households face economic vulnerability due to climate-related events, particularly flooding of the Niger River, which has caused major crop losses in recent years. As a result, households rely on diversified livelihood strategies, family solidarity and informal financial systems to cope with shocks.

Summary of project-related impacts

The Environmental and Social Impact Assessment (ESIA) identified and assessed the potential impacts of the project on the physical, biological and human environment throughout its lifecycle. Impacts were analysed for the preparatory, construction, and commissioning/operation phases, both before and after the implementation of mitigation measures.

Overall, the project presents significant positive long-term benefits, particularly in terms of mobility, economic development and access to services, while the main negative impacts are temporary and occur mainly during the construction phase.

Preparatory phase

During the preparatory phase, impacts are generally limited in intensity, spatial extent and duration. The main impacts include:

- Temporary land acquisition and disruption of land use related to right-of-way demarcation and site installation;
- Localised dust, noise and minor air emissions linked to preliminary works;
- Initial social disturbances related to land acquisition, resettlement processes and community consultations;
- Risks of soil erosion and water quality degradation in sensitive areas, particularly near watercourses.

These impacts are considered minor to moderate and mostly short-term.

Construction phase

The construction phase is the most impactful phase of the project. The main negative impacts identified include:

- Increased dust emissions, noise and air pollution from heavy machinery and traffic;
- Soil erosion, compaction and risks of water pollution due to earthworks, especially in hydromorphic soils and sloping areas;
- Loss and fragmentation of terrestrial and aquatic habitats, with disturbance to fauna and flora;
- Increased risks to community and worker health and safety, including traffic accidents and occupational hazards;
- Social pressures related to the influx of workers, including increased demand on services, potential social tensions, and impacts on vulnerable groups;
- Temporary loss of economic activities and livelihoods linked to land acquisition.

At the same time, significant positive impacts occur during this phase, notably:

- Job creation and income generation;
- Development of local businesses and services;
- Skills transfer and local economic stimulation.

With mitigation measures in place, most construction-related impacts are reduced to moderate or acceptable levels.

Commissioning and operation phase

During the operational phase, impacts are generally less intense but longer in duration. Key impacts include:

- Improved traffic conditions, reduced travel time and enhanced regional connectivity;
- Long-term economic development and improved access to markets and essential services;
- Increased traffic-related air emissions and noise, although partially offset by the improved road surface;
- Long-term pressure on land use, ecosystems and services due to increased accessibility and migration;

- Residual impacts on habitats and wildlife connectivity.

Overall, the operational phase is characterised by strong positive socio-economic impacts, while environmental impacts remain moderate and manageable.

Summary of mitigation measures

To address the identified impacts, the project follows the **Avoid–Reduce–Compensate (ARC)** hierarchy. Key mitigation measures include:

- Optimisation of project design to avoid sensitive areas where possible;
- Implementation of erosion control, dust suppression, waste management and pollution prevention measures;
- Protection and restoration of affected habitats, including replanting and ecological monitoring;
- Health and safety measures for workers and communities, including traffic management and awareness campaigns;
- Implementation of land acquisition and resettlement measures in line with national regulations and international standards;
- Continuous stakeholder engagement and grievance management mechanisms;
- Monitoring and adaptive management through the Environmental and Social Management Plan (ESMP/PGES).

With these measures, the **residual impacts of the project are considered acceptable**, and the project is deemed environmentally and socially feasible.

1. Introduction

This document is the Environmental and Social Impact Assessment (ESIA) for the RN 32 road rehabilitation and construction project (the Project). It assesses the potential impacts of the construction of 85 kilometres of existing unpaved road, which will improve connectivity between the municipalities of Koumana (Kouroussa) on the one hand, and Niandankoro (Siguiro) on the other, as well as a number of villages and localities through which it passes, in the prefectures of Kouroussa and Siguiro.

This document presents the ESIA process, key findings and the environmental and social management approach for the project. Construction will be supervised by QG Construction UK LTD (QGMI). The project will be ultimately owned and operated by AGEROUTE (Agence de gestion des routes de Guinée).

Insuco Guinée SARLU (Insuco) and Oryx were appointed by QGMI to carry out the ESIA to meet national requirements and international financing standards.

This ESIA was carried out in accordance with the International Finance Corporation (IFC) Performance Standards (2012); the applicable IFC Environmental, Health and Safety (EHS) Guidelines for Toll Roads (2007) (specific elements only) and the IFC Guidelines on Extraction of Construction Materials (2007); the Equator Principles IV (2020) (EPIV); the United Nations Guiding Principles on Business and Human Rights (UNGPs) (2011); the OECD Common Approaches (2016); and the Voluntary Principles on Security and Human Rights (2000). It has also been prepared in accordance with the laws and regulations of Guinea.

All IFC performance standards are considered relevant to the project. In particular, an assessment of indigenous peoples was carried out during the baseline phase of the ESIA. The objective of this assessment was to verify that there is no potential impact between the project and the indigenous populations, and therefore to confirm that the requirements of IFC Performance Standard 7, in particular those relating to Free, Prior and Informed Consent (FPIC), do not apply to the project.

For further details, please refer to chapter 4 Legislation and standards.

1.1. Background and justification

As part of the implementation of its sustainable development and poverty reduction programme, and with a view to facilitating trade between prefectures and between Guinea and neighbouring countries, the Guinean government has launched a public works programme to improve the main road network.

The Guinean road network is made up of paved and unpaved roads, with many areas still reliant on unpaved roads that slow down transport, such as the existing RN 32, which is the subject of the construction project envisaged in this ESIA. These roads are more susceptible to erosion, deterioration and flooding during the wet season, leading to safety risks, increased dust pollution and higher maintenance costs.

The development of transport infrastructure, and more specifically the road network, is an essential lever for a country's socio-economic development. A functional road network encourages trade between regions and with the outside world, opens up regions with high potential in terms of agro-pastoral production, tourism or mining resources, and thus contributes to the fight against poverty. The road also facilitates health evacuations from villages to hospitals in the towns.

Upper Guinea is a region with strong mining and agricultural potential, particularly the prefectures of Kouroussa and Siguiro, which will be linked by the construction of this road. In view of all these factors, and given the increase in travel, the current unpaved road is no longer able to fulfil its role of draining traffic from the areas it crosses.

This is why the construction of the RN 32 Kouroussa-Norassoba-Niandankoro,¹ currently 85 km long, will become an essential commercial lever to promote the development of Guinea. Finally, the completion of this road will enable the populations of the areas it crosses to :

¹ The commercial contract between MITP and QGMI calls the road Kouroussa-Norassoba-Niandankoro. However, for greater geographical accuracy, this is a road linking the sub-prefecture of Koumana to the sub-prefecture of Niandankoro. In fact, from this point on, we will be talking about the Koumana-Niandankoro road.

- Transport their goods to consumption areas, which will increase their income and reduce the trade deficit by improving travel conditions and reducing transport costs.
- Easier access to essential services (health, education, administration, etc.).
- Meet users' comfort and safety needs.

Construction of the project is estimated to take around 36 months (3 years, including 6 months of preparation).

The objectives of the project are

- To replace/construct 7 bridges along the route with new, wider and safer bridges.
- Installation of urban crossings in the main towns (Balato, Doura, Norassoba, Nounkounkan and Niandankoro).
- Installation of road safety equipment (horizontal and vertical signs, road protection systems and public lighting).
- Improving water conditions around the road, for example by avoiding water stagnation due to the presence of the road.
- Installation of a toll plaza at each end of the RN 32.

The project is category A according to order A/2023/1595/MEDD/CAB/SGG and international standards. In compliance with the 2019 Environmental Code and its implementing decrees, an ESIA must be carried out. This report presents the method and results, which are detailed in the chapter 4 .

1.2. Organisation of the report

The ESIA is structured according to the plan detailed below.

Table 1 : Outline of the ESIA

Chapters	Sections
Non-technical summary	Description of the project Description of the initial state of the site and its environment Description of the initial state of the human environment Summary of project-related impacts Summary of mitigation measures
Introduction	Background and justification Organisation of the report
Project description	Technical characteristics of the project Project location Immediate human environment Data relating to the siting, design and operation of the project (including a discussion of the reliability and accuracy of the data)

Chapters	Sections
Analysis of project alternatives	Description of alternatives (social, environmental and economic considerations) Selection and justification of the chosen alternative.
Study methodology	
Political, legal and institutional framework of the study	Political framework Legal framework Institutional framework for environmental and social management Social safeguard framework for... Gap analysis in relation to national and international standards
Description of the initial state of the environment	Description of the initial state of the physical, biological and human environment Results of socio-economic surveys
Impacts of the project on various environmental areas	Identification and assessment method Analysis of the project's potential impacts
Risk and accident assessment	Analysis method Identification of types of conflict and their significance Prevention and management measures
Cumulative impact with other nearby projects	
Environmental and social management plan	Overview of mitigation and enhancement measures Detailed mitigation and enhancement measures Implementation programme for mitigation, compensation and enhancement measures Environmental monitoring and follow-up programme Capacity building programme Complementary initiatives Financial estimate of protection and support measures
Public consultation procedure	
Stakeholder Engagement Plan	
Closure/renovation plan	
Conclusion	

2. Method

2.1. Team mobilised

The ESIA was carried out by a consortium involving Insuco Guinea and Oryx.

The Insuco team, in charge of the social part of this study, was made up of :

- Mathieu Van Hoy, Mission Leader - Social Expert, responsible for coordinating the social part of the study, consultations with stakeholders, monitoring socio-economic surveys and preparing data collection tools, and developing this ESIA and the CPR;
- N'Faly Dama Touré, National ESIA Expert, who participated in the development of the ESIA and consultations with stakeholders;
- Thierno Kourouma, National ESIA Expert, who took part in developing the ESIA and coordinating all the socio-economic surveys;
- Kabinè Condé, Head of the survey team, who coordinated the socio-economic surveys at household level; and
- A team of 9 interviewers, responsible for carrying out the socio-economic surveys.

The Oryx team, in charge of the environmental section, was made up of :

- Sébastien OLICHON, Oryx project manager and senior international environmentalist ;
- Eric MULLER, expert in environmental risks and impact assessment;
- Tiphaine OUISSE, scientific coordinator;
- Pr Adama TOLOFOUDYE, field expert in water, soil pollution and chemistry;
- Mikael VATIN, international health and safety expert, specialising in risk management; and
- Experts in fauna and flora inventories:

Experts in fauna and flora	Name
Mammal expert	Ibrahima Khalil BALDE
Mammal assistant	Bangaly KABA
Herpetology expert	Joseph DOUMBIA
Herpetology assistant	François GBEMOU
Botany expert	Kaman GUILAVOGUI
Assistant botanist	Maïmouna TOURE
Ornithology expert	Camille TCHANKPAN
Fish expert	Mexmin Koffi KONAN
Ichthyology assistant	Nestor SANDOUNO

The two teams were supported by Joanna Guernah for the coordination of activities and quality control of the Insuco Guinea office, as well as Francis Ehemba for cartography and computer graphics, and Julien Gasser Morlay and Azim Saboutou for the preparation of tools and data processing.

2.1.1. Insuco Guinea

Insuco is a consultancy specialising in social sciences and engineering, which carries out studies, technical assistance and monitoring of social protection policies and standards in the spatial planning and development sectors in developing countries.



Through these studies, our aim is to create links between the stakeholders in a territory in order to build sustainability. Our multidisciplinary expertise enables us to offer our customers tailor-made solutions.

■ Our teams around the world:

- Around **160** permanent employees in Africa, Latin America and the Caribbean;
- An average of more than **250** contract staff (international and national experts, investigators, translators, etc.) working on our projects.

Our networks and our ongoing policy of building local capacity also enable us to ensure the optimisation and consistency of our activities.

■ Our team in Guinea

Insuco Guinée was set up at the end of 2010. The firm has already carried out more than a hundred studies in Guinea and supervised many others in other countries in the sub-region, including Mali, Senegal, Niger and Liberia. Although Insuco Guinea's primary sector of activity has historically been mining, the office has subsequently opened up to other sectors such as agriculture, energy, territorial development, land, tourism, the environment, waste management, etc. Insuco works for its clients in every region of Guinea and has acquired extensive knowledge of the country (Insuco Guinée's accreditation can be found in Appendix 1).

2.1.2. Oryx

Adapted to environmental conservation services and community dynamics, ORYX Expertise, comprising ORYX FRANCE / SENEGAL / GUINEA, brings together the cutting-edge skills needed to integrate structuring projects into their natural and human ecosystems.

ORYX Expertise brings together experts of all nationalities in the fields of research, the environment, rural development and the management of remarkable environments.

We apply this level of excellence to (1) major private infrastructure projects in the extractive and productive sectors, particularly renewable and non-renewable energy production, and (2) major international cooperation programmes.

What sets Oryx Expertise apart?

- **National and international** teams adapted to local contexts.
- **Scientific and technological expertise in line** with **international sustainability standards**.
- **A flexible organisation** adapted to the resources of the project, guaranteeing inclusive and sustainable actions.
- **Integrated, proactive thinking** with stakeholders to adapt strategies to realities and challenges.

Our areas of activity are



Sustainable management of the environment and its biodiversity

The various activities we carry out in this sector enable us to carry out environmental and social impact studies, as well as the environmental management programmes needed to integrate our clients' development projects.



Spatial planning and natural resource management

We support our clients in the early stages of each pilot project or economic development programme, linked to income-generating activities for local populations, by means of integrated natural resource management plans and land studies.



Community and stakeholder inclusion

Our on-the-ground approach and our close links with local communities enable us to identify clear and totally transparent lines of communication, supported by simple tools and that everyone can understand, thus limiting the risk of conflict or tension linked to the activities we monitor.

We comply with codes of ethics for :

Compliance with international standards: The results of our study will comply, or aim to comply as a priority, with numerous international standards (Inter-American Bank (IDB) and African Development Bank (AfDB) policies, IFC standards, Equator Principles, World Bank standards, etc.).

Respect: Our team is committed to complying with international, national and local laws, as well as professional codes of practice that apply to our activities, and to respecting human rights, the environment and health.

Integrity - fraud and corruption: It is essential to avoid any appearance of conflict of interest or any form of corruption. We therefore attach the utmost importance to exemplary behaviour.

CSR ethics: We respect the natural environment, the social environment and rural development of the regions in which we operate and maintain a regular and open dialogue with our stakeholders.

ORYX EXPERTISE, through its representative office ORYX Expertise Guinée SASU, a permanent establishment registered with the Conakry trade register under number RCCM GN.TTC.2022. B.131136, is approved by the Ministry of the Environment and Sustainable Development and its

Guinean Environmental Assessment Agency by Order A/2023/1771/MEDD/CAB/SGG (see Appendix 2).

2.2. Presentation of the data collection and analysis method

2.2.1. Documentary review

This study is based on an in-depth literature review, drawing on institutional, technical, academic and regulatory sources. The main categories of documents consulted were as follows:

a) Project documents and preliminary studies

- Hydrological, hydraulic, socio-economic, economic and environmental studies associated with the Preliminary Summary Design (APS), Administration et Contrôle des Grands Projets (ACGP), 2021 ;
- APS technical reports and graphics, ACGP, 2021;
- QGMI bids and technical data (2023-2025), including preliminary E&S screening, labour schedule histogram, identified E&S risks and geo-referenced project data;
- Integrated Management System Manual (QGMI, 2022).

b) Development plans, strategic data and statistics

- Local Development Plans (PDL) of the communes concerned (Kouroussa, Sigui, Norassoba, Nounkounkan, Doura and Balato);
- Cartographic portal of the Guinean Mining Cadastre (Spatial Dimension, 2025);
- Annuaire statistique de Guinée (INS, 2021) and RGPH 3 (INS, 2017).

c) Biodiversity data

- International databases: IBAT, GBIF, IUCN Red List, Tropicos, Westafricanplants ;
- ESIA reports available on other projects in the area;
- Scientific articles and grey literature;
- National decree on the protection of species of wild fauna and flora (MEEF/RG, 2020).

d) Standards, guidelines and other references

- Satellite imagery ;
- Equator Principles guidance notes on climate change (2023) and human rights (2020);
- Environmental, health and safety guidelines (World Bank, 2007);
- Good Practice Handbook on Land Acquisition and Involuntary Resettlement (IFC, 2023).

A full list of the literature consulted can be found at the end of this document. The information presented in this report is also based on data collected during field missions carried out by the Insuco-Oryx consortium.

2.2.2. Environmental data collection and analysis

In addition to the literature review, field data was collected on the physical and biological environments in the study area.

2.2.2.1. Physical environment

Field surveys were carried out from 17 to 21 March 2025 to characterise surface water, groundwater, soil, noise and air in the study area.

2.2.2.1.1. Quality of the noise environment

Noise is an important issue, and the standards to be met in Guinea are clearly laid down by the authorities. Six continuous 24-hour measurements and one instantaneous measurement were taken using sound level meters (Peak Tech 8005, PeakTech GmbH), distributed along the RN 32 and at the Kounkono quarry.

The aim of the data analysis is to check that the measurements comply with national and international standards. In Guinea, Ministerial Order No. 2015/342/MIPMEPSP/CAB of 27 February 2015 defines regulatory noise thresholds, presented in Table 2. In addition, Guinean standard NG 09-01 012:2012/CNQ:2004 establishes maximum exposure limits to noise and certain chemical substances in the workplace.

Table 2. Guinean noise standards

Period	Noise level (1 hour, dBA)		
	Residential (Class 1)	Commercial (Class 2)	Industrial (Class 3)
06h00 - 13h00	50	55	
1pm - 3pm	45 ¹	50	70
3pm - 10pm	50	55	
10pm - 6am	45	50	

Thresholds presented in The aim of the data analysis is to check that the measurements comply with national and international standards. In Guinea, Ministerial Order No. 2015/342/MIPMEPSP/CAB of 27 February 2015 defines regulatory noise thresholds, presented in Table 2. In addition, Guinean standard NG 09-01 012:2012/CNQ:2004 establishes maximum exposure limits to noise and certain chemical substances in the workplace.

Table 2 corresponds to the permissible noise level attributable to the project at the location of a receptor, i.e. the noise level specific to the project.

The IFC's general guidelines on environment, health and safety (IFC, 2007b) stipulate the following: "Noise impacts should not exceed the levels presented in , nor result in a maximum increase in background levels of 3 dB at the location of the receptor closest to the site".

Table 3, nor result in a maximum increase in background levels of 3 dB at the location of the receptor closest to the site".

Table 3. WHO guidelines on ambient noise levels (IFC, 2007b)

Receiver	LAeq over one hour (dBA)	
	Daytime (07:00 - 22:00)	Overnight -22:00 - 07:00)
Residential, institutional and educational	55	45
Industrial and commercial	70	70

NOTE(S) :

1. Indicative values refer to noise levels measured outdoors. Source: *Community Noise Guidelines* (WHO, 1999).
2. For , acceptable indoor noise levels for homes, institutions and educational establishments, refer to WHO (1999).

2.2.2.1.2. Air quality

At the same locations as the environmental noise sampling, instantaneous measurements were taken using an Aeroqual 500 meter (Aeroqual HQ, New Zealand). The following parameters were measured

- Suspended particles with a diameter of less than 2.5 μm ($\text{PM}_{2.5}$),
- Suspended particles with a diameter of less than 10 μm (PM_{10}),
- gaseous pollutants: sulphur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO) and ozone (O_3).

Applicable ambient air quality standards include the Guinean national standard on air pollution and discharges NG 09-01-011:2012/CNQ:2004 (Republic of Guinea, 2004), and the IFC air quality guidelines, which are based on World Health Organization guidelines, most recently updated in 2021 (WHO, 2021). These two documents are presented in [Table 4](#).

Table 4. Ambient air quality standards for gaseous emissions and particulate matter (all measurements expressed in $\mu\text{g}/\text{m}^3$)

Standard	Guinean air quality standard			SFI (2007) / WHO (2021) AQS		
Averaging period	24 hours	Annual	1 hour	24 hours	Annual	1 hour
$\text{PM}_{2.5}$	-	65	-	15	5	-
PM_{10}	260	80	-	45	15	-
CO	30	-	-	4000	-	35000
NO_2	-	40	200	25	10	200
SO_2	125	50	-	40	-	-

2.2.2.1.3. Water and soil quality

The quality of the soil, surface water and groundwater was quantified at a given time "t" in the field by taking samples which were then analysed in the laboratory in order to characterise the samples from a physico-chemical, trace metal (heavy metal) and bacteriological (water) point of view.

The analysis methods are described in the table below.

Table 5: Water and soil quality analysis methods

Designation	Parameters	Equipment used
Soil analysis	<i>Mineral composition</i> (SiO_2 , $\text{Al}_{(2)}\text{O}_3$, $\text{Fe}_{(2)}\text{O}_3$, CaO , MgO , $\text{Na}_{(2)}\text{O}$, $\text{K}_{(2)}\text{O}$, TiO_2 , $\text{P}_{(2)}\text{O}_5$, Cr , Cu , Pb , As , Ni , Cd , n , Co , Sulphur, Chlorine)	XRF (X-Ray Fluorescence)
	<i>ABA test</i>	
Minerals sludge/sediment	or Saturated paste at pH PN, PA, PNN	pH meter Volumetry
	<i>Metals from leachate</i>	

Designation	Parameters	Equipment used
	Cr, Cu, Pb, As, Ni, Cd, Mn, Ca, Mg,	MPAES 4200 Agilent Volumetry
Water analysis	<i>Physicochemistry</i>	Multi-parameter
	pH, conductivity, TDS, turbidity, hardness, sulphates, nitrates, nitrites, chlorides, phosphates, cyanide	Turbidimeter
		Spectrophotometer
	<i>Metals and non-metals</i>	UV visible
	Ca, Mg, K, Cr, Cu, Pb, As, Ni, Cd, Mn, Fe, Hg	MPAES 4200 Agilent Volumetry
	<i>Bacteriology/microbiology</i>	

The analysis laboratory is the Centre de mesures of the Faculty of Science and Technology of the USTTB (Université des sciences, techniques et technologies de Bamako, Mali). This ISO 9001-certified laboratory is run by Professor Tolofoudye, who is also in charge of sampling and field measurements.

2.2.2.1.4. Other aspects of the physical environment: hydrology, topography, climate and rainfall

The other aspects of the physical environment were described mainly using bibliographic and satellite data:

- Analysis of the geological and geomorphological contexts (nature of the terrain crossed, important geotechnical conditions for assessing impacts related to water and soil pollution, as well as runoff) of the project site; this description is based on the following documents:
 - BOULVERT Y. (2003) "Carte morphopédologique de Guinée à 1/500 000, Cartes et notices ;
 - ORANGE D. (1992) "Hydro-climatologie du Fouta Djallon et dynamique actuelle d'un vieux paysage latéritique (Afrique de l'Ouest)".
 - THIEBLEMONT D. (2005) "Géologie et pétrologie de l'Archéen de Guinée: une contribution régionale à la formation de la croûte continentale". Geochemistry. Université de Bretagne occidentale.
- Analysis of the characteristics of the local topography, catchment areas and drainage network on the basis of existing data.
- Analysis of the rainfall and climate characteristics of the study area on an annual and monthly time scale on the basis of existing data.
- Estimation of the risks associated with climate change and natural disasters using the *Thinkhazard!* digital tool.

2.2.2.2. Biological environment

The aim of this study was to establish the diversity of flora and fauna in the study area and to identify the priority species for conservation present and potentially present.

The field surveys were carried out on land and in freshwater. All the habitats present in the study area were surveyed, with particular attention paid to the most natural habitats.

The study area was surveyed from 18 to 27 March 2025 (10 days) by a team of biologists covering the following taxonomic groups: flora, avifauna, large and medium-sized terrestrial mammals, herpetofauna and ichthyofauna.

2.2.2.2.1. Inventory of flora and habitats

The aim of this inventory was to identify the types of habitat present in the study area and their specific composition.

The major vegetation groups found in the study area, with their progressive or regressive phases, were identified using White's (1983) classification of different plant formations. These were characterised and the species that make them up were recorded according to the different vegetation strata (stratified sampling).

The following factors were taken into account when describing the habitats inventoried:

- The species encountered and their frequency;
- Types of association in the environment;
- Emergent canopy cover;
- The composition of the undergrowth;
- Level of habitat degradation (anthropisation);
- Existence of woody regrowth.

The state of conservation of the environment has been described according to 5 classes ([Table 6](#)).

Table 6. Definition of quality classes to qualify the state of conservation of the environment

Quality classes	Description
Intact	No perceptible traces of human or animal activity
Almost intact	Very little human activity is visible (e.g. selective removal of a tree).
Slightly degraded	Habitat in which human activity has affected a very small part of its diversity and structure (stratum), and which still provides goods and services.
Degraded	Habitat that has lost some of its structure and whose production of goods and services has become limited.
Severely degraded	A habitat that has lost entire segments of its structure as a result of human activity. Its capacity to produce goods and services has become weak or non-existent. Almost all or all of the species have been destroyed.

The botanical inventory of the project area was carried out using quadrats (or sample plots), transects and ground-truth points (opportunistic observations).

- The surface survey (quadrat) consists of delimiting a 25 m x 25 m (625 m²) plot in the woody plant formations or a 2 m x 2 m (4 m²) plot in the herbaceous formations. Before the inventory, the habitat is geolocated and described, and the impacts on the vegetation and the habitat are noted, along with the characteristics of the site. Within these plots, all the plant species encountered are identified and their names are noted, along with their number and cover, on the survey sheet.

- The transects follow the same protocol but along a linear route of 100 m or more. This method is favoured in thin habitats such as gallery forests.
- The ground-truth point consists of opportunistic observation of priority species for conservation and species new to the inventory during the team's visits to the study area. The habitat is geolocated and described, and the impact on the vegetation is noted.

No plant specimens were collected. However, plants not identified in the field were photographed and then identified in the laboratory, using the appropriate identification books and a reference collection if necessary.

The taxonomy used follows the Kew Gardens Plants of the World Online (POWO) reference system.

The identification of species of conservation importance is based on the classifications produced by the IUCN red list (<http://www.iucnredlist.org/> consulted on 9/04/2025) and the decree on the protection of species of wild fauna and flora in the Republic of Guinea (MEEF, 2020).

2.2.2.2.2. Inventory of avifauna

The bird inventory was carried out by surveying each habitat present on the study site, in an attempt to obtain as exhaustive an inventory as possible. As the aim of this assignment was to establish the specific diversity of the study site, the search for birds was carried out in a non-standardised way, in order to be able to manage the survey time according to the reality on the ground, and in particular the specific attractiveness of each habitat.

The main method used was a visual search for birds using binoculars, during observations made while walking slowly through the various habitats in the study area or from fixed points, from which it was possible to observe birds at sites where there was a high level of activity (banks of the Niger, wetlands, etc.). Listening points were set up opportunistically in the morning during the bird song period. Identification was carried out visually, but also audibly by identifying the specific calls and songs of the birds wherever possible. Night-time observation sessions were organised to contact species that are active at night, such as nocturnal birds of prey and nightjar.

The route followed by the field team was geo-referenced and mapped.

Identifications were made mainly using the works of Borrow & Demey (2015) and the xeno-canto wSBSite (Planqué et al. 2025) for auditory identifications. In the interests of standardisation, we will follow the nomenclature, taxonomy and order of Borrow and Demey (2015) and take account of recent taxonomic developments. The nomenclature and taxonomy will follow the order of the IOC World Bird List (Gill F, D Donsker & P Rasmussen (Eds). 2025. IOC World Bird List, v15.1) and for French vernacular names the reference is Oiseaux.net.

Each visual or auditory observation was noted and geo-referenced and included the following information: location, species name, bird seen/heard, date of observation, number of individuals, age and sex (if determinable), action: landed/survived the site, breeding clues, habitat and conservation status, GPS coordinates.

2.2.2.2.3. Fish inventory

The aim of the aquatic ecology study is to describe the basic ecological conditions of the fish communities and freshwater habitats encountered in the study area. The sampling methods proposed are reproducible so that they can be used for future ecological monitoring.

- **Abiotic characterisation of sampling stations**

The abiotic characterisation of the sampling stations consisted of measuring a number of physical, chemical and hydromorphological parameters of the sampling sites and describing the human activities around and on these sites.

For the physico-chemical characterisation, the temperature ($^{\circ}\text{C}$), electrical conductivity ($\mu\text{S}/\text{cm}$), turbidity (ppm), pH and dissolved oxygen content of the water were measured in situ using an AQUAREAD AP-2000 multiparameter probe (AquaRead Ltd., UK). For hydromorphological characterisation, water depth at some fish sampling sites was measured using a graduated rod. The width was measured using a decameter.

Canopy and substrate composition were assessed visually and expressed as a percentage of site cover (Gordon et al., 1994). Substrate type was determined by estimating the proportion of the stream bottom occupied by different substrates. The proportion of canopy cover was estimated according to the amount of plant cover on the water surface.

• Sampling of fish fauna

Fish were sampled using two techniques: passive and active fishing. Passive fishing was carried out using drift nets 25 m long and 2 m high with mesh sizes of between 15 and 40 mm. These gillnets were set between 4pm and 5pm and retrieved the following day between 6am and 7am. Active fishing was carried out during the day, using a fish net, in shallow areas (0.5 m). The microhabitats generally surveyed were banks, submerged plant litter, aquatic vegetation and wood debris.



Photograph 1: Sampling methods (from left to right): physico-chemical measurements, dip net fishing and gill net fishing.

Fish specimens were identified on the basis of their morphological and morphometric characteristics. It was carried out in situ with reference to the dichotomous identification keys for West African freshwater and brackish water fish proposed by Paugy et al (2003a, 2003b). The names were updated according to the systematic revision data available on the [FishBase](https://www.fishbase.org/) Website (Froese & Pauly, 2025). The fish thus identified were counted and photographed.

• Data analysis

To characterise the fish fauna inventoried during the study, three ecological indices were calculated:

- **Species richness** (S) is a measure of the biodiversity of all or part of an ecosystem. It refers to the number of species present in the study area and at each of the sampling sites (Marcon & Morneau 2014).
- The **frequency of occurrence** (C) expresses as a percentage the ratio of the number of surveys containing species i to the total number of surveys (Dajoz, 2006). It was calculated by taking into account the surveys in which at least one fish specimen was sampled. The following categories are distinguished
 - Ubiquitous: if $C = 100\%$;
 - Constant: if $75\% \leq C < 100\%$;
 - Regular: if $50\% \leq C < 75\%$;
 - Accessory: if $25\% \leq C < 50\%$;
 - Accidental: if $5\% \leq C < 25\%$;

- Rare species if $C < 5\%$.
- **The relative abundance** of a taxon in a given ecosystem is equal to the ratio $(ni/N) \times 100$, where ni is the number of individuals of taxon i and N is the total number of individuals in the sample. Relative abundance was estimated at the level of the orders, families and species of fish identified in order to determine the dominance or otherwise of one group of fish over the others.

The intrinsic vulnerability of the species was also determined. This metric is specific to each species and describes its vulnerability to fishing (Dulvy *et al.* 2003, Cheung *et al.* 2005). Vulnerability data is available on FishBase (Froese & Pauly, 2025) for each species. They are determined using a Fuzzy Logic Expert System (Cheung *et al.* 2005) on the basis of the life cycle and ecological characteristics of the species. Intrinsic vulnerability is expressed on an arbitrary scale from 1 to 100%, representing the highest level of vulnerability. Generally speaking, four classes of vulnerability are defined:

- 0 - 30%: Low vulnerability ;
- 31 - 50%: Moderate vulnerability;
- 51 - 70%: high vulnerability;
- 71 - 100%: very high vulnerability.

2.2.2.2.4. Herpetofauna inventory: reptiles and amphibians

Visual Encounter Surveys (VES) were used to determine the species richness of the study area and local species communities. They make it possible to estimate the relative abundance of species within a community (Crump & Scott, 1994).

The fieldwork was concentrated on freshwater habitats. Although all habitats were inventoried, efforts were concentrated on habitats where freshwater was accessible. Individuals were noted opportunistically during visual searches. The search techniques consisted of a visual sweep of the ground, inspection of potential shelters (cavities in dead tree trunks, cavities under rocks, under bark, etc.), and also auditory identification (or Acoustic Encounter Survey).

The study area was surveyed during the day and at night by walking through shoreline and shallow water habitats. GPS coordinates were recorded at the start and end of the walking routes using a GPS (Garmin map 62S) using a non-standardised method, as the distances between waypoints and the length of time spent investigating each site varied. A GPS point was recorded for species with a special conservation status according to the IUCN (2025) in order to reference the exact capture locations.

Amphibian specimens were identified to the specific level using the field guide to frogs and other amphibians of Africa (Channing & Rödel, 2019). Reptiles (snakes) were identified using Trappe's (2023) most recent and comprehensive guide to snakes of West, Central and North Africa; for other reptiles (lizards, turtles and crocodiles), Trappe *et al.* (2012). Captured individuals were photographed before being released into their natural habitats. The nomenclatures of Frost (2024) and Uetz *et al.* (2025) were used for amphibians and reptiles respectively.

Observations were recorded in an Excel database containing the following information: site number, time (start and end), date, GPS (start and end), conservation status, photos of the habitat, number of individuals, number of species, habitat type, IUCN status, national protection status, number of collectors and Latin names.



Photograph 2 : Inventory of amphibians and reptiles in the study area

2.2.2.2.5. Inventory of medium and large mammals

The mammal inventory covers terrestrial mammals weighing more than one kilogram, as well as squirrels, which are easy to observe.

Given the surface area to be covered by this study, the methodological approach is based on a combination of two methods in order to optimise and refine the results. These methods include surveys of people in the study area and reconnaissance walks (recce) to collect evidence of presence.

- **Surveys of communities in the study area**

Individual surveys and focus groups were conducted with local hunters and citizens with a good knowledge of wildlife in general and primates in particular. A questionnaire was drawn up for this purpose using the ONA/ODK tool form. Other sections of the questionnaire were devoted to the anthropogenic threats to these animals and the interest of wildlife for this community.

- **Reconnaissance walks (recce)**

The mammal inventory was carried out using a walking survey method known as *recce* (White & Edwards 2000). Field observations were made by walking along tracks, searching the entire study area, in particular forest galleries, the montane forest of the Kounkono massif and forest islands likely to provide a habitat for mammalian fauna, and finally along watercourses used as watering places and refuges for certain species. In particular, the team looked for signs of presence (grazing marks, food remains, footprints, diggings, chewing, tracks and droppings), animal vocalisations, their movements and nests, and noted all direct observations and identified the threats to their habitats (bush fires, felled trees, charring, grazing by oxen, planting and clearing). Each indication of the presence of these animals was recorded and geo-referenced using a GPS, along with a description of the habitat, using White's (1983) classification as a reference.

A form in the Survey123 application was used to record the categories of sightings, the number, the evidence (signs of presence), the age of the sign, the habitat and the geolocation of the sighting. The database also includes the taxonomy of the species, their national protection status and their international conservation status (IUCN).

2.2.3. Human environment data collection and analysis

2.2.3.1. Main objectives

To carry out this ESIA, the team used various data collection and analysis methods.

This data collection made it possible to provide a vision of the local socio-economic situation in the project area, to gather the fears, expectations and opinions of stakeholders about the project, to establish a baseline for monitoring socio-economic indicators and to propose monitoring tools to measure impacts during the various phases of the project, through the description of:

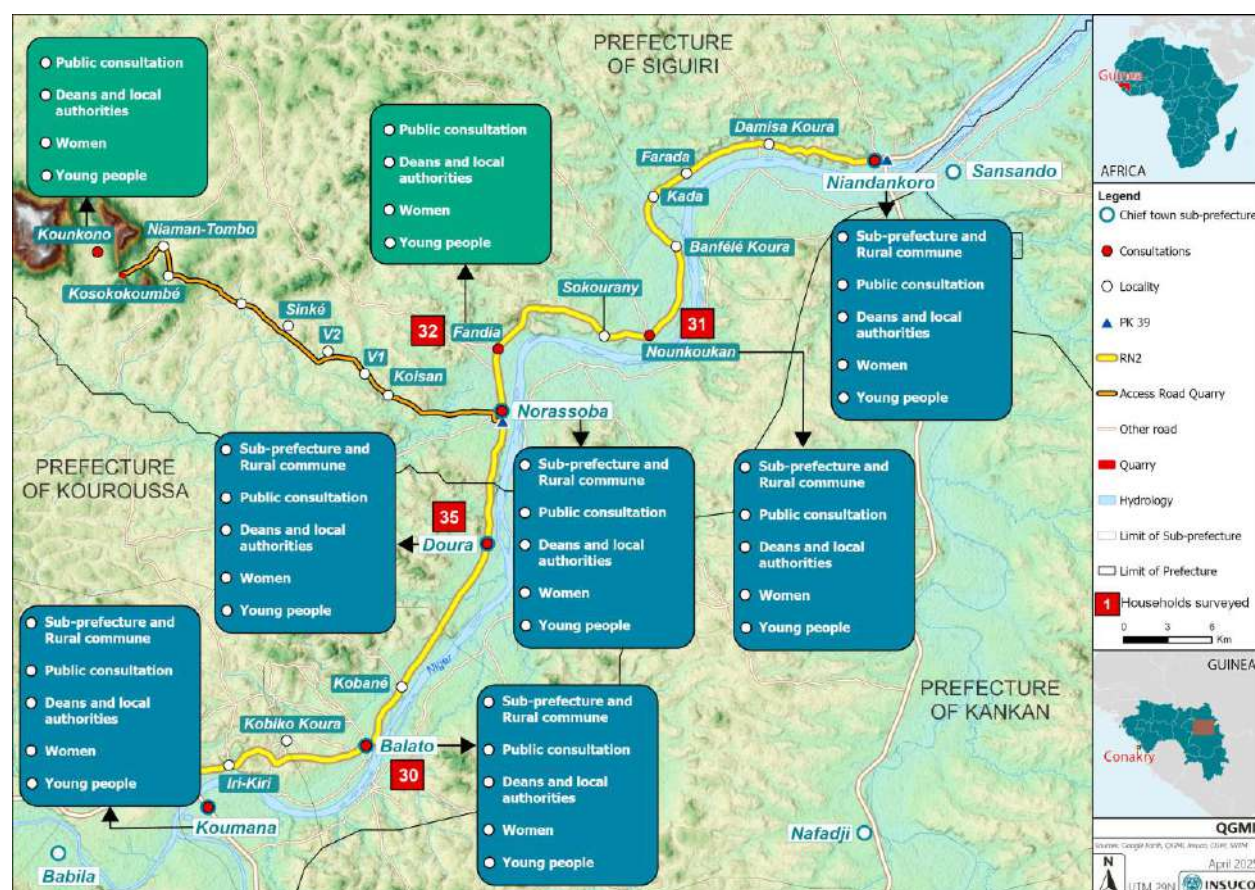
- Demographics and population characteristics of the study area;
- The administrative structure of the area and the principles of state and customary governance that govern it;
- The general socio-economic context of the area: income structure and subsistence strategies;
- The level of well-being and access to services: survey of educational, health, sports and cultural infrastructures, access to water and energy;
- The context of the cultural and historical heritage of the settlement, which is necessary for a clear understanding of local socio-cultural and cultural dynamics;
- The fears and expectations of the stakeholders we met and their perception of the potential positive and negative impacts of the project.

The variety of data collection tools mobilised for the human component of this study made it possible to cover all the population centres included in the Project's zone of indirect influence.

Given the length of the study area (85 km) and in order to establish a sufficiently detailed socio-economic profile of the local populations and optimise data collection, the decision was made to carry out case studies along the route. These case studies provided a picture of the major socio-agroecological zones crossed by the project and their main issues.

The map below (

Map 1) details the administrative situation of each of the 8 localities and enables them to be located.



Map 1: Location of localities along the study area and information relating to the collection of social data (consultations and number of household surveys), Source: Insuco, 2025

Quantitative studies

The quantitative studies were based on data collection through the administration of 4 surveys:

- A socio-economic household survey
- A survey of local prices relating to these dimensions:
 - Food and cash crops (starch crops, vegetables and plantations); Livestock
 - Livestock ;
 - Hunting resources.
- An exhaustive inventory survey of the basic infrastructure to which local communities in the zone of indirect influence have access;
- An inventory survey of cultural heritage sites (sacred sites, cultural sites, etc.) located in the zone of indirect influence.

The data collected using these 4 forms was put into perspective with the qualitative studies (see section "2.2.3.8 "). The survey forms are available in appendix 3.

2.2.3.2. Contextualisation surveys

The purpose of these surveys is to gather the preliminary information needed to design a socio-economic survey questionnaire tailored to the economic strategies of the populations studied, i.e. one that does not omit any important economic activity and optimises data collection (for example by listing local units, or by not asking for redundant data such as the price of equipment). Contextualisation surveys also make it possible to identify problems specific to the study area and to test hypotheses through the socio-economic survey (for example, adapting questions relating to the collection of non-timber forest products (NTFPs) or to manual or semi-mechanised gold panning.

These adjustments were made with the survey teams at the start of the mission.

2.2.3.3. Sampling for the socio-economic household surveys

The socio-economic surveys were carried out in 128 households. In order to optimise the logistics of the survey and the mobilisation of the local authorities² (see [Table7](#)), which shows the stakeholders in the localities concerned by each of the quantitative and qualitative data collection tools), it was decided to target 4 localities and to carry out around 30 surveys in each. Each of the 4 localities was chosen so that these socio-economic household surveys would be spread out along the project's zone of indirect influence and within localities with varied demographics. The households to be surveyed in the target localities were selected at random in order to achieve a diversity of socio-economic profiles.

[Table7](#) details the distribution of household surveys within each selected locality.

Table7 : Breakdown of household surveys by selected locality

Sub-prefecture	Sub-prefecture/ Rural commune	District	Sectors affected by the project's zone of indirect influence	Number of household surveys conducted
Kouroussa	Koumana	Koumana 1	Iri-Kiri	30
	Balato	Balato	Balato	
		Kobané	Kobiko Koura	
	Doura	Doura 1	Kobané	35
		Doura 2	Doura 1	
		Doura 3	Doura 2	
Sigui	Norassoba	Nankoroma 1 (Norassoba)	Doura 3	
			Nankoroma 1	

² It was in fact more appropriate to mobilise the local authorities of 4 localities to carry out 4 times 30 socio-economic household surveys rather than, for example, mobilising the local authorities of 8 localities to carry out 8 times 15 socio-economic household surveys.

Sub-prefecture	Sub-prefecture/ Rural commune	District	Sectors affected by the project's zone of indirect influence	Number of household surveys conducted
		Nankoroma 2 (Norassoba)	Nankoroma 2	
		Nanatraore 1 (Norassoba)	Nanatraoré 1	
		Nanatraore 2 (Norassoba)	Nanatraoré 2	
		Fandia 1	Fandia 1	
		Fandia 2	Fandia 2	32
		Koisan	Koisan (Koyaisan) ³	
		Fadou	Fadou ³	
		Kosokokoumbé	³	
		Niaman-Tombo	3	
		Koukoro	Koukono ⁴	
		Sokourany	Sokourany	
			Nounkounkan 1	
	Nounkounkan	Nounkounkan	Nounkounkan 2	31
			Nounkounkan 3	
		Banfélé Koura	Banfélé Koura 1	
			Banfélé Koura 2	
		Kada	Kada	
		Farada	Farada	
	Niandankoro	Damsakoura	Damsakoura	
		Niandankoro 1	Niandankoro 1	
		Niandankoro 2	Niandankoro 2	
		Total		128

2.2.3.3.1. Structure of the socio-economic survey questionnaire and key concepts

The main objective of the socio-economic household survey (household survey) is to analyse the demographic dimensions, economic strategies, income and living conditions of households. Table 8 below sets out the main socio-economic dimensions studied in the household surveys conducted in the study localities.

Table 8 : Main socio-economic dimensions studied as part of the socio-economic surveys in the study area

Socio-economic dimensions studied	Analysis objectives
1. Demography	Quantify and characterise the population in terms of age, gender and geographical origin.
2. Economic activities	Characterise the economic strategies implemented by households and assess their level of income as well as the different resources cultivated/harvested.
3. Health	Characterise the use of healthcare services by individuals and the main public health problems.
4. Education	Characterise the level of education and literacy of the population

³ Concerned by the access track to the Koukono quarry

⁴ Affected by the access track and the Koukono quarry

Socio-economic dimensions studied	Analysis objectives
5. Housing	Characterise the housing of households and their access to domestic energy.
6. Household durables	Assess the capacity of households to capitalise in order to invest in durable goods
7. Access to basic services	Characterise households in terms of access to water, electricity and amenities.
8. Finances	Analyse financial flows into and out of households, as well as their indebtedness.
9. Expenditure	Assessing households' standard of living by analysing their expenditure items
10. Gender perspectives	Analysing respondents' perceptions of gender issues Note that all data at household member level can be disaggregated by gender, age or ethnic origin if the analysis proves relevant.
11. Knowledge of the project	To assess households' knowledge of the RN 32 construction project and gather their views on their desired involvement in the project.

The questionnaires were coded into digital forms and administered via the ONA-GeoODK™ mobile data collection system. A test phase was carried out before the survey began in order to validate them.

The key concepts used in the socio-economic analysis are defined below.

- **Statistical unit:** "A statistical unit is a unit of observation or measurement for which data are collected or derived. The statistical unit is therefore the basic element for compiling and tabulating statistical data. It is important to specify the statistical unit when publishing results: for example, the percentage of individuals belonging to four-person households does not have the same meaning as the percentage of four-person households. An important feature of the statistical unit is that it relates to the *output* side of the statistical process; it is the building block for calculating statistical aggregates. The statistical unit can be distinct from the collection unit: for example, information can be collected on the statistical unit of *employees* by selecting a sample of establishments and recovering the information sought on all or some of the employees working in these establishments"^{5(.}

In the case of our study, the collection unit used was the household, and the results thus aggregated made it possible to carry out an analysis according to a scale of nine statistical units:

- **The household:** this is the statistical unit used for the socio-economic analysis of the population, particularly for quantifying income. It is an economic unit made up of different individuals sharing the same roof and the same meals, who recognise the authority of one and the same person: the head of household (HH). A household is not the same as a family: only those who live in the household for more than 6 months of the year are considered to be members in their own right. What's more, some of these members may have no family ties with the head of household. They may be children in the care of the head of household or adults who are not related to the head of household;
- **The head of household (HH):** this is the person who runs the household. It may be a man or a woman. He or she is designated by the people interviewed, who recognise his or her authority. Generally speaking, he or she is responsible for managing the household's overall income and expenditure. This statistical unit is used in particular to analyse population migration;

⁵<https://www.insee.fr/fr/metadonnees/definition/c1528>

- **Household member:** this is an individual who is part of the household other than the HH. This may be a child or an adult whose link with the HH will always be established. This statistical unit is mainly used in the analysis to understand the composition of households;
- **The individual:** this statistical unit includes both HHs and household members. It is particularly useful for demographic analysis of the population;
- **The Consumption Unit (CU):** this statistical unit is used in the analysis of household income and expenditure to assess their standard of living. It takes into account the economies of scale achieved by a household according to its composition. In this document, the Oxford equivalence scale is used, with the following equivalences:
 - i. The first adult in the household: 1 CU ;
 - ii. Additional adult: 0.7 CU;
 - iii. Child under 14: 0.5 CU.

Other concepts are also used:

- **The singleton:** this is a particular configuration of the household, when it is made up of a single member, the HH;
- **Temporality of investigation:** the questions asked of households about their economic activities and income covered the 12 months preceding the survey;
- **Working population:** working population refers to the entire population of working age;
- **Economic activity:** an economic activity corresponds to any activity carried out by an individual in the household that enables that person to meet his or her needs. This category includes activities in the primary sector, such as agriculture, fishing and NTFP collection, as well as activities in the secondary and tertiary sectors. These activities can be characterised in two ways, for the primary sector, according to their main objective;
- **Food-producing economic activity:** an economic activity is said to be food-producing when most of its production is intended for household consumption. In the case of agriculture, some agricultural products may be intended for household consumption and others for sale;
- **Cash crops:** these are products that are mainly intended for sale.

2.2.3.4. Survey administration

The fieldwork took place from 14 April 2025 to 15 May 2025, during which time the authorities were met, consultations were held, and qualitative and quantitative socio-economic surveys were carried out. The quantitative socio-economic surveys were conducted between 18 and 22 April 2025.

The surveys, which lasted between 45 and 90 minutes, were conducted in households' homes. Interviewers were instructed to note down important information in their notebooks (locality, identity of the head of household and household composition), as well as any data about which there was any doubt and any calculations made (agricultural production, for example).

The main errors and difficulties encountered by the interviewers were shared with the team on a daily basis during the debriefing at the end of the day, and adjustments were made if necessary to the schedule or to the way in which the surveys were administered.



Photograph 3 : Household survey, Source: Insuco, 2025

2.2.3.5. Additional surveys

Three other surveys were carried out during the fieldwork:

- A survey to collect local prices for agricultural, livestock and game production, making it possible to estimate the monetary and non-monetary income earned by households (cross-referenced with the household survey);
- An exhaustive inventory survey of the basic infrastructure to which local communities in the zone of indirect influence have access;
- A survey of cultural heritage sites (sacred sites, cultural sites, etc.) located in the zone of indirect influence.

2.2.3.6. Quality control of the data collected

A check was carried out by the team coordinator after each day's survey to ensure that any missing data could be easily repeated with the respondents the following day. In the event of missing or questionable data, the interviewer had to recover the corresponding data on the following day as a matter of priority. Once this initial validation and any corrections had been made, the surveys were frequently sent to the ONA platform. The head of mission would then carry out a second check directly on the export in the form of an Excel™ database.

2.2.3.7. Data processing and analysis

Quantitative data processing (tables and graphs) was carried out on Excel™ and Anaconda™ software from databases (DB) extracted from the ONA server.

These were first cleaned, with outliers identified and replaced by averages where possible.

2.2.3.8. Qualitative studies

Carrying out a socio-economic baseline study (SBS, see chapter 6.3) requires the use of quantitative and qualitative tools in order to analyse the social, cultural and economic realities and dynamics of the populations present in the zone of indirect influence.

The use of qualitative studies covers various fundamental aspects in order to capture these realities.

These qualitative studies were carried out via :

- Group semi-directive interviews with stakeholders at prefectural level (prefect and deconcentrated technical services) and sub-prefectural level (sub-prefect and communal team);
- Focus groups with groups representing local communities in the areas concerned (elders and local authorities; women; young people);
- Public consultations to provide information on the project and to gather the fears and expectations of local communities. These public consultations were preceded by and combined with radio announcements on rural radio stations in the 2 prefectures concerned (Kouroussa and Siguiri, in Malinké and French, 4 times a week for a fortnight in each prefecture) presenting the project, its partners, the ESIA mission and its objectives. This enabled information about the project and the ESIA to be disseminated even in sparsely populated areas that had not been consulted.

The

Map 1 gives an account of the stakeholders in the localities concerned by each of the quantitative and qualitative collection tools.

In all, 8 major localities were studied and consulted in the study areas.

The interview guides can be found in Appendix 4.

■ Main income-generating activities

Alongside the household survey, qualitative data was collected on the various economic sectors in the area, such as agriculture, gold panning, livestock farming, fishing and hunting. Each economic sector is explained so that the data obtained from the household surveys can be accurately interpreted.

■ Access to basic services and challenges

Qualitative data on access to basic services and the issues involved were collected in order to analyse the statistical data on the level of access enjoyed by residents in the area. This data is needed to monitor changes in the population's situation, particularly in terms of isolation, transport methods and the marketing of local products (agricultural, NTFPs, services, etc.).

■ Gendered division of domestic tasks

Qualitative data was collected to identify the main activity of household members according to gender and to analyse the differences in sources of income, which are more or less gendered.

■ Migration among young people

It is important to collect data on the phenomenon of youth migration in order to understand demographic dynamics. This phenomenon has a cross-cutting impact on other issues such as employment.

■ Identification of community infrastructure in the immediate vicinity of each study area

The aim of this sub-study is to draw up a picture of the community infrastructure (schools, electrification, healthcare facilities, etc.) available to the local communities concerned by the case studies and the main challenges they face. The typology of infrastructure inventoried is presented in the table below (*Table9*).

Table9 : Types of outstanding infrastructure studied

Types of infrastructure
Educational (school, training centre, etc.)
Health (health post, pharmacy, etc.)
Water and sanitation (boreholes, wells, springs, communal latrines, etc.)
Access to electricity (generator, solar panels for street lighting, etc.)

■ Local governance systems and settlement history

It is important to have a clear understanding of the institutional hierarchy and the roles and responsibilities of all the administrative stakeholders. In rural Guinea, traditional power is deeply entrenched, particularly at the local level (villages with duti and sotikémo) and meso-local level (sub-prefecture/district). The actors who exercise some form of authority have therefore been identified and their respective involvement in traditional management has been described.

■ Structure of customary land management

To gain a full understanding of the land tenure situation at each site, data was collected on the types of land occupation, the legal status of individuals on the sites and their administrative and customary affiliations.

■ Historical and cultural heritage

The aim of this component is to present a typology of the different cultural heritage sites present in the vicinity of the localities studied and in the zone of indirect influence. By cultural heritage site we mean all the places that form part of the cultural identity of the populations, whether on the scale of a locality, a lineage or an individual. In this category we find elements that belong to ancestral beliefs and customs, such as sacred groves, genie sites, historical settlement sites (fortresses, walls, etc.) and isolated cemeteries and tombs.

2.2.3.9. Team training

The team of 8 surveyors was recruited locally to carry out the field surveys.

The interviewers were given two days' training beforehand. This training, given by the team coordinator, covered the following points:

- The objectives and methods of the study and its various sub-studies;
- The study's communication plan and good ethical practice;
- Getting to grips with smartphones and the ODK™ application for administering questionnaires;

- Getting to grips with the socio-economic questionnaire, which at the same time allowed it to be reviewed, tested and amended. This test was carried out by means of a simulation between the interviewers in pairs during the training. The interviewers' feedback on the survey forms was then incorporated into the processing plan to finalise the questionnaire.

The team's fieldwork equipment consisted of :

- Laptops for the survey team coordinator and the experts;
- Smartphones configured with the ODK™ forms administration application and the SWMaps™ GIS data management and geolocation application;
- Office equipment: notebooks, pens, flipchart, felt-tip pens, blank attendance sheets for consultations, etc.

2.2.3.10. Consultation with stakeholders

Consultations were held with the main stakeholders concerned by the project at prefectoral, sub-prefectoral and certain district/sector levels:

- Decentralised administrative authorities;
- Decentralised administrative authorities
- Local customary authorities;
- Local communities and their representatives
- Economic operators.

These consultations dealt with various themes:

- Stakeholder engagement:
 - i. Knowledge of the project ;
 - ii. Desired modes of engagement;
 - iii. Expectations and concerns;
 - iv. Recommendations for setting up the complaints management mechanism (MGP);
 - v. Locally written and spoken languages;
 - vi. Identification of key stakeholders.
- Identification of potential impacts:
 - i. Positive and negative impacts during the construction phase;
 - ii. Positive and negative impacts during the operating phase.
- Recommendations relating to vulnerable groups;
- Issues relating to access to public services in the study area, including housing for project workers;
- Historical and land tenure situation in the study area;
- Income-generating activities (IGAs) and their specific challenges;
- Specific issues relating to gender and migration;
- Cultural heritage sites.



Photograph 4 : Public consultation in the rural commune of Nounkounkan, Source: Insuco, 2025

2.2.3.11. Study biases

Although the methodology developed aims to minimise the study's biases, these are inherent in socio-economic studies and stakeholder consultations. They may be linked to the survey or sampling method, to the seasonality of activities in relation to the survey period, or to households' perception of the survey or consultation objectives and of any tendency to influence them in their favour. This section presents the main biases identified.

The length of the road, its condition and the large number of settlements spread along its length meant that it was not possible **to reach all the local communities in the zone of indirect influence exhaustively for the purposes of collecting the social baseline data, measuring the impacts and gathering the fears and expectations of the stakeholders** (see

Map 1 detailing the stakeholders in the localities concerned by the various data collection tools). However, Insuco limited this bias by adapting the data collection methodology.

The Insuco team limited this bias:

- Firstly, by organising public consultations and stakeholder consultations (collective semi-structured interviews and focus groups) in all the sub-prefectures in the zone of indirect influence as well as in additional districts and sectors, which enabled an in-depth analysis while tending towards exhaustiveness.

- Opting for an exhaustive inventory of the basic infrastructure (basic services) to which local communities in the zone of indirect influence have access.
- By broadcasting radio announcements on rural radio stations in the 2 prefectures concerned (in Malinké and French, 4 times a week for a fortnight in each prefecture), making it possible to disseminate information on the project, its partners, the ESIA mission and its objectives on a large scale and on a recurring basis, and thus to serve as a means of amplifying the public consultations.
- But also by making the representatives of the local communities consulted and the participants in the public consultations aware of the need to disseminate the information to which they had access during their discussions with the Insuco teams. This made it possible to gain a better understanding of the socio-environmental situation and issues in each of the areas targeted by the study, and to communicate about the project on a large scale, reaching a large number of people.

The main biases associated with stakeholder consultations are **social censorship**, **social desirability bias** and **non-response bias**. In fact, during consultations attended by several people of different ages, genders, origins or socio-economic status, each speaker's opinion is subject to the scrutiny of the assembly and can therefore be adjusted according to the other people in the room, and in particular the consultation moderators (in fact, the members of the field mission team were mostly men). Social desirability bias is characterised by the tendency of individuals to give socially desirable answers. Thus, stakeholders questioned about potential negative impacts might tend to minimise the negative impacts for which they might also be responsible, and to emphasise the positive impacts for which they are responsible and the negative impacts of another category of people. Non-response bias is linked to the lack of representation of certain groups in the consultations, resulting in an under-representation of their opinions and the issues related to them.

The Insuco team limited this bias by :

- Systematically organising separate focus groups and collective semi-directive interviews between the different stakeholder groups, including women, men, young people, sub-prefectoral and prefectural authorities, etc. It should be noted, however, that at many of the consultations, certain communal or sub-prefectoral authorities remained close to the discussion groups that were being held at the time;
- Reassuring participants from the outset of group semi-structured interviews or discussion groups, and inviting them to express themselves as freely and naturally as possible, emphasising that all opinions are valid;
- Encouraging triangulation of the data collected between the different sources consulted (stakeholder consultations, bibliography and expert opinion).

Given that few farmers, fishermen, hunters or traders record their production/gross income or expenditure in writing, the data collected is based on their memory, which is influenced by the perception of the study's objectives and how the household's answers may influence its results. It is likely that the actors interviewed **tended to overestimate losses and/or underestimate their production/benefits**, either consciously because they hope for help in the area that concerns them, or unconsciously. The incomes calculated should therefore be treated with a degree of caution, as they are probably underestimated or overestimated, particularly for agricultural production that was badly affected by the floods of the 2024 rainy season in the region and elsewhere in Guinea and West Africa.

The household survey period in the study area coincided with the manual and semi-mechanised gold panning season. As a result, **the availability of members of households** involved in this activity was relatively lower than for other households. This income-generating activity (IGA) is probably less represented than other IGAs that are less dependent on seasonality. To limit this bias, the team collected data on this activity using qualitative collection tools in order to triangulate and put into perspective the data collected in the household surveys.

Obtaining reliable data on **activities declared to be illicit or socially unimportant** by households is often a challenge, and the study area is no exception. The socio-economic survey questionnaires covered all household income, including that derived from activities declared to be illicit or morally reprehensible in the

local context, which biased the responses of certain stakeholders, such as gold panning, charcoal burning or artisanal timber exploitation. Several strategies were used to limit this bias:

- Additional questions were added to the socio-economic surveys to explicitly confirm whether or not the household was involved in charcoal production;
- Interviewers were trained to explain at the start of the survey that the aim of the study was not to identify people engaged in activities that had been declared illegal or morally reprehensible, or to provide information to the institutions responsible for regulating these activities;
- The qualitative data collection tools also made it possible to limit this bias by collecting first-hand data during semi-directive interviews with key informants and notables in the localities under study.

Even so, it is difficult to estimate how many of the households surveyed failed to mention their gold panning, charcoal burning or artisanal timber harvesting activities, either for fear of reprisals or out of shame. It was often difficult to determine whether households reporting low incomes were decapitalising or hiding additional sources of income. The results of the socio-economic survey must therefore be treated with some caution, as failure to include this income necessarily underestimates overall household income, and under-represents these activities in the economic strategies of households in the study areas.

The episodes of **intense flooding between July and September 2024 throughout the project's zone of indirect influence caused enormous damage to both agricultural crops** and residential areas. Data on declared agricultural crops and their yields over the twelve months preceding the household survey (the generic time step used for data collection in this type of survey) are therefore analysed in the light of these extreme climatic events.

Fruit production (mangoes, avocados and citrus fruits) in the study areas is very limited and is characterised mainly by **self-consumption of fruit** produced by a few vines in residential and agricultural plots. As a result, the production of fruit species (whether self-consumed or not) was severely under-represented in the surveys, with survey respondents believing that this predominantly non-cash income is negligible in relation to their overall household income.

Questions relating to the ownership (as an individual or lineage owner) and leasing of agricultural plots were only asked of households declaring that they farmed. One possible bias is **the absence of data for households that own agricultural land but do not themselves practise farming**. However, this bias should be minimised given that the probability of a household owning agricultural land but not practising agriculture is limited.

2.2.4. Study areas

2.2.4.1. Main study area

For the purposes of assessing the social and environmental risks and impacts of the project, the right-of-way area includes the right-of-way of the permanent components of the project as well as the physical extent of the proposed works. It is defined as follows:

- Preparation and construction phase:
 - A 30-metre corridor mainly along the road in unpopulated areas (15 metres on each side from the centre of the road), including the construction site areas for the 7 bridges to be rehabilitated and the 2 toll stations at the ends of the project route (KP 1+500 and KP 81+000);
 - A 15-metre corridor mainly along the road in populated areas (7.5 metres on each side from the centre of the road). QGMI defines the right-of-way required for the construction work according to the technical needs of the project, currently set at a corridor of between 15-30 m (subject to local adjustment following topographical studies). Although this definition does not require any formal agreement with the authorities, discussions may take place concerning the definitive right-of-way (RoW) during the operational phase. In

- addition, certain ad hoc adjustments to construction or demolition activities in inhabited areas may be considered in order to limit the impact of physical and economic relocation;
 - Buildings and parking areas for each of the two toll plazas that will be located at the ends of the project route, with a total surface area of 15,000 m² ;
 - A 7-metre corridor, mainly along the 32 km access track to the Koukono quarry (3.5 metres on each side from the centre of the track);
 - Granite quarry with a projected surface area of 3.5 ha;
 - Aggregate borrow pits, the size and number of which have not yet been defined at the time of the study, but there will be at least 3 in order to minimise transport costs. Three borrow pits are located at KP 1+800, KP 47+600 and KP 53+100 respectively;
 - A 20,000-square-metre living base, which at the time of the study was planned to be located at KP 42+000, between Norassoba and Fandia, in the sub-prefecture of Norassoba, in the prefecture of Siguiri.
- In the operational phase :
 - Corridor of 40 metres along the road (20 metres on each side from the centre of the road), including the 7 bridges and 2 toll stations at the ends of the project route (PK 1+500 and PK 81+000). This corridor enables the relevant authority to carry out its maintenance and upkeep duties on the road, including the carriageway and all ancillary facilities (shoulders, pavements, gutters, embankments, cuttings, side access roads, etc.). Article 10 of Law L/2016/074/AN on the protection of the Republic of Guinea's national road heritage stipulates that "unless otherwise provided for in construction plans in general, and in town crossings, in duly approved subdivision or development plans, the right-of-way width of "classified" national roads is set at a minimum of 40 metres, with the right-of-way extending on either side of the road axis to a minimum distance of 20 metres from the latter. The crossing of a town by a trunk road is an integral part of that road and remains subject to the same status. At the time of writing, following a request from Insuco-Oryx, QGMI has applied to the authorities to validate this derogation ;
 - Buildings and parking areas for each of the two toll plazas that will be located at the ends of the project route, with a surface area of 15,000 m².

It should be noted that once the final design has been completed and the specific topographical study completed, certain smaller sections may have to be added to the right-of-way area to make way for excavations or embankments, as required by the topography.

2.2.4.2. Secondary study area

■ Zone of indirect influence of the project on the human environment

With regard to the human environment, the Project's indirect area of influence can be considered to include all of the geographical areas that will benefit from the construction of the RN 32 once the Project is implemented. However, choosing this area of indirect influence would have a negative impact on the future ESIA, as this area would be over-proportional compared to the area of indirect influence of the negative impacts of the Project. In fact, this Project will have positive impacts on the socio-economic development not only of the entire Kankan administrative region but also of Guinea as a whole and neighbouring countries, particularly Mali. The scale of the study would then be too broad and would significantly limit the depth of the analysis of negative impacts. For this reason, the zone of indirect influence has been defined without taking into account all the positive impacts on socio-economic development⁶.

Depending on the project's potential impact on the human environment, such as traffic disruption, dust emissions or social tensions in recruitment, the zone of indirect influence will be characterised by a buffer zone of 250 metres on either side of the route and its ancillary infrastructure (base camp, quarry, etc.).

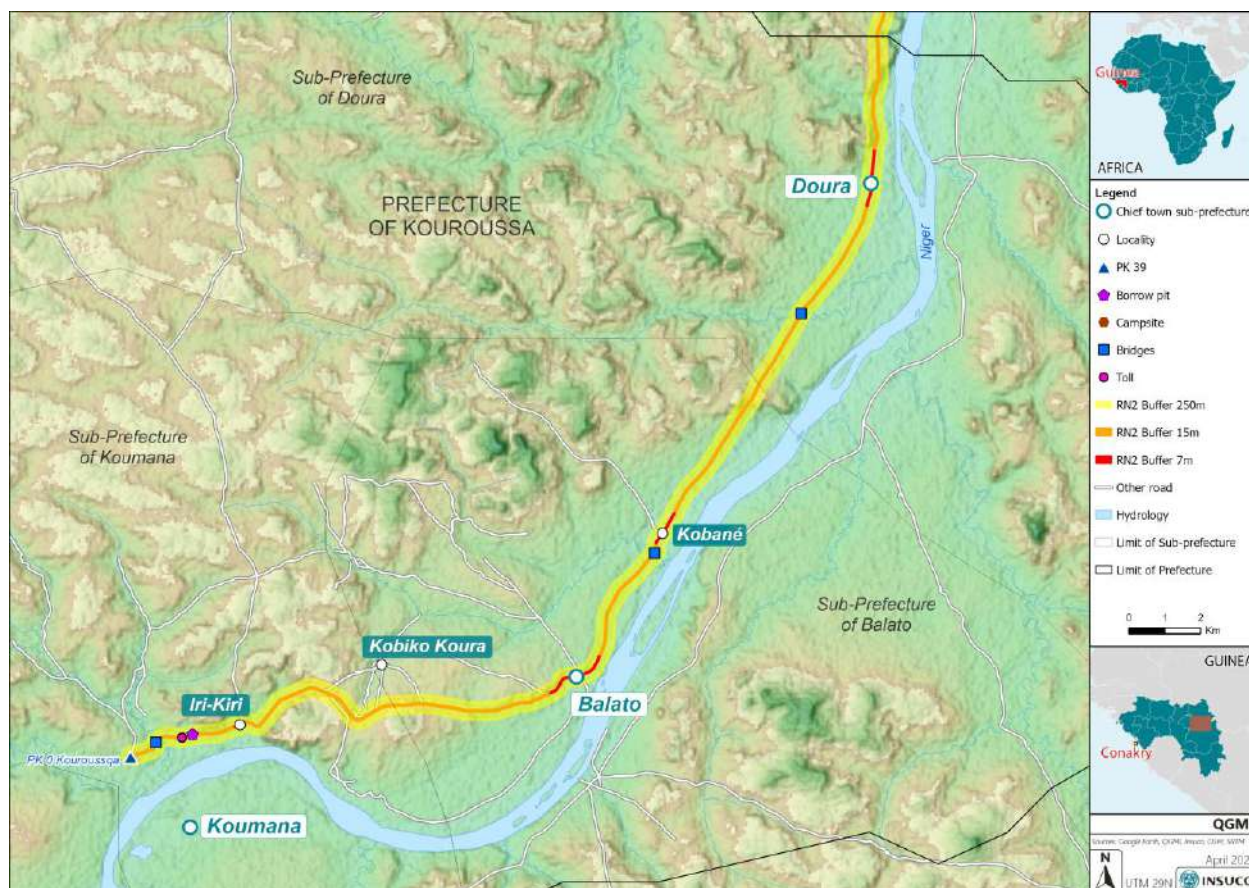
The following maps Map 2, Map 3, Map 4, Map 5 illustrate the right-of-way areas for the preparation and construction phases and the associated zones of indirect influence.

⁶ This does not mean that this impact will not be measured.

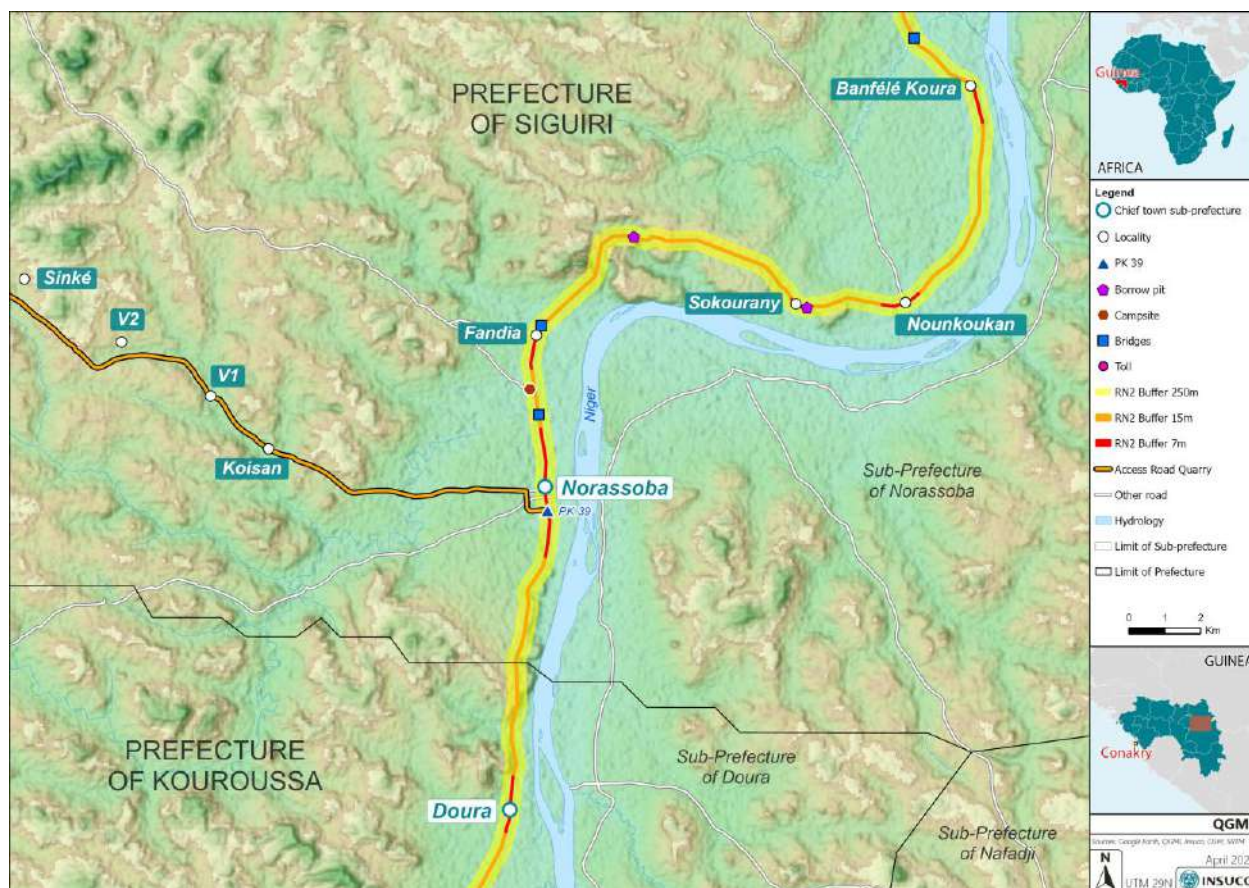
■ Indirect zone of influence of the project on the biophysical environment

On the basis of previous similar studies and the dimensions of the project, it has been decided that the zone of indirect influence for biodiversity inventories and monitoring of physical environment parameters will extend for 500 m in a north-westerly direction along the footprint. On the other side of the project route, the zone of indirect influence will also be 500m wide, except where the distance between the road tracks and the River Niger is less than 500m. In these sections, the zone of indirect influence will be limited to the middle of the bed of the River Niger.

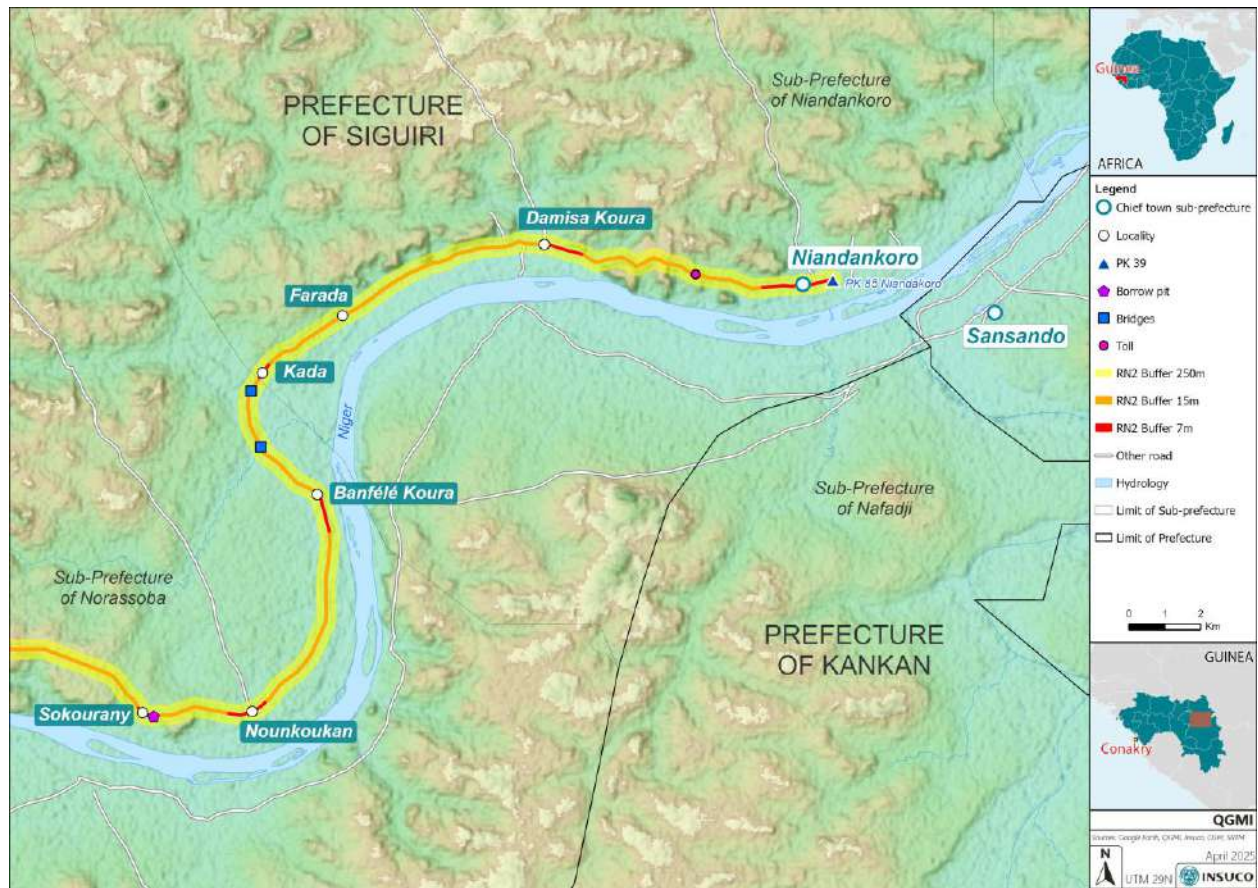
Due to the suspected presence of western chimpanzees in the project area, a special survey zone for this species will extend up to 17 km north-west of the project route. This measure is based on the results of a study of the impacts of roads on this species in Guinea (Andrasi et al. 2021).



Map 2: Location of the first section of the road (PK0) and the 500m study zone.



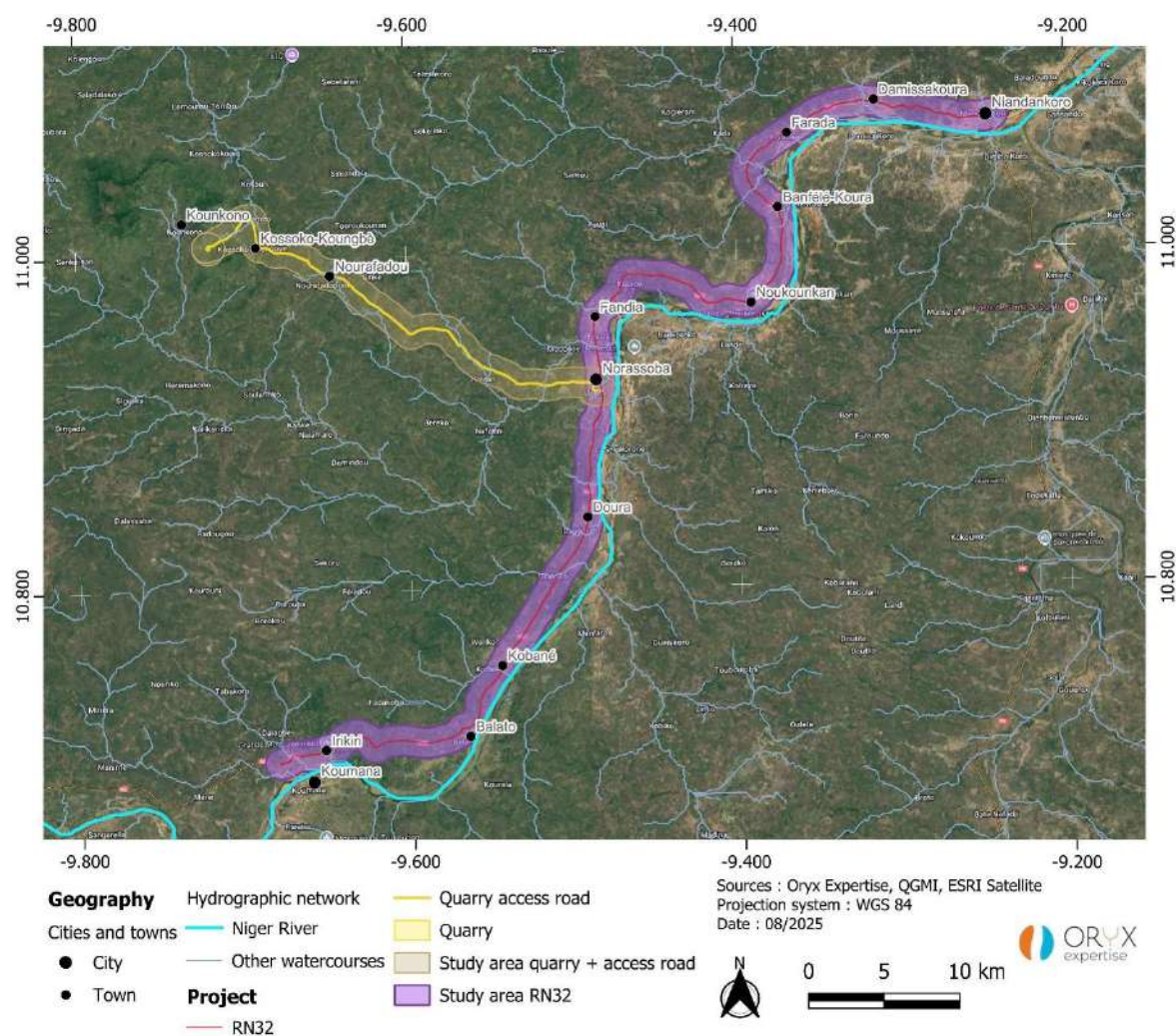
Map 3: Location of the second section of the study zone (PK 39), Source: Insuco, 2025



Map 4: Location of the third section of the study zone (PK85), Source: Insuco, 2025



Map 5: Location of the selected quarry, Kounkono and its access track, and the study area, Source: Insuco, 2025



Map 6 : Study area for the physical and biological environment, Source : Oryx, 2025

3. Detailed description of the project

3.1. Introduction

This section describes the project and provides an overview of the main elements and activities associated with the planned construction and operation. At present, the road will remain operational for the foreseeable future due to the beneficial nature of the project. The decommissioning phase has therefore not been considered.

QGMI (promoter) was engaged as EPC (engineering, procurement and construction) to undertake the development of the RN 32 road construction project in Guinea (hereafter referred to as "the project"). The contract has been awarded by the Ministry of Infrastructure and Public Works of the Republic of Guinea (MITP). The borrower will be the Ministry of Economy and Finance of Guinea (MEF), while AGEROUTE (Agence de Gestion des Routes de Guinée) will be the government entity responsible for the operation and maintenance of the road.

The project aims to upgrade 85 km of the existing unpaved RN 32, improving the link between Kouroussa and Niandakoro, in the prefectures of Kouroussa and Siguiri respectively (Map 7)

Road infrastructure in Guinea comprises a mixture of paved and unpaved roads, with many areas of the country currently unpaved, making the road transport system slow and too costly for the population. Unpaved roads can pose road safety problems for citizens, increase the risk of flooding during the rainy season and reduce air quality due to dust generation.

This is why the Guinean government has sought to develop several programmes to extend and improve the country's road network and infrastructure, with the aim of supporting growth through Vision 2040 for an emerging and prosperous Guinea and the Interim Reference Programme (PRI 2022-2025).⁷

3.2. Project promoter

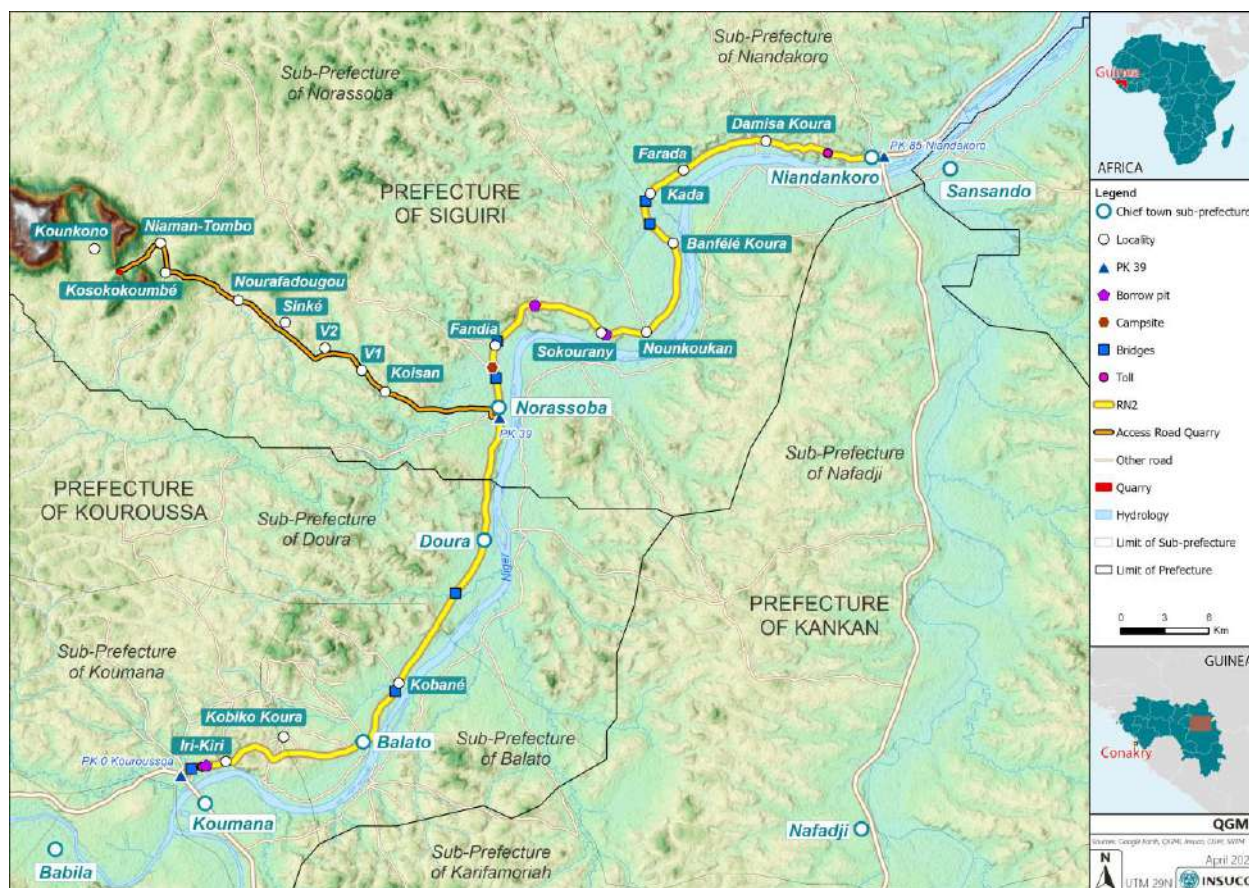
The Ministry of Infrastructure and Public Works of the Republic of Guinea is the project promoter. To carry out the project, the Ministry has recruited an EPC (Engineering, Procurement and Construction) contractor.

The EPC contractor in charge of the project is QGMI, an international group specialising in the development, procurement, structuring and implementation of construction projects. QGMI has the capacity to implement complex projects, taking responsibility for all the activities involved, from design through procurement and construction to commissioning and turnkey delivery. QGMI's largest market is Africa, with a significant portfolio of projects and opportunities in recent years. The types of projects developed by QGMI in Africa include roads, transport and mobility, energy, water and sanitation, and buildings. One of the countries where QGMI plans to carry out projects is the Republic of Guinea, and this project is one of them.

3.3. Project location

The Map 7 shows the location of the project components whose location was known at the time of writing.

⁷ faolex.fao.org/docs/pdf/gui215096.pdf



3.4. Technical characteristics of the project

3.4.1. Current state of the road

The RN 32, established between Koumana and Niandankoro, is a major artery in the Guinean road network. It allows Siguiri to be reached from Kouroussa without passing through Kankan. The RN 32 also includes hydraulic and drainage structures, as well as 7 bridges. In the dry season, the journey takes around 3 hours, while in the rainy season, the road becomes almost impassable and the journey time, several hours, is difficult to estimate.

The RN 32 is currently in an advanced state of disrepair. It is an earth road with an average width of 9 metres, with gravelly lateritic soils and compacted soils of fine clayey sand, which have been badly damaged and whose roadworthiness is limited, especially during the rainy season. The road is slightly lower than its immediate surroundings and follows the topography of the land, which has led to water stagnating and running off the road, resulting in the formation of quagmires in sections with low bearing capacity. The most common types of damage to roads are gullying, potholes, subsidence, sloughs and humps.

The existing engineering and hydraulic structures along the road consist of reinforced concrete gutters, metal culverts and reinforced concrete culverts. However, these structures are clogged and no longer meet load capacity and gauge requirements. The road also suffers from a lack of hydraulic structures, which encourages water stagnation on the carriageway and the formation of quagmires.

Lastly, the existing road includes 7 engineering structures, either mixed steel-concrete or entirely concrete. Their poor condition and their unsuitability for the gauge of the future road no longer meet requirements. The feasibility report (APS) presented a brief analysis of these structures, and an examination of all the sites revealed a number of similarities, which are summarised below:

- All the bridges cross a watercourse, including the Djoliba, Komba and Tinkisso rivers;
- All the structures are undersized;
- The riverbeds have very large flood zones;
- Most of the bridges have masonry supports;
- The heights are insufficient, which is a source of flooding;
- The widths do not meet the requirements of the specifications, i.e. the standards of the Economic Community of West African States (ECOWAS);
- Most of the watercourses crossed dry up completely during low-water periods;
- There is a strong need for people to travel throughout the year.

The following photographs illustrate the state of deterioration of the engineering structures and hydraulic structures.



Photograph 5: Degraded surfacing (Source: APS report, 2021)



Photograph 6 Undeveloped and unmaintained verges (Source: APS Report, 2021)



Photograph 7 Old gutter in poor condition (Source: APS Report, 2021)



Photograph 8: Bridge undersized (Source: APS report, 2021)

3.4.2. Scope of works and activities

The main scope of works for the project includes construction works and improvements to RN 32, which will be implemented in accordance with the relevant ECOWAS standards:

- Road widening: the existing road will be widened to accommodate the expected traffic and improve the overall capacity of the road.
- Pavement improvements: The pavement will undergo the necessary improvements to ensure its durability, fluidity and improved driving conditions.
- Drainage infrastructure and bridges: Drainage systems and bridges will be installed and adequately repaired to prevent water stagnation and flooding, and to ensure good water flow along the road.
- Improved junctions: junctions will be improved to improve traffic flow, optimise safety and minimise congestion at intersections.
- Pedestrian facilities (pavements): the project includes the construction of pavements to ensure the mobility and safety of pedestrians in towns and villages.
- Horizontal signage (white paint strips, retroreflective paint and paint on structures) and vertical signage (triangular, circular, indication, direction and location signs), guardrails, concrete markers,

milestones, pedestrian steps and street lighting (in towns and villages for the latter), included in the scope of works to provide clear signage, promote road safety and improve visibility at night.

- Restoration of utility networks: repositioning of utility networks (e.g. water, electricity, fibre optics and telephone lines) in areas impacted by the project.

This work will follow the following process, in coordination with and under the supervision of the relevant State technical services:

■ For the road component

1. Preparatory work: topographical marking, additional geological and geotechnical studies and preparation of the Resettlement Action Plan (RAP);
2. Earthworks to maintain all public and private services affected by the works:
 - a. Marking on the ground of the topographical markers and other fixed points, duly dimensioned and coordinated, serving as a basis for the proper execution of the works.
 - b. Delimitation, with sufficient proximity, of the strips of land along which the construction will be carried out.
 - c. Stripping of the planned excavation boundary to free existing deposits of debris prior to mass excavation.
 - d. Excavation work consisting of the excavation and movement of materials from the natural or modified terrain, in order to prepare an area for the construction or development of infrastructure. These materials may include earth, rock or other elements that need to be removed to adapt the terrain to the requirements of the project. Reusable materials are used for backfilling or levelling, while non-reusable materials are transported to pre-approved landfill sites. These landfill sites must be located in areas that do not harm the environment or neighbouring infrastructures, such as housing or crops. Finally, once the excavation work is complete, appropriate drainage systems are installed to ensure the stability of the excavated land. These systems must be maintained throughout the duration of the project to ensure that they function properly.
 - e. Backfilling, which consists of filling in excavations or voids created during excavation work, in order to re-establish the level of the ground or prepare the soil to ensure a stable base for future constructions. The actual filling is done in successive layers of material, according to project specifications. Each layer is carefully spread over the surface and compacted to ensure the stability of the ground and prevent any future deformation or subsidence. This compaction process is essential to achieve uniform density and a solid base.
Once the backfill layers have been completed, checks can be carried out to ensure that they comply with the project criteria, particularly in terms of compaction and levelling. Adjustments can be made if necessary to guarantee the quality and stability of the soil.
3. A planimetric survey of the sub-bases is carried out to check the topography and make any necessary corrections before the base course is laid.
4. Laying the impregnating/hooks base course by successive compaction with pneumatic rollers.
5. Laying the asphalt concrete by mixing followed directly by compaction at controlled temperatures with metal and pneumatic rollers.

■ For the engineering structure component

1. Preparing the site: clearing vegetation and debris, and setting up access roads and work areas.
2. Dismantling of existing structures (where applicable): Controlled removal of existing bridge components, including deck, beams and piers, in compliance with safety and environmental protection protocols.
3. Creation of shallow foundations:
 - a. Construction of the substructure elements
 - i. Assembling reinforcement and formwork for footings and piers.

- ii. Concreting the footings and pillars.
 - iii. Hardening the concrete.
 - iv. Removal of the formwork after the appropriate curing period.
- b. Bearings: Fitting the bearings (neoprene pads, bushes, elastomers, etc.) on the footings or abutments.
- c. Assembly of longitudinal steel beams:
 - i. Transporting prefabricated steel beams.
 - ii. Lifting and positioning the beams on the supports using cranes.
 - iii. Checking alignment and levelling.
 - iv. Fixing (temporary or permanent bracing if necessary).
- d. Installation of transverse beams (where applicable) : Installation of the transverse elements between the beams (steel or precast concrete).
4. Construction of the reinforced concrete deck:
 - a. Installation of formwork and shoring between the steel beams (if necessary).
 - b. Placement of the deck reinforcement.
 - c. Pouring the concrete onto the deck.
 - d. Vibrating and curing the concrete.
5. Additional superstructure work:
 - a. Installation of safety barriers (railings or parapets).
 - b. Waterproofing the slab (if specified).
 - c. Laying a layer of asphalt or surfacing (if applicable).
 - d. Bridge drainage (gutters, vertical drains).
6. Finishing and fine-tuning:
 - a. Treatment of expansion joints.
 - b. Painting the metal girders (anti-corrosion protection if necessary).
 - c. Installation of horizontal and vertical signage.
 - d. General cleaning of the site.
7. Demobilisation: opening to traffic (after testing, if necessary).

As a result of the project, the road infrastructure and surface will be greatly improved, and the safety of road users, whether drivers or pedestrians, will be enhanced by traffic control and safety devices. Preliminary studies predict that the traffic induced by the project (traffic growth induced by road improvements) is 20%, compared with 3% without the project.

In order to complete each stage of the project, the following activities will be carried out:

- Acquisition of land to carry out the construction work.
- Recruitment of labour to carry out the construction work.
- Using service providers and suppliers to purchase the goods and services required for the construction work.
- Development and operation of the base camp, which will house accommodation, a canteen/refectory, a clinic, offices, a laboratory, concrete and asphalt plants, workshops, generators, fuel depots and a refuelling station, storage areas, and areas for cleaning and maintaining machinery.
- Quarry excavation at the selected Koukono site, located 32 km from the Project. This activity will require the use of explosives to break up the rock and extract aggregates.
- Civil engineering work, including digging, excavation, levelling, construction of embankments, installation of culverts and drains, construction of ditches and stratification.

- Delivery of equipment and movement of machinery to carry out the activities listed above.
- Use of resources due to the production and use of construction materials.
- Waste generation due to the production and use of construction materials.
- Potential disruption to utilities and networks within the project footprint.

According to the information available, none of these activities have been carried out at the time of writing.

3.5. Technical components of the project

The design of a project takes place in several phases, as indicated below:

- Preliminary Design (APS): this is the preliminary phase of project development, during which the main parameters, technical guidelines, alternatives and viable solutions to meet the project's needs are defined;
- Final Preliminary Design (FPD): this is the intermediate phase, which is more detailed than the preliminary study and defines and dimensions the main elements of the structure; and
- Implementation Study: this is the final and most detailed phase of the project. It provides all the information necessary for the execution of the works, without any room for interpretation.

The APS has been completed. The APD is in progress and should be finalised during the first quarter of 2026. The execution study will be completed during the construction phase, staggered in accordance with the construction schedule, so that the various construction teams can carry out the work.

3.5.1. Road components, bridges and toll stations

The current road, built to 1970 standards, which are less demanding than current standards (RN, reference speed 80 km/h), has an average carriageway of 6.20 m (down to 5.00 m in places) and a roadbed of 9.00 to 10.00 m, with shoulders often less than 1.50 m wide.

ECOWAS standards specify a uniform cross-section of 10.00 m, comprising a 7.00 m carriageway and two 1.50 m shoulders. The cuttings slopes are 3V/1H, with a 0.50 m bench and a 2.0 to 3.00 m berm every 3 m; the rocky cuttings are 4V/1H and the embankments are 3H/2V. **Three types of cross-sections are provided: type C rural, type B urban (villages), urban (large towns with BAU/parking lanes) and engineering structures.**

■ Type C Rural - Typical cross-section of the road alignment on the current section

In rural areas, the roadbed is 10.40 m wide, with a standard cross-section comprising :

- A 7.40 m carriageway (2 lanes of 3.70 m, including 0.20 m of road markings) ;
- 1.50 m shoulders on each side of the road.

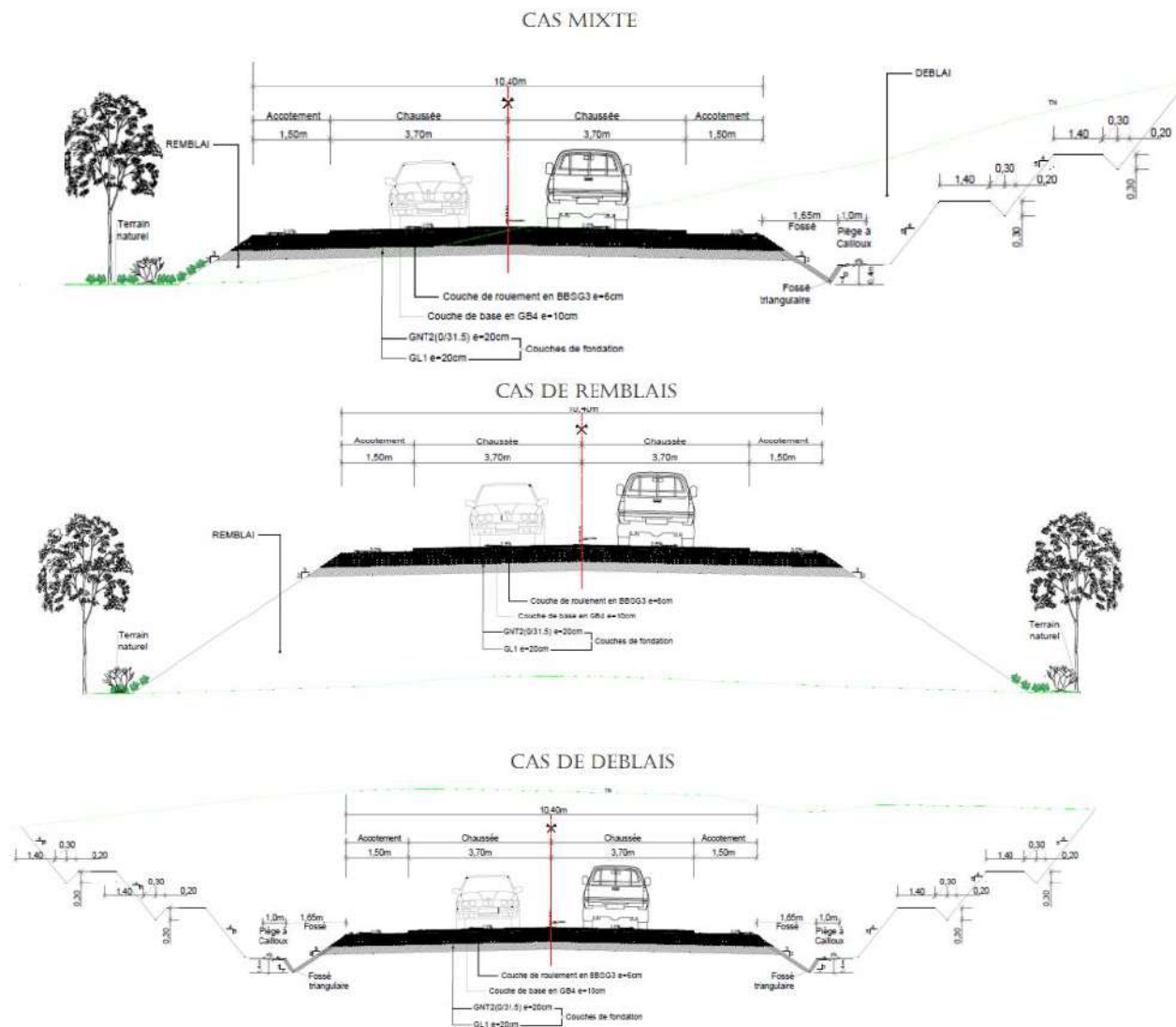


Figure1 : Typical cross-section through countryside (mixed case, embankment case and cutback case)

■ Type B Urban - Typical cross-section of road through villages

In villages, the roadbed is 10.40 m wide, with a typical cross-section comprising :

- A 7.40 m carriageway (2 lanes of 3.70 m, including 0.20 m of road markings) ;
- 1.50 m shoulders;
- Rectangular concrete gutters measuring 0.60 x 0.60 metres.

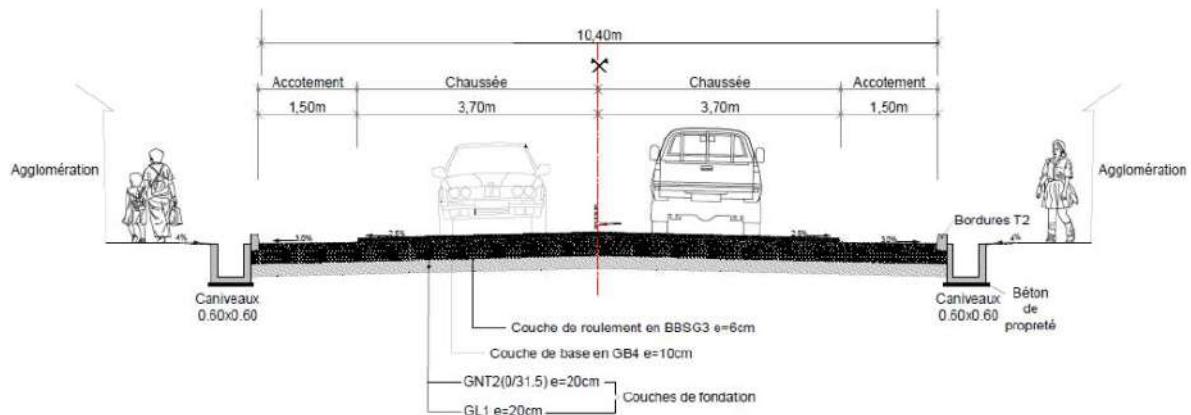


Figure2 : Typical village crossing cross-section

■ Urban - Typical cross-section of a road layout through large cities with hard shoulders and parking lanes

In cities, the platform is theoretically 15.40 m wide with a typical cross-section comprising:

- A 7.40 m carriageway (two 3.70 m lanes, including 0.20 m of road markings);
- 2.5 m hard shoulders;
- 1.50 m pavements, each with 10 cm thick reinforced concrete surfacing;
- Possible side drainage channels (80x80);
- Street lighting.

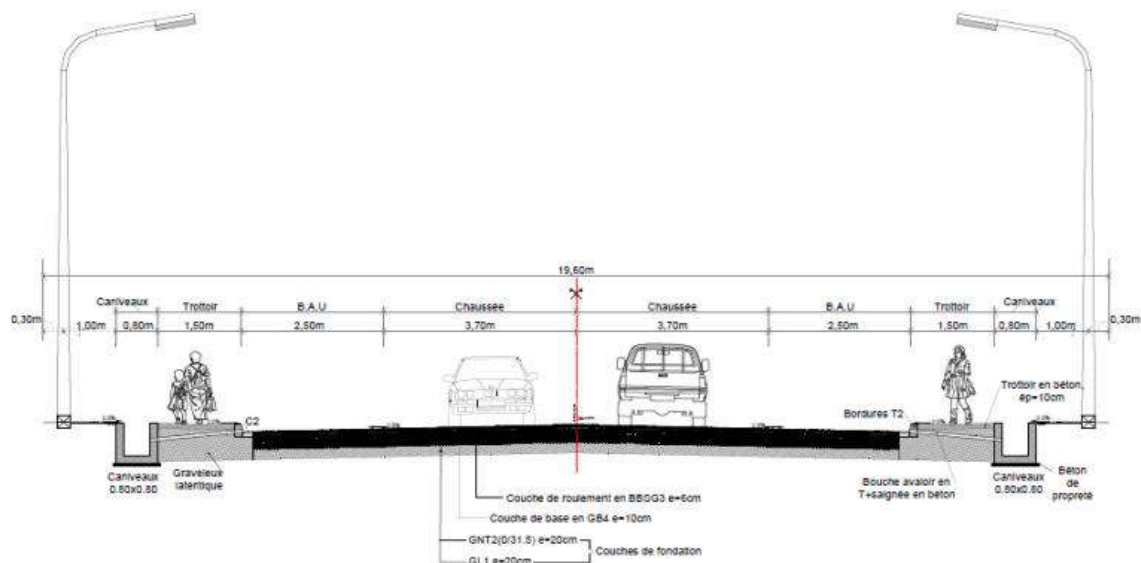


Figure 3 : Typical cross-section profile for urban crossings

■ Typical cross-section of engineering structures.

The characteristics of the standard cross-section of the road spanned were taken into account when determining the cross-section of the bridge deck. They are as follows

- Type of carriageway: 2x1 lane carriageway with pavements,
- Width of carriageway: 7.0 metres;
- Pavement width: 1.50 metres;

- Width of culverts: 2 x 0.5 metres;
- Type of guardrail: S7 ;
- Cross slope: 2.5%, longitudinal slope: 0.5%.

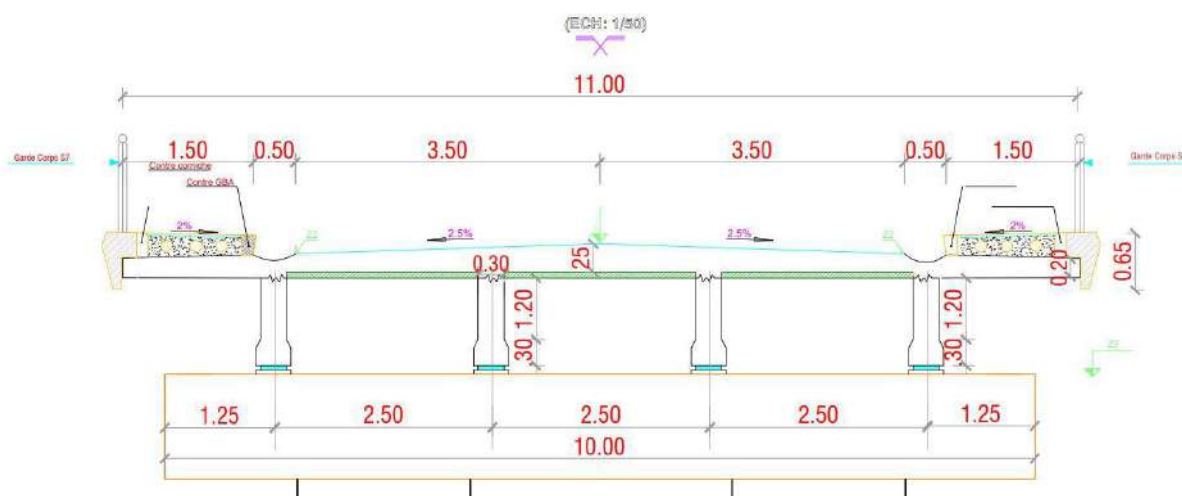


Figure 4 : Typical cross-section of deck on pier



Figure 5 : Typical cross-section of deck on abutment

3.5.2. Temporary infrastructure

The main associated temporary facilities to be taken into account in the ESIA are as follows:

- Project living quarters: a living quarter will be required to accommodate some of the workers during the construction phase. The base camp will occupy an area of 20,000 m² and is planned to be located on the outskirts of Norassoba, towards Fandia. However, its exact location has not yet been defined. As currently planned, the base camp will house accommodation, a canteen/refectory, a clinic, offices, a laboratory, concrete and asphalt plants, workshops, electrical generators, at least one borehole, fuel depots and a refuelling station, storage areas, cleaning and machine maintenance areas and a potential mobile wastewater treatment plant (WWTP).
- Access roads: QGMI will mainly use existing access roads. An access road will need to be opened up to the base area, and diversions adjacent to the RN 32 will be put in place during the construction phase to limit the impact on road traffic. The characteristics of the track that will be rehabilitated to access the Kounkono quarry are detailed in the following section.

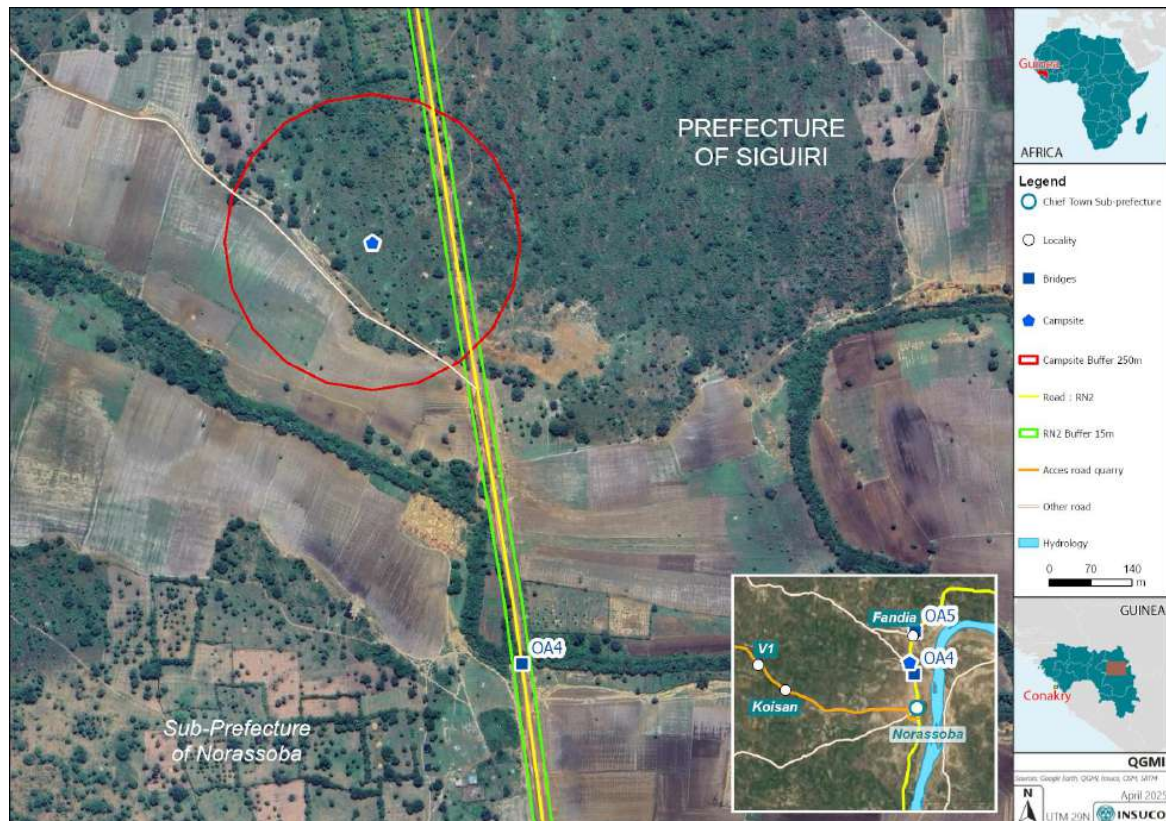
- **Granite quarry:** QGMI plans to source gravel, sand and aggregates from a new quarry in the region. Under the current project design, a quarry meeting the characteristics required by the project has been identified in the village of Kounkono. This quarry will have a surface area of 35,000 m², including the extraction area, the crushing plant and the storage area. The question of land acquisition remains to be defined. All necessary permits will be obtained prior to any extraction. The selected site is located 32 km from Norassoba. This existing track will be rehabilitated by reprofiling the laterite track, widening it to a width of 7 metres and rehabilitating 4 bridges (at KP 6, 11.3, 21.6 and 27.8). In order to limit the impact on physical resettlement, the route of this access road will deviate from the current track at the level of the villages of Nourafadougou and Niaman-Rombo in order to avoid residential areas.
- **Borrow pits:** Aggregate borrow pits will be required to supply the site. The size and number of borrow pits have not yet been defined at the time of the study, but there will be at least 3 in order to minimise transport costs.
- **Storage yards:** infrastructure outside the route may be required. At this stage, the project's technical information does not allow us to determine whether such a tank farm would be necessary and, if so, where it would be located.



Photograph 9: General view of the site chosen for the project camp (Source: Insuco, 2024)

3.5.2.1. Construction camp

The construction camp will include technical and administrative areas, living quarters and small industrial areas. Only one construction camp is planned, and it will be newly built. It is expected to be located between Norassoba and Fandia.



Planned location for the base camp, Source; Insuco, 2025

Map 8 :

It will include the following key elements:

- Security infrastructure: perimeter fencing, security posts, controlled access points, and gates;
- Administrative facilities: main project offices, meeting rooms, IT and communication systems;
- Medical clinic: basic health services for first aid and emergency care;
- Accommodation: modular housing units for workers and technical staff;
- Kitchen and canteen: meal preparation and dining areas; and
- Secondary industrial area:
 - o Warehouse: centralised storage of construction materials, aggregate storage area, tool and equipment storage area;
 - o Mechanical workshop: facilities for vehicle and machinery maintenance and repair;
 - o Laboratory: for materials testing and quality control; and
 - o Utilities and support services: power generation area, water supply and treatment systems, fuel storage facilities, solid and liquid waste management.

The construction camp will be operational until the completion of construction works (36 months), with an additional period of several months until the end of demobilisation. This additional period is estimated to be approximately 2-3 months.

Figure 5 shows the typical layout of a main construction camp in QGMI projects.

The construction camp will be sized to accommodate the peak workforce in terms of offices and canteen. However, accommodation options will be limited, as most workers are expected to stay at home or in rented accommodation in nearby villages.

The construction camp facilities will include a kitchen and canteen, a laundry room, common areas (with tables, chairs and possibly televisions) and a dispensary. The entire perimeter of the construction camp will be fenced.

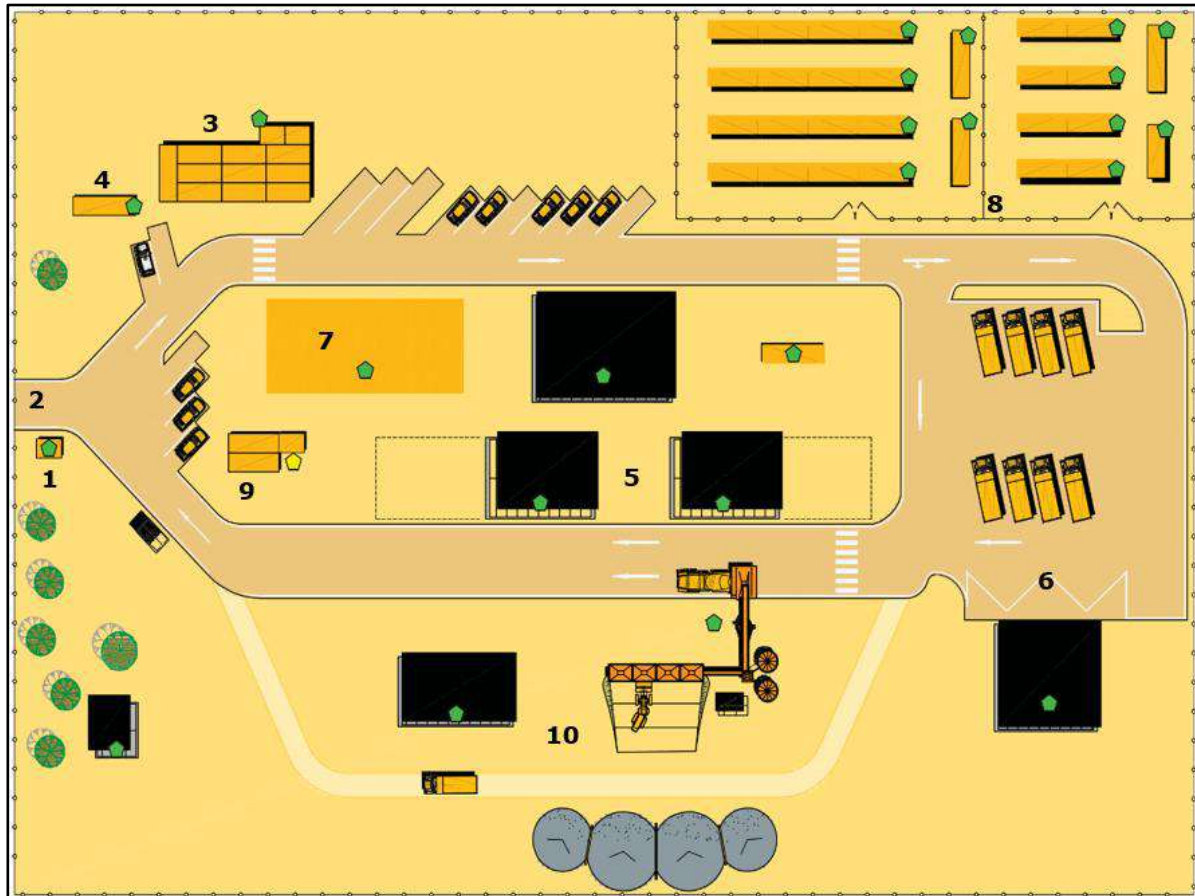


Figure 6: Example of Typical QGMI Construction Camp Layout

It will include:

Security post

Access control to construction camps regulates and monitors the entry, movement and exit of vehicles, equipment and people within the premises. Its main purpose is to ensure the safety and security of the construction camp while effectively managing the flow of people and resources. Security guards will be stationed at the security post. Security guards will be recruited from specialist companies to ensure that they have all the necessary licences. Security guards will also carry out routine patrols on construction sites to monitor the storage of equipment and materials and prevent theft or vandalism. The security post is shown in Figure 6 under reference 1. A specific procedure will be developed to ensure security (i.e. the site security management plan).

Access points and gates

Strategically placed access points and gates are set up to control entry and exit from construction camps. These access points are equipped with barriers, such as gates or turnstiles, to allow authorised personnel or vehicles to pass through. The number and location of access points are determined based on the size, configuration and security requirements of the construction camp. They are shown in Figure 6 under number 2.

Administrative Office

The administrative office is designed as a single-storey building to accommodate technical and administrative teams. The office layout is optimised to ensure efficient workflow and communication between team members. The design allows for natural lighting, adequate ventilation and comfortable working conditions. Figure 7 shows the standard design of QGMI administrative offices in major construction camps. The administrative office is indicated by number 3 in Figure 6.

The design of the administrative office will comply with accessibility standards, ensuring easy access for employees with disabilities, adequate lighting, fire extinguishers, signs indicating emergency exits, and first aid kits.

The administrative office will include rooms or workstations allocated to different technical and administrative sectors, such as finance, human resources, procurement, and project management. Each sector will have designated workspaces equipped with desks, chairs, storage cabinets, and necessary office equipment.

There will be a sufficient number of toilets, sinks, and sanitary facilities based on the expected number of employees. There will also be a dedicated kitchen area that will serve as a break room and dining area for employees. The kitchen will be equipped with basic amenities, such as a refrigerator, microwave, coffee machine, sink, and seating. There will also be a comfortable and relaxed environment where employees can take a break, chat, and enjoy their meals.



Figure 7: Example Layout of the Administrative Office

Medical clinic

A modular or prefabricated building will be allocated within the construction camp to house a medical clinic. The layout will be designed to accommodate patient examination rooms and will include a waiting room, an emergency room, a common room, a consultation room and toilets. The medical clinic is shown in Figure 6 under number 4.

The main tasks of the medical team will be as follows. An ambulance will be made available to the medical team.

- Provide adequate primary care to staff;
- Perform daily administrative tasks, manage medical records and refer patients to external specialist clinics if necessary;
- Manage emergencies and oversee the rapid evacuation of patients;
- Conduct health promotion activities (e.g., health lectures and health awareness programmes);
- Provide active health surveillance, including assessing fitness for work and monitoring patients with chronic diseases;
- Inspect medical equipment on a daily basis;
- Manage the clinic's pharmacy;
- Conduct health and hygiene inspections; and
- Provide first aid training.

Warehouse

The warehouse is used to store supplies, equipment and materials necessary for the project's operation. It consists of enclosed, covered buildings that are spacious enough to meet the needs of the work. It includes shelving, a reception desk, tools, and a room for the warehouse. Outside, it includes a patio for storing non-perishable materials. This area is isolated by a fence to enhance security and control of stored materials.

The layout of the warehouse will accommodate shelving systems, pallet racking and designated areas for different types of stock, with efficient organisation and easy access to ensure smooth logistics and stock management. The warehouse is shown in Figure 6 under reference 5.

Mechanical workshop

The mechanical workshop is designed to facilitate the maintenance and repair of equipment and vehicles. It provides sufficient space for tools and workbenches, including storage areas for spare parts and materials, as well as areas reserved for equipment maintenance. Figure 8 shows a workshop at a QGMI construction camp. The workshop is shown in Figure 6 under number 6.



Figure 8: Example of a view of a workshop in a QGMI Construction Camp

Kitchen and canteen

The kitchen will meet the dietary needs of employees with tables, chairs and sufficient seating to accommodate all employees.

The facility includes food preparation areas equipped with professional-grade appliances for cooking, baking and food storage. Separate sections will be provided for meal preparation, dishwashing and food storage to ensure efficiency and hygiene. It will also include refrigeration units, industrial ovens, hobs, sinks and adequate food preparation surfaces.

There will also be sanitary facilities (washbasins, urinals, showers, lockers) made of durable, washable materials, with waterproof, non-slip flooring, adequate lighting and ventilation to ensure the well-being of users. Sanitary facilities will be separated by gender.

Figure 9 shows a typical layout of a kitchen/canteen in a QGMI construction camp. The kitchen and canteen are shown in Figure 6 under number 7.

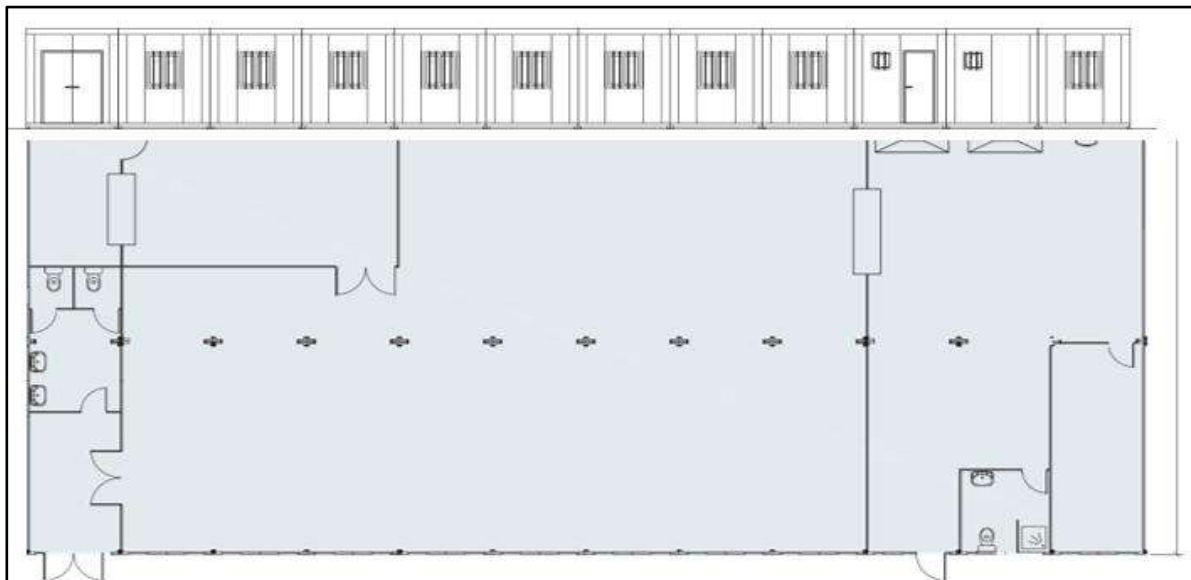


Figure 9: Typical layout of Kitchen and Canteen

Accommodation

A small proportion of the workforce employed during the project will be accommodated in construction camps, particularly international visitors and workers from other regions of Guinea when there are no other accommodation options in neighbouring villages.

The camp's accommodation capacity is estimated at 30 people. The accommodation system will work closely with the project and QGMI human resources departments to ensure sufficient accommodation capacity, which will be anticipated based on the monthly estimate of the workforce required.

The accommodation is built with adequate insulation to ensure comfort and will be strategically located within the construction camp.

The accommodation will be equipped with toilets, showers, washbasins and urinals to meet the hygiene needs of residents. The facilities will be appropriately sized according to the number of people accommodated to ensure sufficient availability.

In order to maintain a clean and hygienic living environment, the premises will be cleaned daily. Regular cleaning programmes will ensure that common areas, toilets and showers are properly maintained and free of dirt and debris. In addition, bed linen will be changed weekly to promote hygiene and comfort for residents.

Here are some key features of the accommodation units:

- Laundry facilities: to enable employees to wash and dry their clothes easily. There will be washing machines, tumble dryers and ironing equipment, as well as sufficient space for sorting and folding laundry;
- Sanitary facilities: sufficient toilets and showers to meet the hygiene needs of employees.

There will be an adequate number of toilets, washbasins, and shower cubicles based on the expected occupancy; and

- Common areas: where employees can relax, socialise, and participate in recreational activities. Common areas will include amenities such as televisions, tables, chairs, and other entertainment items.

Figure 10 shows a typical accommodation unit in a QGMI construction camp. Accommodation units are shown in Figure 6 under number 8.

Local workers who do not use the accommodation units will benefit from a bus service set up by the project to take them from their homes to the construction camp or work site.



Figure 10: example of accommodation unit

Laboratory

A quality control laboratory is used to test and analyse various materials, products and samples to ensure that they meet predefined quality standards.

The laboratory is responsible for conducting tests, inspections and assessments to evaluate the quality, consistency and safety of materials and products used in construction camp operations. The laboratory also tests the quality of road surfacing to ensure compliance with project standards.

Sufficient space in a dedicated facility must be allocated for the various sections or workstations, including sample preparation areas, testing areas, instrumentation stations, storage areas and documentation offices.

The laboratory is shown in Figure 6 under number 9.

Industrial area

The industrial area refers to a designated area within the construction site for construction-related operations.

Activities planned for the industrial area of the site include concrete and asphalt production, equipment maintenance and repair, and material storage and shipping. Therefore, industrial areas will include:

- A concrete plant;
- An asphalt plant;
- A steel framing and carpentry yard;
- Mechanical workshops;
- Equipment storage yards;
- Fuel storage facilities; and
- Vehicle maintenance areas.
- Mitigation measures planned for the industrial zone include:
 - Dust suppression (e.g., water spraying, enclosures);
 - Oil-water separation systems;
 - Fuel and chemical spill prevention and containment systems; and
 - Erosion and sediment control near areas prone to runoff.

Concrete plants and coating plants are described in more detail below, given their importance to the project.

Concrete plant and coating plant

A concrete plant mixes sand, cement and water to produce concrete. The proportions of each element in the mixture may vary depending on the characteristics of the concrete to be produced.

The main components of a concrete plant are detailed below. Figure 11 shows the typical layout of a concrete plant. The concrete plant and asphalt plant are shown in Figure 6 under number 10.

- Aggregate bins and aggregate dosing machine: where aggregates are stored and classified according to size;
- Cement silos: for storing cement;
- Feeding mechanisms: conveyor belts for transferring aggregates and cement to the concrete mixer;
- Additives, also transferred to the concrete mixer;
- Water basin, including a water pump and weighing system;
- Concrete mixer, where all key concrete components (water, aggregates, cement and additives) are mixed using a computerised control system; and
- Final delivery of concrete to mixer trucks, which will transport the concrete to the construction site.

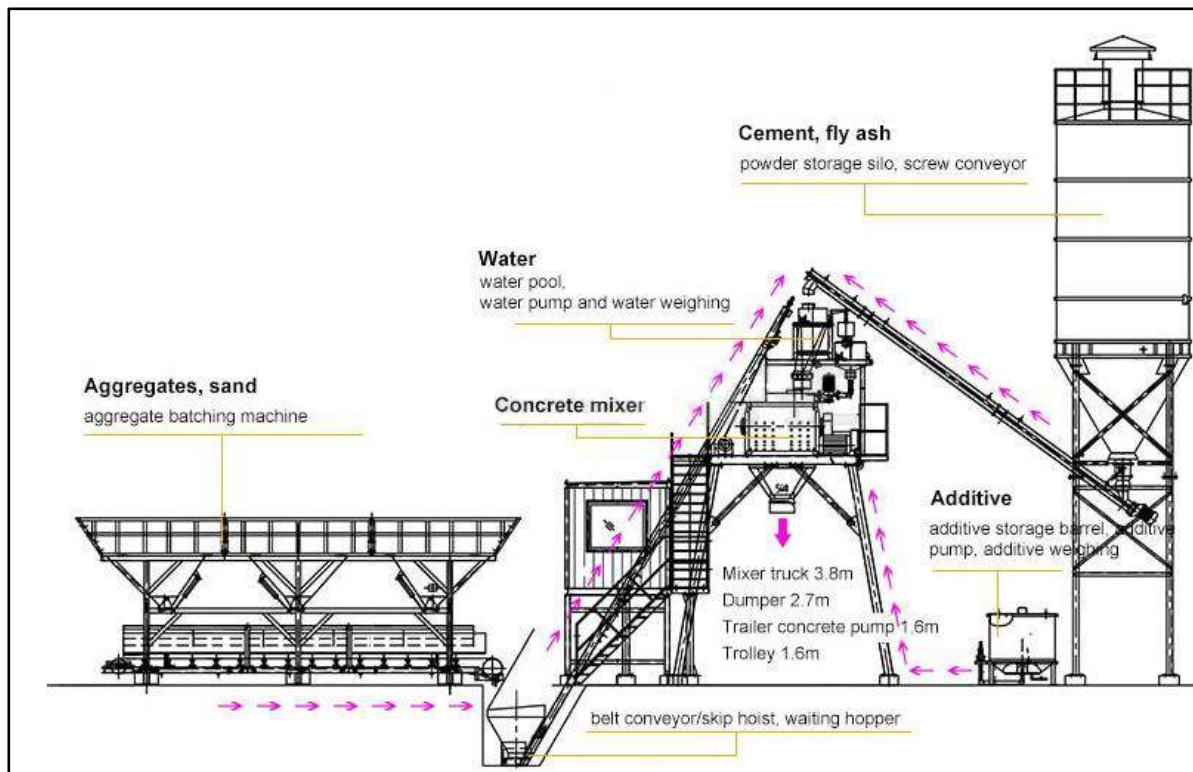


Figure 11: typical layout of a concrete plant

An asphalt mixing plant is used to mix aggregates, bitumen and filler materials to produce asphalt concrete (hot mix). The proportions of each component in the mix may vary depending on the characteristics of the asphalt to be produced.

The main components of an asphalt mixing plant are detailed below. Figure 12 shows the typical layout of an asphalt mixing plant.

- Storage elements for the components of the asphalt mix: aggregates, bitumen, fillers and recycled asphalt;
- Feeding mechanisms: conveyor belts to transfer the various components of the asphalt mix;
- Dryer: to heat the bitumen;
- Emission control system: to collect dust from the dryer;
- Dosing tower: to mix the bitumen (after the dryer) with the aggregates; and
- Storage of hot mix, before transfer to trucks that will transport the asphalt to the construction site.

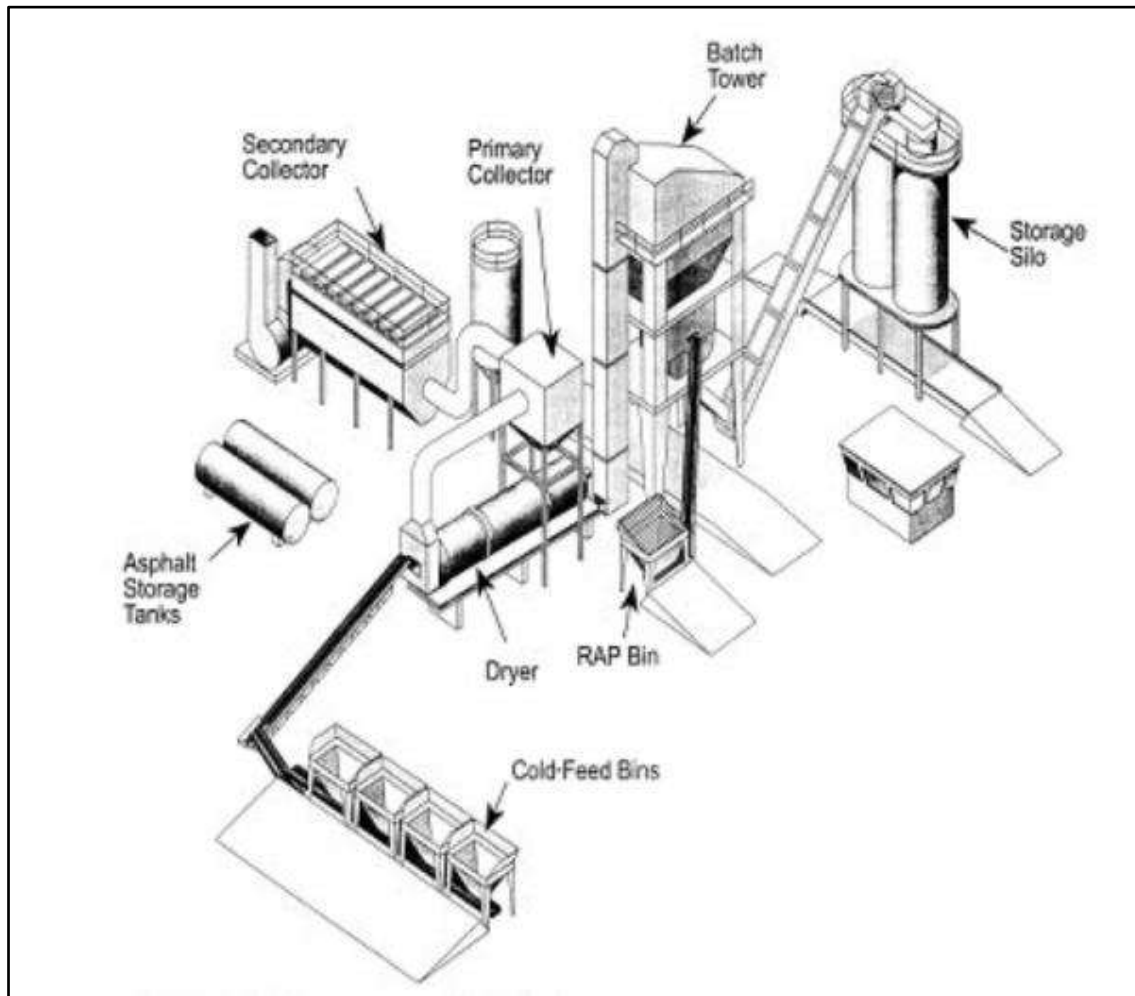


Figure 12: Typical layout of a coating plant

3.5.2.2. Quarries and Borrow Pits

Quarries and gravel pits will be needed for the construction work along the road. Around 560,000 m³ of crushed stone and sand will be extracted. Laterite will also be extracted from the quarries and gravel pits. It is estimated that 1.5 million m³ of laterite will be extracted for the project.



Map 9: Location of Kounkono quarry, Source: Insuco, 2025

Activities in the quarry should be carried out using small boreholes created by controlled explosions. First, a grid will be drawn up for blasting based on the volume of each detonation, then holes will be drilled and explosives will be loaded into the holes under police supervision.

The type of explosives will depend on the type of rock to be explored. The transport of explosives is the responsibility of the supplier and must be carried out under police supervision. The explosives will be stored in an area enclosed by a fence and monitored 24 hours a day, with two containers for the separate storage of explosives.

The quarry will also house a crusher to process the stone before temporary storage and transport of the aggregates to the project.

The following maps show the location of the borrow pits already identified. It is expected that additional borrow pits will be necessary for the construction phase. These will be identified during the preparatory phase, and their location, preferred in the vicinity of the road, will take into consideration the results and findings of the present ESIA (i.e. avoidance of any sensitive habitat identified)



Map 10 : Localisation of borrow pit 1, Source : Insuco, 2025



Map 11 : Localisation of borrow pit 2 and 3, Source : Insuco, 2025

Quarry activities are expected to be carried out using small boreholes created by controlled explosions. First, a grid will be drawn for blasting according to the volume of each detonation, then holes will be drilled and explosives will be loaded into the holes under police supervision.

The type of explosives will depend on the type of rock to be explored. The transport of the explosives is the responsibility of the supplier and must be carried out under police supervision. Explosives will be stored in a fenced area under 24-hour surveillance, with two containers for separate storage of explosives.

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The quarry will also house a crusher to process the stone before it is temporarily stored and transported to the project.

3.5.3. Related facilities

IFC PS1 defines "associated facilities" as those not financed by the project, which would not have been built or expanded without the project and on which the project depends to be viable. No such facilities are planned as part of this project.

3.6. Pre-construction and construction phases

The project envisages two simultaneous construction fronts, but their progress and start have not yet been defined.

3.6.1. Pre-construction work

Pre-construction activities include the clearing of construction areas, including the felling of trees and shrubs, the removal of organic soil, stumps and roots, the demolition of existing concrete structures to be removed and general cleaning.

The felling of trees and shrubs and the removal of vegetation in the area will be carried out using bulldozers (Figure 13). In time, chainsaws may be used to cut down larger trees. Deforestation will be carried out in order to pile vegetation and organic soils into windrows, so that they can be re-spread at the end of the work, with the aim of restoring native vegetation.

One of the first steps QGMI will take before carrying out any deforestation services will be to precisely delimit the areas to be deforested, in order to reduce deforestation to the minimum area possible in terms of the footprint of the road and the safety of users. Under no circumstances will pesticides be used to carry out these services, and branches, trunks and other materials from the operations provided for in this document will not be thrown into the natural watercourses and thalwegs of the road site. As far as possible, woody materials resulting from deforestation activities will be made available to local communities.

The establishment of quarries, gravel pits and construction camps (see section 3.5.2) will also form part of the pre-construction work.

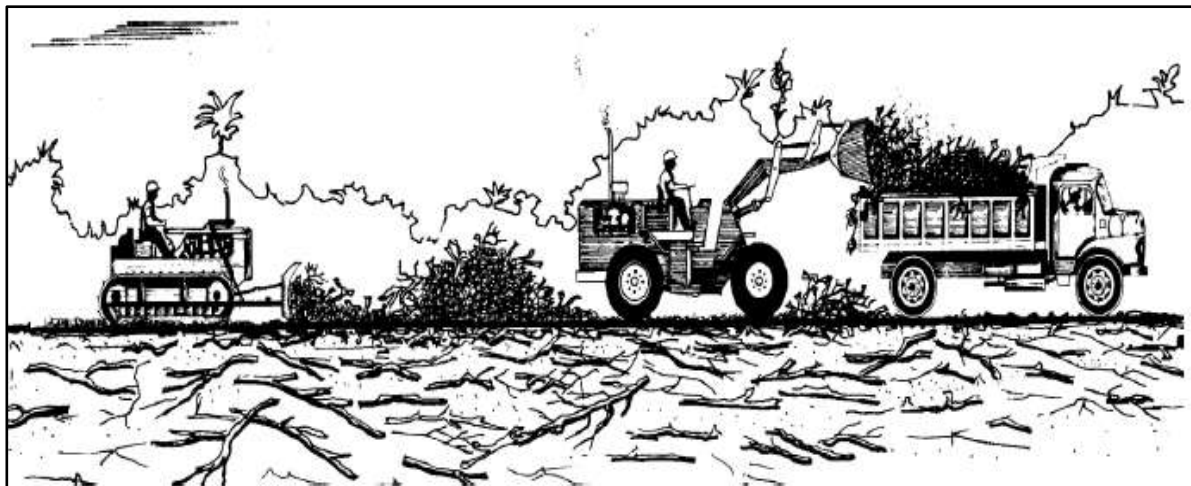


Figure 13: Scrub clearance work

Current road conditions vary considerably along the route. The average width of the carriageway along the entire route is around 6.20 m, but it can be as narrow as 5.00 m in some places. The roadbed has an

average width of 9.00 to 10.00 m. It should also be noted that in several places, the residual shoulders are less than 1.50 m wide.

3.6.2. Earthworks

Preliminary construction activities include the clearing of construction areas, including tree and shrub felling services,

Once the area to be levelled has been cleared, the earth will be moved to allow the next stages of the work to take place. For both excavation and road construction, a cut-and-fill process will be used, where the amount of material from the excavation will approximate the amount of fill required to complete the nearby embankments. Various sections of a pavement design will require soil to be brought in (backfill), while other sections will require soil to be removed (cuttings). In the end, this meant that the labour required for the excavation work could be reduced to a minimum.

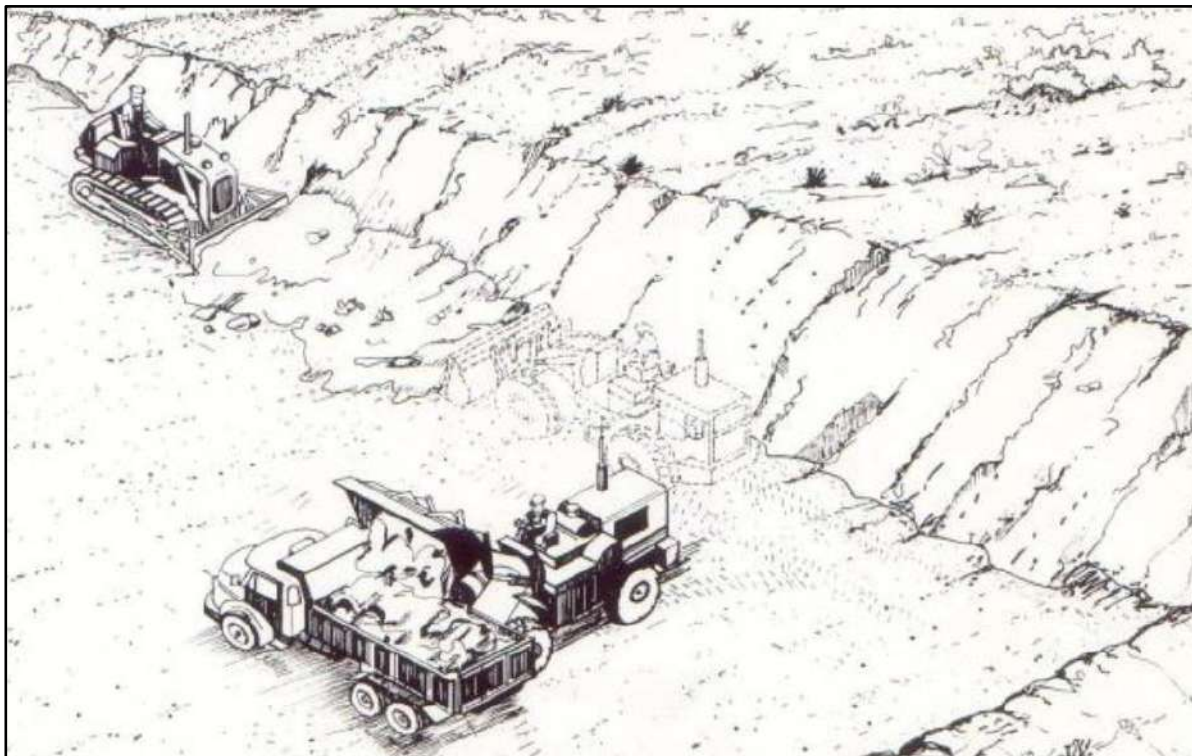


Figure14 : Earthworks

Excavation work along the project footprint perimeter includes activities such as site clearance, overburden stripping, and stockpiling. This work will only be carried out once the sites have been approved as borrow areas for use in the construction.

Borrow sites will be excavated using a backhoe loader and the excavated material will be properly stockpiled temporarily. These materials will be blasted, chipped or excavated in such a way as to ensure that they are effectively broken up in the quarries before being loaded. Borrow material requirements will be confirmed prior to application. Tipper trucks will be used to transport the borrow material.

At present, general excavation and backfill volumes are as follows:

- Excavation volume: 506,000 m³; and

- Backfill volume: 965,000 m³.

3.6.3. Drainage

The drainage system includes the definition, calculation and location of engineering structures with the following objectives:

- To enable the road network to cross natural drainage lines in complete safety;
- Intercept surface, deep and/or underground water flowing towards the body of the road, direct it towards the nearest natural drainage lines and allow the free flow of water in the flood zone; and
- Direct rainwater falling on the central medians and roadbed to safe and appropriate discharge points.

The design of the drainage scheme was based on an assessment of existing drainage systems, catchment areas along the road and rainfall estimates with different return periods. For the design of this project, a return period of 10 years was proposed for all small hydraulic structures and 100 years for engineering structures (bridges). The aim is to preserve the road structure and ensure traffic safety during periods of heavy rainfall.

Given the risk of flooding and submergence of the road during periods of heavy rainfall, the areas that will require particular attention in the design of drainage networks are ford crossings and areas where the RN 32 runs alongside and/or crosses flood-prone agricultural areas (see habitat map). The following areas are particularly at risk: (from KP0 to KP85): bridge no. 1, the bend after Irikiri, on leaving Kobané, bridges no. 3 and no. 4 on either side of Fandia, on leaving Noukounkan, bridge no. 7, between Farada and Damissakoura. For the access road to the quarry, only the fords are at risk of flooding in the event of heavy rain.

A drainage system will be installed along the route of the road to ensure adequate drainage of rainwater in specific sections of the route where the topography presents a high risk of water run-off. The current design of the drainage system has made it possible to determine the preliminary location of the culverts. Their final location and design will be confirmed on the basis of detailed topographical studies to be carried out during the next design phase. At this stage, one hundred and eighty (180) hydraulic crossings are envisaged, including seven (7) bridges.

The drainage system will require the digging of trenches. The trenches will be dug simultaneously with the earthworks, either manually or mechanically, depending on local conditions:

- Mechanical excavation: using a hydraulic excavator or backhoe. Excavated material will be transported by tipper trucks; and
- Manual excavation: tools such as picks and shovels will be used. Wheelbarrows will be used to transport materials to locations where they can be loaded by mechanical means into trucks.

In the case of trenches, the material resulting from excavation will be deposited alongside. The trench will be compacted using manual vibrating plates. Where the water table is high, motor-driven water pumps or pneumatic pumps powered by portable compressors will be installed. All materials deemed unsuitable for storm sewer foundations will be removed and transported out of the area.

The drainage systems associated with the road component will be of two types:

- Open drainage, which will be implemented along most of the road alignment (longitudinal drainage). It is not limited to compacted trenches and can be reinforced with concrete if the drainage needs to be strengthened.
- Closed drainage (culverts crossing the carriageway transversely), which may be present along the entire route. In this case, the drained water will be conveyed by concrete pipes.

Illustrative cross-sections of open drains are provided in

Figure 15. and Figure 16

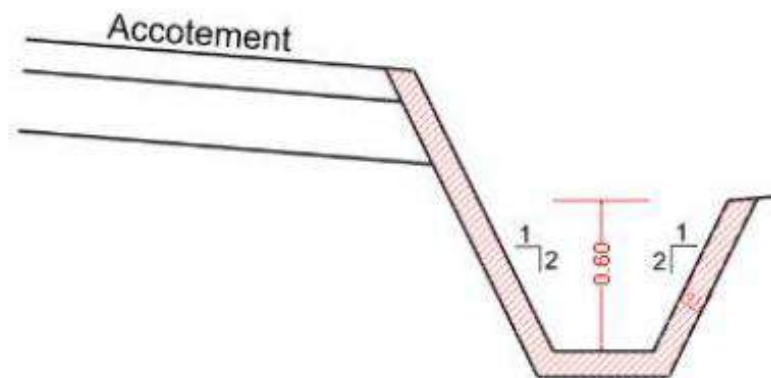


Figure 15 : Typical cross-section of open drainage

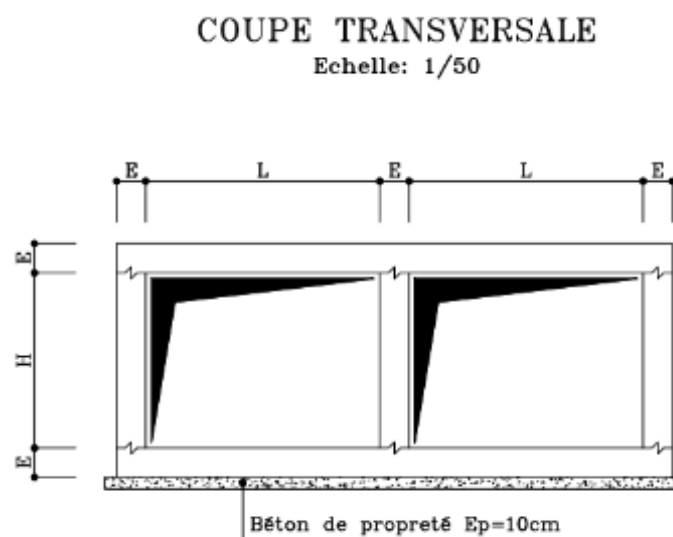


Figure 16 : Typical gutter cross-section (closed drainage)

3.6.4.Lining

The surfacing profile envisaged for the project, shown in Figure 17, comprises four main layers:

- **Bituminous asphalt (Béton Bitumineux Semi-Grenu - BBSG):** the top layer of the pavement, laid hot, it provides resistance to wear caused by traffic and climatic conditions;
- **Base layer or binder (Bituminous Gravel - GB):** intermediate bituminous layer acting as a link between the surface course and the sub-base, guaranteeing the cohesion and durability of the whole;
- **Sub-base layer (Grave Non Traitée - GNT):** made up of aggregates, it distributes traffic loads and supports the pavement on the sub-base;
- **Sub-base course:** located directly on the sub-base, generally made of laterite, it contributes to structural support and promotes drainage.

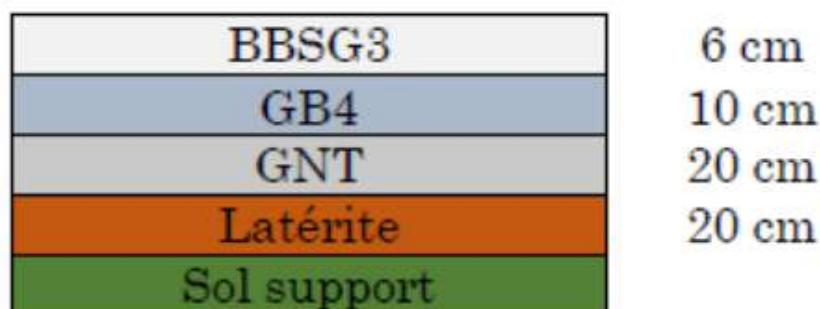


Figure 17: Pavement profile

The pavement profile takes account of Guinea's specific climatic conditions, with high temperatures in the dry season and heavy rainfall in the wet season.

The first stage of the paving process consists of preparing and adapting the existing soil, mainly by compacting. The main actions carried out are as follows

- **Topographical demarcation** of the area to be paved ;
- **Scarification and homogenisation**: the soil is scarified using a grader, then the material is dispersed and homogenised using disc harrows and graders, until a uniform texture is achieved. This stage also includes the removal of roots, stone blocks and other undesirable materials;
- **Moisture correction**: the optimum moisture content for compaction is adjusted using water tankers (watering), a grader and a disc harrow;
- **Compaction**: preferably using a vibrating roller with "short-legged" sheep's feet, enabling the vibration frequency to be controlled appropriately;
- **Finishing and sealing**: tyred rollers are used if necessary. The operation is completed by a combination of rollers and a grader, to ensure the longitudinal and transverse geometry of the surface.

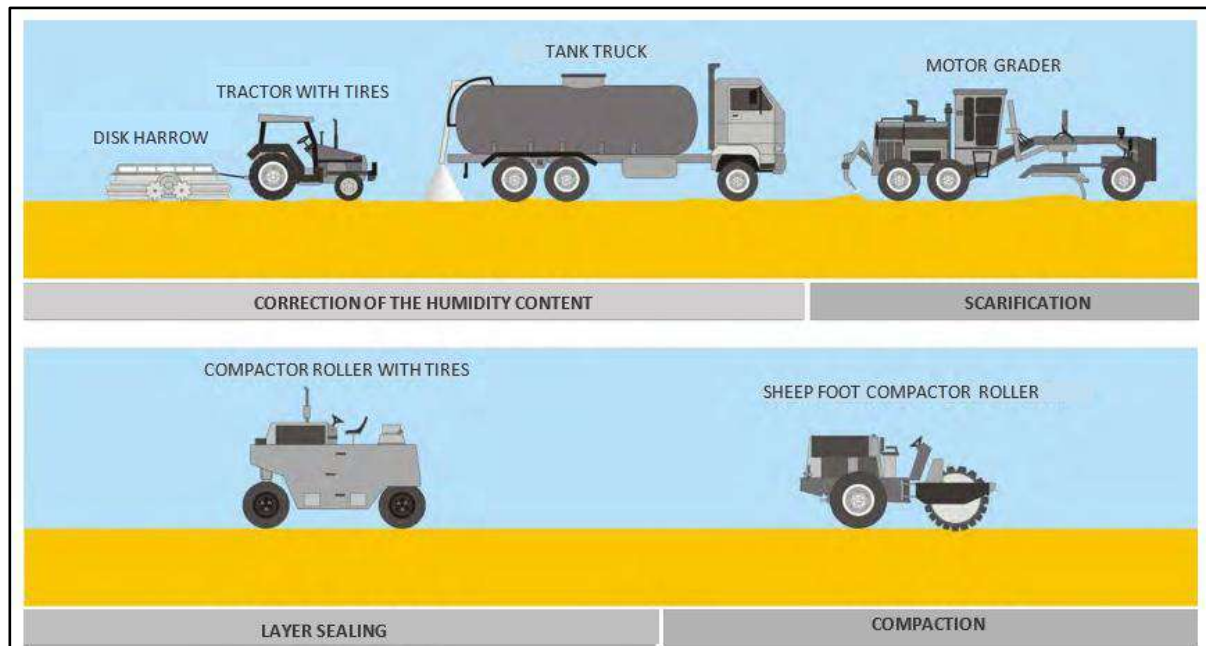


Figure18 :Soil preparation

Lateritic base

The next step is to lay the laterite base. The material is first spread on the platform using a grader, to obtain a layer of even thickness. It is then homogenised using a disc harrow and grader, until a perfectly uniform texture is achieved. All foreign materials (stone blocks, roots, etc.) are removed during this operation.

Optimum moisture levels are achieved using tanker trucks (moistening), supplemented by a grader and disc harrow (aeration). Compaction is preferably carried out using a self-propelled vibrating roller with sheep's feet (short feet), combined with a self-propelled smooth vibrating roller. The finishing operation, carried out with the same rollers and a grader, ensures the longitudinal and transverse geometry of the platform.

Foundation layer

The next layer is made up of graded crushed aggregate (untreated gravel). It plays an essential role in supporting and distributing traffic loads on the lateritic base.

As with the previous stage, the material is first spread using a grader. To ensure greater homogeneity, most of the material is spread first, before the rest is added. Homogenisation is carried out using a disc harrow and a grader, until an even spread is achieved. All foreign materials are removed at this stage.

The moisture required for compaction is achieved using tanker trucks (humidification), scrapers and disc harrows (aeration). Compaction is generally carried out using a self-propelled smooth vibrating roller combined with a self-propelled pneumatic roller, although it is possible to use just one of these machines. Particular attention is paid to soil-gravel mixes to avoid excessive density. Finishing is carried out using the same rollers and a grader, ensuring longitudinal and transverse geometric conformation.

Bituminous layers

The final stage consists of laying the **bituminous layers**, which include :

- the **bituminous wearing course** (hot mix asphalt) forming the top layer of the pavement, resistant to traffic and climatic conditions;
- the **bituminous binder** (tack coat), applied between the sub-base and the wearing course, ensuring the cohesion and durability of the structure.

Once the granular layer is perfectly shaped, the surface is swept to remove fine particles and loose material. The binder is then applied at the right temperature and in the right quantity, depending on its temperature-viscosity relationship. The entire treated section must be completed in a single operation, with the road closed to traffic.

The asphalt mixes, which are hot-mixed at the site plant (gravimetric dosing, intermittent production), are transported in tarpaulin-covered tipper lorries to maintain the temperature. On the roadway, the material is spread using **self-propelled tracked vibratory pavers**, operating in tandem to limit the number of longitudinal joints.

Final compaction is carried out using a **smooth vibratory roller** or a **variable pressure roller**, in conjunction with a **tandem roller with smooth metal wheels**, to obtain the required thickness and density.

Figure19 illustrates the process of laying the asphalt layer.

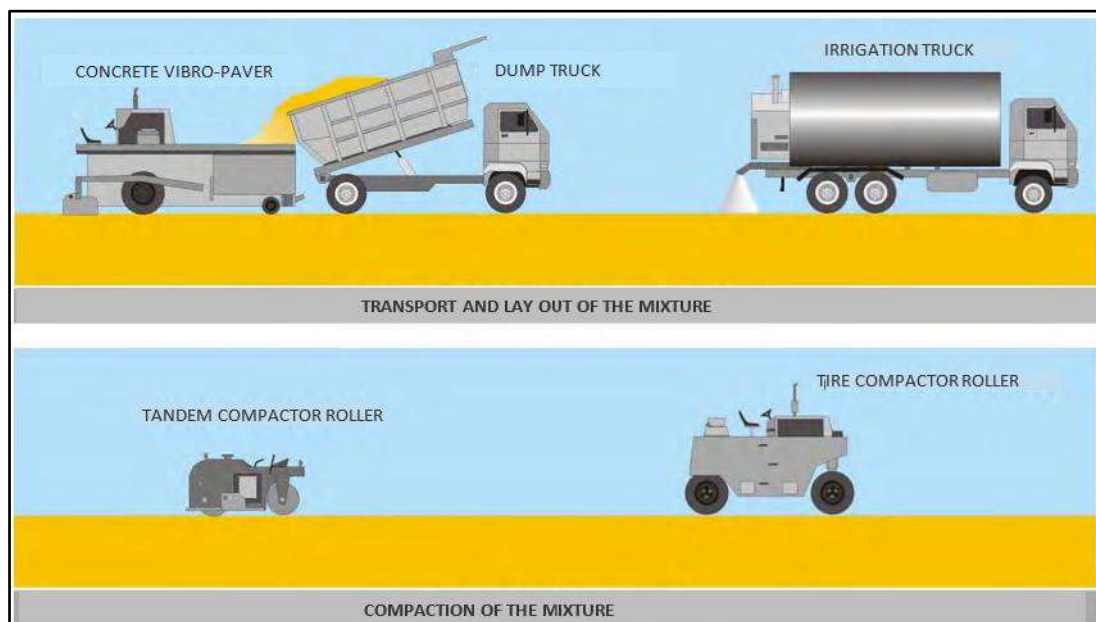


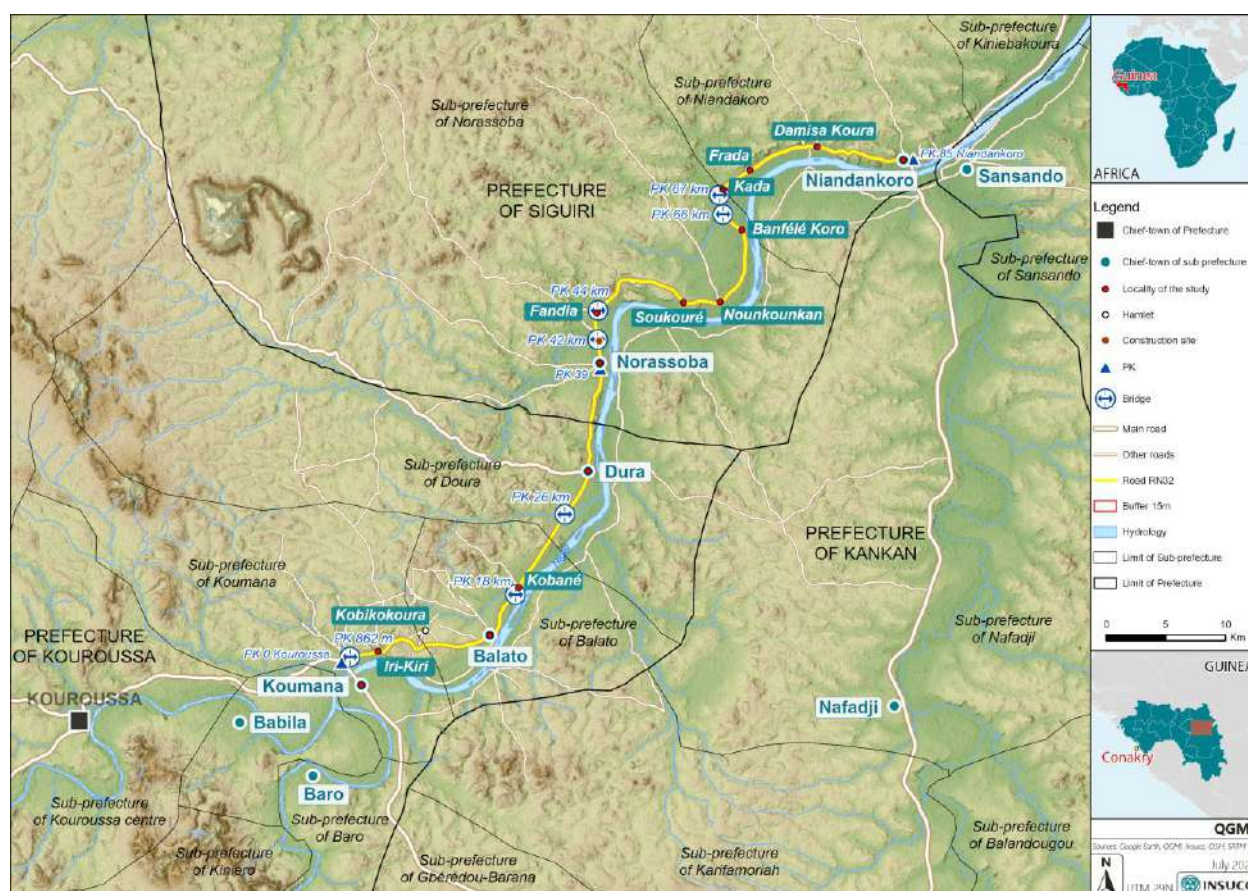
Figure19 :Laying the asphalt layer

3.6.5. Dismantling existing bridges and building new ones

Seven bridges are planned along the project route to enable watercourses to be crossed (see Map 12 :)

- **Bridge 1: Maimanen river (KP 862m), length 12 m ;**
- **Bridge 2: Kobanen river (PK 18km), length 13 m;**
- **Bridge 3: Yarako river (PK 26km), length 12 m;**
- **Bridge 4: Nyinan river (PK 42km), length 19 m;**
- **Bridge 5: Bandjantè river (PK 44km), length 15.5 m;**
- **Bridge 6: Foyiah river (PK 66km), length 10 m;**
- **Bridge 7: Kodako river (PK 67km), length 12 m.**

All these bridges are existing and will be replaced by new structures.



Map 12 : Location of the 7 bridges, Source: Insuco, 2025

Key stages in dismantling and construction

1. **Site preparation**
 - Clearing vegetation and removing debris ;
 - Development of access roads and work areas.
2. **Dismantling of existing structures** (if applicable)
 - Controlled removal of deck, beams and piers;
 - Compliance with safety and environmental protection protocols.
3. **Foundations and substructure**
 - Assembling reinforcement and formwork for footings and piers;
 - Concreting and curing concrete;
 - Stripping formwork after curing;
 - Installation of support equipment (neoprene pads, bearings, etc.).
4. **Erecting the superstructure**
 - Transporting, lifting and positioning the longitudinal steel beams (using cranes);
 - Checking alignment and levelling;
 - Fixing and bracing if necessary;

- Installation of transverse beams if required.
- 5. Construction of the deck**
 - Formwork and shoring;
 - Laying the reinforcement;
 - Pouring, vibrating and curing the concrete.
- 6. Additional superstructure work**
 - Installation of railings or parapets;
 - Waterproofing the slab (if required);
 - Laying a layer of asphalt or other surfacing;
 - Installation of drainage systems (gutters, drains).
- 7. Finishing and fine-tuning**
 - Treatment of expansion joints;
 - Anti-corrosion paint on metal beams;
 - Horizontal and vertical signage;
 - General cleaning of the site.
- 8. Demobilisation and opening to traffic**
 - Safety tests (if required);
 - Commissioning of the structures.

3.6.6. Connectivity

Throughout the works, one side of the road will remain open to traffic, insofar as this is technically and safely possible. However, in certain sections where this is impracticable due to site constraints, temporary diversions will be put in place. These diversions will be duly signposted and accompanied by temporary traffic management measures to ensure safety and minimise disruption.

Specific access roads will also be built to link the construction camp, material sources and work fronts, if necessary.

The main measures planned (detailed in the Traffic Management Plan, *TMP*) are as follows:

- Maintaining safe traffic lanes in the work zones;
- The presence of signallers at the start and end of the worksite to coordinate access for users, while ensuring their safety in relation to the machines in operation;
- Installation of signposts upstream of the work zones to inform users in advance.

In addition, the Stakeholder Engagement Plan (SEP) provides for regular meetings with local communities to keep them informed of the progress of the works and the location of work zones.

3.6.7. Additional works

Once the carriageway has been completed, a number of measures will be put in place to ensure that the infrastructure is put into service correctly and safely.

3.6.8. Vertical signs

Vertical signage will include regulatory, warning and directional signs that comply with national standards. The aim is to increase the safety and comfort of users by warning them of potential hazards and providing information on destinations and traffic rules.

3.6.9. Horizontal markings

Horizontal markings will include lane markings, pedestrian crossings (where applicable) and kerb lines. Made of reflective thermoplastic paint, they will be used to delimit traffic lanes and mark the edges of the road.

3.6.10. Guardrails and other protective elements

Steel guardrails will be installed at strategic points (bridge approaches, bends, embankments) to reduce the risks in the event of a road departure. They will be transported and stored in such a way as not to damage the road surface.

Other devices will also be provided: concrete markers, milestones, pedestrian steps, as well as public lighting in urban and village areas to improve night-time visibility.

3.6.11. Restoring public networks

As the works may affect existing networks (water, electricity, fibre optics, telecommunications), these will be repositioned in the intervention zones to ensure continuity of public services.

3.6.12. Means of communication

To ensure effective coordination, safety and responsiveness during the construction phase, various communication systems will be used:

- Mobile telephony, for general communications where coverage is available;
- Two-way radios, as the main means of communication between teams on site, particularly in remote areas;
- Satellite telephone, used as a back-up for emergency communications.

3.7. Operating phase

Once commissioned, the road will be operated and maintained by AGEROUTE, the responsible government entity. The operational life is estimated at 15 years.

Maintenance operations will focus mainly on routine maintenance, including :

- Cleaning of gutters and culverts;
- Vegetation control;
- Repair of road markings;
- Repair and replacement of vertical signs;

- Refurbishment of crash barriers;
- Repairs to carriageways and verges;
- Treatment of potholes and cracks;
- Repair of verges.

These operations will not require the use of heavy machinery and will involve limited staff.

3.8. Use and management of resources

The data available relates mainly to the pre-construction and construction phases. For the operational phase, and in the absence of specific data at the time of writing, it is assumed that material requirements will be occasional, negligible and mainly related to maintenance activities.

3.8.1. Resource efficiency

The project has been designed with integrated measures to promote the sustainable use of resources, particularly energy, water and waste management. By incorporating these measures from the design phase, it not only meets sustainability standards, but also helps to anticipate and mitigate potential environmental and social impacts, thereby promoting a more resilient infrastructure.

When designing and selecting the ancillary facilities, priority was given to two major principles:

- Optimising distances (from quarries, gravel pits and worksites), in order to reduce the overall length of transport and, consequently, fuel consumption and associated emissions;
- Rehabilitating existing road corridors rather than opening new ones, which limits deforestation, reduces the need for earthworks and soil stripping, and minimises the impact on sensitive areas.

This approach makes it possible to preserve the essential ecosystem services provided by the soil (water regulation, fertility, support for biodiversity).

In addition, in order to recover materials and reduce waste:

- Mineral soils excavated during earthworks will be reused for other activities (backfilling), thereby reducing the need for new resources and limiting transport-related emissions;
- Organic soil will be conserved on site and reused to restore temporarily occupied areas (camps, temporary accesses).

Other mitigation measures are planned to improve efficiency in the use of materials:

- Use of local aggregates (crushed stone, laterite, sand) to reduce transport distances and emissions;
- Use of prefabricated metal structures (e.g. bridge elements), to limit on-site manufacturing waste and optimise the use of resources;
- Implementation of a construction waste management plan, incorporating sorting, reuse and recycling wherever possible.

Finally, in order to avoid or limit negative impacts on human health and the environment, the project includes specific strategies concerning:

- Management of hazardous materials;
- Reducing greenhouse gas (GHG) emissions;

- Treatment and management of wastewater and waste.

3.8.2. Water management

The industrial water required for construction work, the site camp and other project facilities will come mainly from local rivers and may also be extracted from boreholes, depending on availability and suitability. At this stage, the water collection points have not yet been defined. In both cases (surface water and groundwater), use will be subject to prior feasibility analysis and approval from the regulatory authorities (obtaining a water abstraction permit).

Volumes and distribution.

The total quantity of water required for the construction phase is estimated at around 365,000 m³, corresponding to the sum of two uses:

- Industrial water: 340,000 m³, covering site requirements (dust suppression, pavement preparation, etc.) and supplying the concrete plant and asphalt/coating plant;
- Drinking water: 25,000 m³, for human consumption on the site and on the working faces, calculated on the basis of working months, the number of workers and consumption data from other QGMI projects.

Time profile.

Average monthly consumption is estimated at around 10,100 m³, taking into account the total 36-month duration of the works (including the preparation phase). Consumption will be higher in the dry season than in the wet season, as work progresses at a faster pace in the dry season.

Storage and distribution.

Water will be stored in 10 m³ tanks, the number of which will vary according to requirements during construction. The tanks will be installed in the construction camp. 10 m³ tankers will transport water :

- from the collection points to the storage tanks ;
- from the storage tanks to the construction sites/work fronts.

Drinking water (quality and hygiene).

For human consumption, bottled water will be supplied to all workers in the construction camps. This water will be supplied by an approved service provider or extracted from boreholes located in the camp, after potabilisation treatment, in order to guarantee compliance with the necessary quality and hygiene requirements.

Operating phase.

During the operating phase, only routine maintenance operations are planned. No heavy machinery is envisaged and the number of staff required will remain limited. On this basis, potential water consumption during operation is considered negligible.

3.8.3. Electricity

There are no plans to use electricity from the national grid; power will be supplied by diesel generators on site, due to the remoteness of the project area, where the existing electrical infrastructure is very limited.

Up to 4 different types of generators may be used during the construction phase :

- 165 KVA generators: one generator to supply the construction camp;
- 125 KVA generators: two generators of this type are planned to be used for different purposes;
- 075 KVA generators: Three generators are planned to be used for different purposes on the construction fronts, in the quarry and at the camp; and
- Generators 040 KVA: only one generator of this type is planned, and it will be used for different purposes on the construction fronts.

The fuel consumption of all generators is taken into account in the total fuel consumption value for the project (where the fuel required for vehicles and other machinery is also taken into account). Total fuel consumption during the construction of the project is estimated at 13,300 m³.

Fuel will be stored in temporary above-ground tanks, each with a typical capacity of 30 m³. A fuel storage facility is planned in the industrial zone of the construction camp.

It is estimated that 5 fuel tanks will be in operation.

Each fuel storage facility will be associated with two 10 m³ trucks that will transport the fuel to the work face to power the machinery and equipment there.

The following energy efficiency measures are planned to reduce fuel consumption as much as possible:

- Optimised logistical planning to reduce the number of lorry journeys and fuel consumption; and
- Regular maintenance of equipment and generators to ensure optimal fuel combustion and operational efficiency.

During the operation phase, no heavy machinery should be used and the number of personnel required for this work will be limited. Power supply during the operational phase will be limited to the fuel used by maintenance vehicles during these operations, which is considered minimal and has not been estimated.

3.8.4. Materials

The main materials required for the construction phase are sand, laterite, aggregates, concrete, steel, asphalt, steel bridge structures and cement. The sources and volumes of materials required will be specified as the project design progresses.

The table below summarises the hazardous and non-hazardous material requirements for the project.

Hazardous materials will be managed as part of a hazardous materials management plan. Safety Data Sheets (SDS) will be required for all chemicals considered hazardous. SDSs will be obtained for all chemicals used or stored to ensure that they are readily available to personnel using these substances.

SDSs will provide information about the chemicals in a form that is most easily understood by the user, will indicate whether the substance is classified as hazardous and will meet the needs of employees with language or literacy difficulties.

Table 10: Hazardous and non-hazardous materials requirements

Material/Substance	Quantity/Volume	Unit	Storage	Use
Fuel (diesel)	13 300	m ³	Capacity of 150,000 litres spread over the site in above-ground tanks (with a capacity of around 30,000 litres).	Used for heavy machinery, transport vehicles and generators
Lubricants and hydraulic oils	Unknown at this stage		Storage and handling in sealed drums within fenced areas.	
Explosives for quarry operations	185 000	Kg	Storage and security in approved explosives shops, in accordance with national legislation.	Used for rock fragmentation and aggregate extraction in the Kounkono quarry.
Bitumen	16 200	Tonnes	In isolated bitumen tanks with watertight infrastructure in the area of the asphalt plant.	Used for road surfacing
Crushed stone and sand	560 000	m ³		Used for construction activities

Cement	3 900 000	Kg	
Steel	470 000	Kg	
Steel bridge structures	220 000	Kg	
Laterite	1 500 000	m ³	
Asphalt emulsions	2 030	Tonne s	
Safety barriers	17 000	Metre s	
Other hazardous materials (small quantities)	<i>Unknown at this stage</i>		Solvents, paints, adhesives, cleaning products, used in workshops and storage areas. Medical waste, including used syringes, out-of-date medicines and swabs from the base clinic.

The project involves the excavation of 630,000 m³ of rock, sand and laterite.

3.8.5. Transport of equipment and materials

The current plan is for materials to be supplied locally or regionally wherever possible (road transport). Materials and equipment that cannot be sourced locally or regionally will be imported and will arrive at the port of Conakry or by air freight, and will then be transported by road to the project site.

During the peak periods of the construction phase, it is estimated that around 100 tipper trucks will be used for earthworks and materials transport, and 64 heavy goods vehicles (flatbed trucks, tankers and other trucks) will operate mainly in the project area (RN 32 and track to the quarry).

Existing roads, bridges and transport infrastructure in the study area have been assessed and are deemed adequate to withstand the passage of construction machinery, subject to minor local reinforcement if necessary.

The transport of materials (aggregates, cement, etc.) will require several lorries per day at peak periods, fuel deliveries will require up to 3 lorries per week and the transport of waste (construction debris, packaging, etc.) will require up to 1 lorry per week, depending on the phase.

A project traffic management plan will be drawn up and implemented (see section on risk and accident assessment).

3.8.6. Waste

The following subsection presents the different waste streams, the expected quantities of each type to be generated by the project, and the corresponding management measures.

■ Non-hazardous waste

- Domestic waste (including food waste): estimated at 111 tonnes, generated mainly by the living quarters and kitchens. It will be stored in sealed, impermeable skips, then regularly removed to approved landfill sites. Wherever possible, organic waste will be composted to produce manure that can be used for local market gardening.
- Paper, cardboard and packaging: estimated at 6 tonnes, from offices, warehouses, workshops and the clinic. It will be stored in dry containers and reused internally whenever possible. Residual waste may be stored with a view to sale, or incinerated under controlled conditions, with authorised community recovery.

- Plastics and rubber (including tyres): estimated at 1.26 tonnes of plastics and 9 tonnes of used tyres. They will be stored in specific containers and sent for recycling via approved waste management companies.
- Inert construction rubble (concrete, aggregates, spoil): estimated at 2,145 tonnes, mainly from building sites and quarries. They will be stored in dedicated, demarcated areas, away from watercourses and drainage lines. Gravel platforms will limit erosion and dust. This waste will be reused as fill material or for the rehabilitation of disturbed sites (e.g. borrow pits).
- Scrap metal: estimated at 12 tonnes (sheet metal, vehicle parts, workshop scrap). It will be stored on pallets and offered to companies specialising in metal recycling.
- Used personal protective equipment (PPE): estimated at 3 tonnes, to be incinerated on site or at an approved facility.

■ Waste water management

The total volume of liquid wastewater is estimated at 712.5 m³, generated by sanitary facilities, kitchens and washing stations. This will be managed using septic tanks and infiltration wells, with periodic emptying carried out by approved service providers. A mobile wastewater treatment plant may be considered if necessary.

During the construction phase, two main categories of wastewater are identified:

- **Domestic wastewater (grey and black water):**
 - Treatment by septic tanks and purification pits.
 - Sludge is emptied and managed by an approved service provider.
 - Treated effluent discharged into infiltration fields or cesspools.
 - Where technically possible and safe: reuse of treated grey water for dust removal or irrigation of non-edible plants, in compliance with regulations.
- **Industrial wastewater (car washes, concrete plants, etc.):**
 - Treated by oil/water separators and sedimentation tanks.
 - Discharges authorised only after verification of compliance with national standards and IFC guidelines.

All effluents will be discharged in accordance with IFC's General Health, Safety and Environmental Guidelines and Guinean effluent quality standards.

Rigorous monitoring will be carried out:

- Periodic analysis of treated effluent by accredited laboratories to verify compliance with local ambient water quality criteria;
- Development of a Wastewater Management Plan (WWMP), including a waste water monitoring programme;
- Identification and regular monitoring of all treated effluent discharge points.

■ Storage, transport and disposal practices

In Guinea, waste and wastewater management remains complex and difficult, due to the limited number of approved facilities and operators, and the poor coverage of public waste management and sanitation services. This situation applies in particular to the prefectures of Kouroussa and Siguiri, where the project will be developed.

Planned management plans

In response to these constraints, QGMI will draw up :

- a Waste Management Plan (WMP) ;
- a Wastewater Management Plan (WWMP);

These plans will define management procedures during the construction phase, taking into account the country's current capacities. The WMP and WWMP will identify alternatives and solutions for the treatment of waste and wastewater, including the hiring of approved service providers and the use of authorised disposal sites (landfill sites, specialised facilities, etc.).

Management principles

The project will adopt the principle of waste prevention and reduction, following a hierarchy:

1. Reduction at source ;
2. Reuse/reincorporation ;
3. Recycling (where possible);
4. Landfill disposal as a last resort.

This approach aims to reduce the project's carbon footprint, in particular by minimising transport to disposal sites. The principle will be detailed in the Waste Management Plan (WMP).

Waste sorting and storage

- Sorting at source: all types of waste will be sorted and clearly labelled as soon as they are produced.
- Non-hazardous flows: paper/cardboard, plastics, glass, metals, recyclable and non-recyclable waste.
- Organisation of sorting: use of separate, labelled containers; additional manual sorting in designated temporary areas.
- Storage: temporary storage areas set up on work faces and in the construction camp, protected from bad weather and accidental leaks.

Transport and disposal

- Approved contractors will transport and dispose of hazardous and non-hazardous waste in accordance with Guinean regulations and international best practice.
- Suitable equipment and vehicles will be used to transport hazardous waste to transit zones, where it will be packaged and stored before final treatment or disposal.
- Non-recyclable municipal waste will be sent to the nearest landfill site.

To date, no specialist treatment facilities (solid or liquid) or approved landfill sites have been identified in the immediate vicinity of the project. These considerations will be incorporated into the waste management plan to ensure their effective implementation during the pre-construction and construction phases.

Operating phase

During the operating phase, only routine maintenance operations are planned. No heavy machinery will be used and the number of personnel involved will remain limited. Waste production will therefore be negligible.

The waste management plan will provide further details on how this will be implemented (see section on impact management measures).

3.8.7. Emissions of atmospheric pollutants

Expected atmospheric emissions include dust (particulate matter), nitrogen dioxide (NO₂), carbon monoxide (CO) and volatile organic compounds (VOCs), mainly from:

- The use of heavy machinery.
- Traffic on unpaved roads.
- Excavation and earthworks.
- Excavation and earthworks.
- Quarry operations.
- The asphalt plant.

Control measures include regular water spraying, speed limits on site roads and regular equipment maintenance.

By including an estimate of GHG emissions, the project aims to provide a clear understanding of its environmental footprint and to identify and define appropriate mitigation measures to effectively address the associated impacts. Ultimately, the detailed estimation of GHG emissions and the corresponding mitigation strategies are essential to ensure that the project contributes positively to global environmental objectives, such as reducing the carbon footprint, integrating renewable energy sources, implementing waste reduction practices and adopting advanced technologies to minimise emissions.

The results of the GHG emissions estimation are presented in chapter 10 . The high-level GHG inventory showed that the project is not expected to exceed the Equator Principles 4 limits of 25,000 tCO₂e or 100,000 tCO₂e per year, neither during the pre-construction nor the construction phases.

During the operating phase, only routine maintenance operations are planned. No heavy machinery is expected to be used, and the personnel required for this work will be limited. On this basis, atmospheric emissions during the operating phase are considered negligible.

3.8.1. Light pollution

Light emissions during the construction phase will be limited and essentially functional, to ensure worker safety, site security and continuity of operations in low-light conditions.

Light emissions will mainly come from construction sites and night-time operations via lighting towers, vehicle headlights and machinery.

Light emissions during the operational phase are estimated to be negligible, given that no heavy machinery is planned and the limited number of personnel required for this work.

3.8.2. Noise pollution

The main sources of noise are as follows

- Earthmoving and excavation machinery (bulldozers, backhoes, excavators, etc.).
- Concrete batching plants and mixers.
- Crushing and screening equipment (if used).
- Generators and power tools.
- Transport vehicles and heavy trucks.

3.8.3. Rainwater management

The following measures will be developed to manage rainwater on the project site:

- Site drainage and runoff control. Temporary surface drainage systems (via channels and diversion ditches, for example) will be built to direct rainwater away from active work areas and sensitive areas.

- Erosion prevention. Sloping surfaces will be stabilised using temporary plant cover, geotextiles or mulching. Work areas will be compacted and levelled to promote controlled drainage.
- Equipment and fuel storage areas. All fuel and lubricant storage areas will be fenced and covered, with drainage systems isolated from site run-off. In the event of rain, rainwater in protected areas will only be discharged after inspection or treated and then discharged if contaminated.

Drainage structures will be inspected weekly and before/after heavy rainfall. Sediment traps and basins will be regularly desilted to maintain their retention capacity.

3.9. Human resources mobilised by the project

During the construction phase, the project will create :

During the least labour-intensive month (during the first two months of the construction phase), 40 jobs comprising:

- 7 national administrative jobs ;
- 22 national operational jobs
- 11 expatriate administrative jobs;

During the most labour-intensive month, 818 jobs comprising :

- 34 national administrative jobs ;
- 158 national operational jobs ;
- 17 expatriate administrative jobs
- 4 expatriate operational jobs;
- 605 skilled and unskilled workers.

It is expected that around 80% of the workforce will be employed directly by QGMI, while the remaining 20% will be employed by subcontractors.

The expected subcontractors are mainly associated with :

- Canteen operations will be provided by a catering company.
- Security services for the protection of the site and property will be provided by an approved security company.
- Medical services.

QGMI may subcontract certain construction activities such as drainage, toll administration buildings and other minor civil works to local companies. Service providers will be identified to support project implementation for activities not directly related to construction. Their selection will be based on technical capacity, experience with similar infrastructure projects and a compliance risk rating. The service providers will be mainly related to these activities: canteen operations, provided by a catering company; security services for the protection of the site and property, provided by an approved security company; and medical services.

The local workforce, drawn from local communities and municipalities in the project area and other parts of Guinea, will represent 97% of the total project workforce, with the remaining 3% being non-Guinean workers.

QGMI is committed to respecting Guinean legislation on local content as well as international standards and best practices in this area, which will entail, among other things, the implementation of a recruitment policy at prefectural and communal level (priority to be given to equal skills).

Recruitment will therefore be carried out as a priority at local level, in coordination with municipal administrations, traditional authorities and community representatives.

The base camp will provide accommodation for non-Guinean workers and workers from other regions of Guinea.

The project involves setting up a fully-equipped medical clinic at the base camp to provide health services to all project workers. The clinic will be staffed by qualified medical personnel and will be able to treat minor injuries and common illnesses, as well as stabilise more serious cases before referring them to external medical facilities if necessary.

Once operational, the project will continue to provide jobs in maintenance, administration and management.

Although indirect jobs are not estimated, the project should also contribute to economic dynamism at local, prefectural and regional level. Indeed, the construction of the RN 32 should contribute to the creation of a multitude of ancillary jobs in the region and stimulate socio-economic development.

The provisional staff mobilisation schedules are presented in Appendix 5.

The working week for workers during the construction phase will be 40 hours, with two periods for specific areas requiring high productivity, in order to meet the requirements of construction activities, in compliance with the Labour Code and the Republic of Guinea's collective agreement for the building and public works sector, which stipulates a statutory working week of 40 hours (excluding security guard posts) and additional pay for overtime.

In the case of positions such as security guards, day and night shifts will be set up, in compliance with the Labour Code of the Republic of Guinea, which stipulates a statutory working time of 55 hours for security guard positions and additional pay for overtime. It is planned that a private security company will be hired to provide security services for the project. Security personnel will be responsible for:

- Controlling access to construction areas and ancillary facilities (e.g. base camp, quarry and equipment and materials storage areas).
- Carrying out routine patrols along the project right-of-way.

All operations by security guards will comply with Guinean laws.

Labour during the operations phase will be limited to road maintenance activities. No further information is available at this stage.

3.10. Equipment

The equipment and heavy machinery required during peak periods for the construction phase of the project are detailed in Table 11 below.

Table 11 : Project equipment and heavy machinery requirements during the construction phase

Heavy machinery and equipment	Number at peak activity
Ambulance	1
Diesel concrete mixer	1
Fuel truck (depot)	2
Tipper truck	100
Router truck	2
Flatbed truck	3
Bitumen spreader truck + Spreading tank	2
Truck crane	7
Sprinkler truck	19
Tank truck washer	2
Cement silo truck with compressor	1
Wheel loader	8
Drilling rig	4
Road tractor	26

Heavy machinery and equipment	Number at peak activity
3-axle semi-trailer	26
Aggregate crushing plant	1
Concrete batching plant	1
Aggregate finisher	1
Forklift truck	1
Hydraulic shovel	12
Wheeled crane / Telescopic boom	1
Soil, bitumen and concrete laboratory	4
Motor grader	15
Bus	1
Backhoe	5
Double roller compactor	3
Self-propelled pneumatic roller compactor	4
Smooth-footed self-propelled vibrating roller	15
Bulldozer	7
Farm tractor	10
Asphalt mixing plant	2
Tracked asphalt pavers	2
SUV 4x4 Diesel wagon station	1
4x4 Diesel SUV wagon station for mission manager/control engineers	5
Pick-up CS 4x4	20
CS 4x4 pick-up for the head of mission/control engineers	8
Generator set (40 kVa)	1
Generator set (075 kVa)	3
Generator set (125 kVa)	2
Generator set (165 kVa)	1
Static tandem roller compactor (10 t)	2
Hydraulic truck on chains (20 t / 0, 90 m ³)	1
Hot asphalt tanker (10 to 30 m ³)	8
Self-propelled mechanical winch	3
Hydraulic breaker 2500 kg	3
Pump unit (3" outlet)	4
Rectangular welding machine	2
Water tank (20 to 30 m ³)	1
Acetylene welding kit	3
Iron bender (up to 38 mm)	1
Iron cutter (up to 50 mm)	1
Sandblasting centre (500 t/h)	1
30 kg pneumatic jackhammer	1
Edge extrusion machine	1

3.11. *Project schedule*

The current project schedule provides for a 36-month construction phase, including a 6-month preparation and mobilisation phase, and a completion phase. The duration of the preparation phase is indicative and will depend in particular on the time required to complete the Resettlement Action Plan (RAP).

The construction phase will most likely involve the implementation of two construction fronts, which will evolve simultaneously.

For the operating phase, the project envisages a lifespan for the RN 32 of 15 years.

3.12. *QGMI's internal management system*

The key procedures of QGMI's integrated management system are listed below:

- MS-IMS-QGMI-001 - Integrated management system manual.
- PC-ACT-QGMI-001 - Closing of contracts.
- PC-AUD-QGMI-001 - Internal and external audit.
- PC-CMP-QGMI-001 - Opening, conduct and closing of investigations into the ethics chain.
- PC-ENG-QGMI-001 - Guidelines for design and development.
- PC-IMS-QGMI-001 - Control of Documented Information.
- PC-IMS-QGMI-002 - Risk Management
- PC-IMS-QGMI-003 - Non-conformance management
- PC-IMS-QGMI-002 - Risk Management PC-IMS-QGMI-003 - Non Conformance Management
- PC-IMS-QGMI-003 - Risk management PLA-QGMI-001 - Work management guide.
- PC-PLA-QGMI-002 - Project planning.
- PC-PLA-QGMI-003 - Project mobilisation.
- PC-PLA-QGMI-004 - Performance monitoring and control.
- PC-PLA-QGMI-008 - Project demobilisation.
- PC-RRH-QGMI-001 - Competence, awareness and training.
- PC-RRH-QGMI-002 - Human resources management.
- PC-SUS-QGMI-002 - Environmental Health and Safety Monitoring Guidelines, Health and Safety.
- PC-SUS-QGMI-004 - Guidelines for Emergency Situations.
- PC-SUS-QGMI-005 - Rules of coexistence.
- PC-SUS-QGMI-006 - Dispute Resolution Procedure.
- PC-TIC-QGMI-001 - Information Technology.
- PC-TIC-QGMI-002 - Data retention.
- PC-TIC-QGMI-003 - Document control and data backup.
- PC-TIC-QGMI-004 - Guidelines for the use of IT resources.
- PO-IMS-QGMI-001 - Integrated Management System Policy.
- PO-RRH-QGMI-001 - Human Resources (HR) Policy.
- PO-RRH-QGMI-002 - Human rights policy.

3.13. Assessment of available information on the project

At the time of writing the ESIA, no additional information was provided on the project. Given that the project characteristics have not changed since then, the information available at this stage is considered reliable, sufficient and up to date.

The impacts measured in this ESIA have nevertheless been identified and assessed on the basis of the project design available at the time of writing this report (at the preliminary design stage).

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4. Policy, legal and institutional framework

This section of the ESIA report presents the legislation and standards applicable to the Project, covering both national requirements, relevant international conventions and standards, as well as the internal guidelines and standards to which QGMI has committed in order to obtain financing for the Project. The purpose of this section is to define the regulatory and non-regulatory performance requirements applicable to all stages of the Project. In identifying and assessing the relevant standards and requirements for the Project, the most stringent provisions have been selected as the Project's baseline standards and applied in the ESIA.

4.1. Guinea's policy framework

The project falls within the framework of several policy documents.

■ Vision 2040 for an emerging and prosperous Guinea

Vision 2040 for an emerging and prosperous Guinea is a strategic framework that brings together all the nation's development efforts and a reference framework for the country's economic progress, social development, cultural growth and equitable and sustainable development. The Vision is supported by strategic goals and objectives based on six key pillars, namely: (i) Peace, unity and national solidarity; (ii) Economic and administrative governance; (iii) Human capital; (iv) Structural transformation of the economy; (5) Environment and living environment; (6) External influence.

The fourth pillar aims to ensure strong economic growth, to equip the country with the infrastructure needed to support growth, including energy and transport infrastructure, and to promote the development of the industrial and craft sectors.

The fifth pillar sets targets for environmental protection. One of the objectives is to promote land use planning with a view to developing structured housing that complies with town planning and environmental standards; to ensure that urban waste (solid waste, sewage, excrement, smoke, inorganic substances) is controlled and treated, and to combat climate change and preserve the environment.

■ The Interim Reference Programme (PRI 2022-2025)

The Interim Reference Programme for the Transition (PRI) 2022-2025 provides Guinea with structuring projects to rebuild the State while providing appropriate responses to the country's transformational and infrastructural challenges. It comprises 5 main areas: 1) institutional rectification; 2) macroeconomic and financial framework; 3) legal framework and governance; 4) social action, employment and employability; 5) infrastructure, connectivity and sanitation.

The project falls mainly under priority 5 (infrastructure, connectivity and sanitation), which specifically aims to ensure nationwide: (i) access to the country's administrative regions; (ii) fluidity of road, air and digital traffic; while strengthening defence and security infrastructure, the justice system and social sectors. The actions envisaged under this heading should make it possible to: (i) improve the mobility of people and the movement of goods and services; (ii) improve access and accessibility to basic social services; (iii) develop and implement environmental and land-use planning policies and strategies.

In Guinea, development projects, including the RN 32 project, must contribute to achieving the objectives of the PRI (2022-2025).

■ The National Environmental Action Plan (PNAE)

Since 1994, Guinea has had its National Environmental Action Plan (PNAE) in place, which constitutes the national Agenda 21 and the basis for environmental policy. The fundamental principle of the PNAE is the integration of the environmental dimension into the country's economic and social development policies, with two main objectives: the rational and sustainable management of resources and the definition or reinforcement of sectoral policies.

■ The national disaster risk reduction strategy (2024-2030)

As part of the implementation of the recommendations of the Sendai Framework (Sendai Framework for Disaster Risk Reduction 2015-2030 which was adopted at the Third United Nations World Conference on Disaster Risk Reduction in March 2015) and several conventions relating to the prevention and reduction of disaster risks, environmental and humanitarian emergencies, Guinea and its partners have made efforts that have led to several structural, political and institutional reforms. The results of these reforms for the prevention and management of environmental and humanitarian emergencies include the National Disaster Risk Management Policy (PNGRC) drawn up in October 2016. The National Strategy for Disaster Risk Reduction 2019-2023 (SNRRC) is derived from this policy. The evaluation of this strategy led to the National Strategy for Disaster Risk Reduction (2024-2030).

This project is part of strategic axis 4 of this strategy, "development and protection of adaptation and resilience infrastructures", which comprises the following elements: 1) Development of water, hygiene and sanitation infrastructures; 2) Development of basic socio-economic infrastructures; 3) Relocation of high-risk sites and industries located in city centres; 4) Protection of public infrastructures.

■ International conventions ratified by the country

The Republic of Guinea has acceded to, signed and/or ratified a number of agreements, conventions and treaties relating to the management of natural resources, environmental protection and the protection of cultural heritage. According to the Transition Charter, previously ratified treaties remain in force. Treaties that are ratified or approved in accordance with the normal procedure take precedence over the laws of the country.

These treaties and conventions are listed below:

Management of natural resources and protection of the environment

Table 12: Conventions ratified for the protection of the environment and the management of natural resources by the Republic of Guinea that apply to the project

Convention	Date of ratification by Guinea	Objective	Link with the project
Maputo Convention on the Conservation of Nature and Natural Resources - Conference of Heads of State and Government of the African Union	2003	To improve environmental protection, promote the conservation and sustainable use of natural resources and harmonise and coordinate policies in these areas.	Opening of a borrow pit + roadworks with an impact on the environment + development of road traffic with an impact on biodiversity (increased use of roads, pollution, etc.)
Convention on Biological Diversity	1992	To conserve biological diversity, ensure its sustainable use and the fair and equitable sharing of the	Opening of a borrow pit + roadworks having an impact on the environment + development of road

		benefits arising out of the utilisation of genetic resources.	traffic having an impact on biodiversity (increase in the exploitation of RN, pollution, etc.)
United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa	1994	To combat desertification and reduce the effects of drought in countries particularly affected, with a focus on Africa.	The deforestation of certain areas of the route and the quarry will have an impact on the desertification of the area.
United Nations Framework Convention on Climate Change	1992	To stabilise greenhouse gas concentrations at a level that would prevent dangerous anthropogenic (human-induced) interference with the climate system.	Establishment of a borrow pit, use of explosives and the project activity itself (road traffic emitting gases).
Convention on the Conservation of Migratory Species of Wild Animals	1979	To conserve migratory species in their geographical range, ensuring their long-term survival.	Presence of a RAMSAR zone
Kyoto Protocol and Paris Agreement (UNFCCC)	2015	The Kyoto Protocol, adopted in 1997, aimed to commit industrialised countries to reducing their greenhouse gas emissions. The Paris Agreement, aims to strengthen the global response to climate change.	Construction work, followed by road traffic during the operational phase, will be a source of greenhouse gas emissions.
Vienna Convention for the Protection of the Ozone Layer	1985	The Vienna Convention serves as the basis for the Montreal Protocol which sets out concrete measures to phase out substances that deplete the ozone layer.	Construction work, followed by road traffic during the operating phase, will be a source of greenhouse gas emissions. The works may consume ozone-depleting substances.
Montreal Protocol on Substances that Deplete the Ozone Layer	1987	The Montreal Protocol aims to protect the ozone layer by reducing the production and consumption of ozone-depleting substances (ODS), such as CFCs and HCFCs.	Construction work, followed by road traffic during the operating phase, will be a source of GHG emissions. The works may consume ozone-depleting substances.
Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat	1971	To ensure the conservation and wise use of wetlands, especially as waterfowl habitat.	The Project crosses the RAMSAR site Niger-Niandan-MiloR

Stockholm Convention on Persistent Organic Pollutants	2004	To protect human health and the environment from the harmful effects of POPs, persistent and toxic chemicals.	Construction work and road traffic will be sources of pollution
Agreement on the Conservation of African-Eurasian Migratory Waterbirds	2021	To maintain or restore migratory waterbird populations to a favourable conservation status, particularly in the geographical area covered by the agreement, which includes Africa, Europe and parts of Asia.	Presence of a RAMSAR zone
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal	1989	To protect human health and the environment against the adverse effects of hazardous wastes by regulating their transboundary movement and promoting environmentally sound management.	Roadworks and road traffic will be sources of pollution and the production of various types of waste.
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)	1973	To ensure that international trade in wild animal and plant species does not threaten their survival.	The development of human activities along the route will be a risk for wildlife traffic and hunting.

Protection of cultural heritage

Guinea ratified the United Nations Educational, Scientific and Cultural Organisation (UNESCO) World Heritage Convention concerning the Protection of the World Cultural and Natural Heritage in 1979. This convention aims to protect the world's cultural and natural heritage by creating a committee for the protection of the world's cultural and natural heritage and a fund for this protection.

Guinea has ratified a number of other UNESCO texts and international conventions. These are listed below.

Table 13: Conventions ratified for the protection of cultural heritage by the Republic of Guinea that apply to the project.

Convention	Date of ratification by Guinea	Objective	Link with the project
Promotion and protection of the diversity of cultural expressions	2005	To protect and promote the diversity of cultural expressions, while recognising their dual nature, both cultural and economic.	The identification of several sites in or near the project's zone of indirect influence highlights cultural expressions that need to be protected. These include: the sacred site of Farakouloumba , the sacred ponds ,

			the sacred forests of Balato , and the historic site of Djinkono (in the right-of-way zone for the latter) .
Safeguarding intangible cultural heritage	2003	To ensure the viability of this heritage by implementing measures to identify, document, protect, promote and transmit the practices, knowledge and expressions that make it up.	In the case of the opening of the quarry, the project will have to include in its social and environmental management plan the treatments required to relocate the site, in consultation with the customary authorities.
World Heritage Convention	1979	To protect, conserve, present and transmit to future generations cultural and natural sites of outstanding universal value.	The identification of the sites of Farakouloumba , the sacred ponds , the sacred forests of Balato , in or near the area of indirect influence of the project, as well as the historic site of Djinkono in the project's right-of-way area, constitute cultural heritage to be conserved and passed on to future generations.
Protection of the world's natural and cultural heritage	1972	To preserve sites of outstanding universal value in order to pass them on to future generations.	The identification of several sites in the project area highlights cultural expressions that need to be protected. These include: the sacred site of Farakouloumba , the sacred ponds , the sacred forests of Balato , in or near the area of indirect influence of the project, as well as the historic site of Djinkono in the project area.
Combating illicit trafficking in cultural property	1970	Combating the illicit trafficking of cultural goods aims to protect cultural heritage and prevent the loss of people's history and identity.	In the context of the project, it applies to the identification and preservation of several cultural and spiritual sites, such as the sacred site of Farakouloumba , the sacred ponds , the sacred forests of Balato , in or near the project's zone of indirect influence, as well as the historic site of Djinkono in the project's right-of-way zone.
United Nations Convention on the Protection and Promotion of the Diversity of Cultural Expressions	2005	To create conditions in which cultures can flourish and interact freely, so as to mutually enrich each other and encourage intercultural dialogue.	The identification of several sites in the project area highlights cultural expressions that need to be protected. These include: the sacred site of Farakouloumba , the sacred ponds , the sacred forests of Balato , in or near the area of indirect influence of the project, as well as the historical site of Djinkono in the project right-of-way area.

African Convention on the Conservation of Nature and Natural Resources	2003	To conserve, sustainably manage and rationally use the natural resources of the African continent, including soil, water, flora and fauna.	In the context of the project, this convention applies to the sacred ponds and the sacred forests of Balato , in or near the area of indirect influence of the project, which are both cultural sites and ecosystems of high ecological and symbolic value.
Cotonou Agreement Declaration of the ACP States on the return or restitution of cultural property	2000	To encourage the return or restitution of cultural goods to the countries of origin and to recognise the legitimate right of ACP States to their cultural identity.	The identification of sites such as the historical site of Djinkono in Nounkounkan (an ancient fortified architectural complex and place of memory linked to the Samorian wars), the sacred forests of Balato or the sacred ponds in or near the project's indirect area of influence, bears witness to the importance of the local tangible and intangible cultural heritage.
African Charter on Human and Peoples' Rights	1981	Promoting and protecting human rights and fundamental freedoms on the African continent.	The identification of the sacred site of Farakouloumba , the sacred ponds and the sacred forests of Balato , in or near the project's zone of indirect influence, as well as the historical site of Djinkono in the project's area of influence, highlights the existence of a cultural and spiritual heritage for local communities. The preservation of these places is essential to ensure that the cultural identity of the populations concerned is respected and passed on.

Human rights and labour

Guinea has ratified 9 of the 10 fundamental conventions of the International Labour Organisation (ILO):

Table 14: Conventions ratified on human rights and labour by the Republic of Guinea that apply to the project

Convention	Date of ratification by Guinea	Objective	Link with the project
C029 - Forced Labour Convention	1959	Abolish all forms of forced or compulsory labour	The project must ensure that Convention C029 is applied, in line with Guinea's international commitments.
C087 - Freedom of Association and Protection of the Right to Organise Convention	1959	Guarantee the right of workers and employers to form organizations.	The project must ensure that Convention C087 is applied, in accordance with Guinea's international commitments.

C098 - Right to Organise and Collective Bargaining Convention	1959	Guarantee the protection of the right to organize and promote collective bargaining between employers and workers to improve working conditions.	The project must ensure that Convention C098 is applied, in accordance with Guinea's international commitments.
C100 - Equal Remuneration Convention	1967	Guarantee equal pay for men and women for work of equal value, by eliminating all forms of wage discrimination.	The project must ensure that the C100 Equal Remuneration Convention is applied, in line with Guinea's international commitments.
C105 - Abolition of Forced Labour Convention	1961	Prohibit and abolish all forms of forced labour used as a means of political coercion, repression, labour mobilization or discrimination.	The project must ensure that Convention C105 is applied, in accordance with Guinea's international commitments.
C111 - Discrimination Convention (Employment and Occupation)	1960	Prevent and eliminate all forms of discrimination based on race, colour, sex, religion, political opinion, descent nationality or social origin, and promote equality of opportunity and treatment in employment and occupation.	The project must ensure that Convention C111 is applied, in accordance with Guinea's international commitments.
C138 - Minimum Age Convention	2003	Abolish child labour by setting a minimum age for access to employment, to ensure that work does not compromise the health, safety or schooling of young people.	The project must ensure that Convention C138 is applied, in line with Guinea's international commitments.
C182 - Worst Forms of Child Labour Convention	2003	Prohibit and eliminate as a matter of urgency all forms of exploitation of children, including slavery, trafficking, forced labour, sexual exploitation and any hazardous activity that endangers their health, safety or morals.	The project must ensure that Convention C182 is applied, in accordance with Guinea's international commitments.
C187 - Promotional framework for the Occupational Safety and Health Convention	2017	Strengthen the prevention of work-related accidents and diseases by promoting a sustainable prevention culture and encouraging States to set up coherent national health and safety systems.	The project must ensure that Convention C187 is applied, in line with Guinea's international commitments.
International Covenant on Civil and Political Rights	1978	To guarantee fundamental rights such as freedom of expression, freedom of religion, the right to life, safety and a fair trial, as well as	The project must ensure that the International Covenant on Civil and Political Rights is applied, in

		protection against torture, slavery and arbitrary arrest.	line with Guinea's international commitments.
International Covenant on Economic, Social and Cultural Rights	1978	Guarantee essential rights such as the right to work in fair and safe conditions, the right to social security, health, education and an adequate standard of living, as well as the protection and promotion of cultural life.	The project must ensure that the International Covenant on Economic, Social and Cultural Rights is applied in accordance with Guinea's international commitments.
Convention on the Elimination of All Forms of Discrimination against Women	1982	To guarantee equality between women and men in all areas of social, economic, political and cultural life, and to eliminate all forms of discrimination based on gender.	The project must ensure that this convention is applied, in accordance with Guinea's international commitments.
Convention on the Rights of the Child	1990	Guarantee the protection, survival, development and participation of children, ensuring that their fundamental rights are respected in all circumstances.	The project must ensure that this convention is applied, in accordance with Guinea's international commitments.

4.2. Guinea's legal framework

■ The Transition Charter of 27 September 2021

On 5 September 2021, Guinea's political and legal order underwent a major change. The 2020 Constitution was repealed and replaced by the Transition Charter, promulgated on 27 September 2021, which serves as a provisional constitution pending the drafting of a new constitutional text. However, national laws and international treaties in force prior to the arrival of the new authorities are extended and remain applicable in their entirety. The Transition Charter mainly contains provisions on the reaffirmation and respect for fundamental rights and freedoms, as well as on the management of the transition with a view to achieving a State governed by the rule of law with strong institutions. Thus, while it guarantees the right to property against any form of expropriation, with the exception of expropriation in the public interest, declared under the conditions and in the forms provided for by law and subject to fair and prior compensation (article 28), there are no provisions relating to the protection of the environment and the decentralisation of powers. However, this absence of provisions relating to the environment is offset by the extension of national laws in force before 5 September 2021, including the Environmental Code and its implementing regulations. The latter constitutes a legal framework with which the Project must comply in its implementation.

■ The Local Authorities Code revised in 2017

The Local Authorities Code defines the roles and responsibilities of local authorities in land use management. As such, the municipality must give an opinion before any investment in a project and before any occupation/use of the land. Local authorities share responsibility for land use management with the State.

Revised in 2017 (to remedy several contradictions and shortcomings), the Local Government Code aims to make decentralisation and the transfer of competences, powers and duties from central government to local authorities effective. Given the responsibilities conferred by law on local authority officials, their

involvement in identifying and assessing the environmental and social impacts associated with the RN 32 road project is crucial.

■ The Environment Code

The 2019 Environmental Code, or Code de la protection et de la mise en valeur de l'environnement, establishes the administrative and legal framework enabling the Guinean State to fulfil its constitutional obligation to ensure a clean and healthy environment for everyone in Guinea. Article 1 defines its purpose as being "to lay down the fundamental principles for the promotion of sustainable development, the management and protection of the environment and natural capital against all forms of degradation".

The Environment Code is the cornerstone of environmental protection and improvement in Guinea and sets out the fundamental legal principles to be respected to ensure the protection of environmental resources and the human environment.

With regard to environmental assessment (articles 25 to 34), the Environmental Code requires such an assessment for any project which, by its nature, size or location, is likely to harm the environment or human health. This environmental assessment, carried out by qualified experts approved by the ministry responsible for the environment, takes the form of an ESIA carried out before any project is implemented.

The Code also requires a periodic environmental audit to be carried out during project implementation, either on the company's own initiative (internal audit) or on the initiative of the ministry responsible for the environment (external audit), in order to assess the impact that a company or part of its business generates or is likely to generate on the environment, directly or indirectly, and to ensure that this activity complies with regulations, norms and standards, and to require corrective measures if necessary, or to impose sanctions in the event of non-compliance with the Environmental and Social Management Plan (ESMP) (articles 38 to 40).

With regard to the institutional framework (articles 10 to 19), the Code requires that stakeholders at all levels (Ministry in charge of the environment, other ministries and public structures, local authorities, private, public or mixed companies, environmental protection associations) be involved to ensure that environmental concerns are taken into account in their respective areas of activity or intervention. It should be noted that the Ministry in charge of the Environment remains the key player in its role as the department in charge of implementing the national environmental protection and management policy, as well as promoting best environmental governance practices and incorporating Guinea's international environmental commitments into national legislation.

However, the implementing regulations covered by the new code have not yet been published. In the meantime, the texts published under the old code, although not updated in relation to the new code, continue to apply insofar as is necessary to avoid situations of legal vacuum.

The legal and institutional frameworks for impact assessment are described in [more detail in section 4.3](#)

4.2.1. Protection of biodiversity

The regulations on species protection are set out in the Code de protection de la faune et des règles de chasse (Law L/97/038/AN of 9 December 1997 adopting and promulgating the Code de protection de la faune et des règles de chasse). This code defines the legal framework for the protection, conservation and management of fauna and flora and their habitats, and provides for the recognition of hunting rights. It also sets out certain rules concerning hunting and aims to promote the sustainable use of species and ensure their survival to satisfy human needs. This Code and its interaction with the ESIA legislation currently form the cornerstone of the protection and enhancement of biodiversity in Guinea.

The Code is supported by a national policy on flora and fauna, which sets conservation objectives and an action plan for their conservation, rehabilitation and development. The code also stipulates that certain

species of flora and fauna constitute a national resource that must be protected. It lists the species that must be fully or partially protected. These are listed in decree A/2020/1591/MEEF/CAB/SGG of 19 May 2020.

The first national parks were created in Guinea on the basis of the network of classified state forests. In 1990, the Code for the Protection of Fauna and the Regulation of Hunting was adopted and, from 1997, integrated into the legal system. The Code distinguishes five categories of protected areas in Guinea: National Park, Strict Nature Reserve, Managed Nature Reserve, Wildlife Sanctuary and Hunting Reserve. In addition, Guinea has ratified international conventions (see section 3.4) and designated several areas as "internationally recognised areas of importance for biodiversity and ecosystems", including biosphere reserves and Ramsar sites. More recently, at the request of the IUCN, Ramsar sites have been designated along major rivers. It is not clear how these biosphere or Ramsar sites are integrated into the national system of legal protection.

Furthermore, in addition to the 1994 PNAE, mentioned above, there are several policy actions in favour of biodiversity, including:

- National Forestry Action Plan (1990) ;
- Mangrove management master plan (1990);
- National Action Plan to Combat Desertification (2006).

Finally, the Project is located close to the Haut Niger National Park (PNHN), which is subject to specific regulations. The shortest distance between the Project's Pk0 at Koumana and the edge of the PNH is 14.5km, and 35.5km separate the Pk0 from the edge with the heart of the park (limit of the former Amana classified forest, adjoining that of Mafou). The NNHP was built around two classified forests: Mafou, created by decree no. 97/011/PRG/SGG of 28 January 1997, and Kouya, created by decree no. 97/8210/MAEF/SGG of 28 September 1997. The park's buffer zone was defined by decree no. 2002/5048/MAE/SGG of 23 September 2002.

According to article 18 of decree n°97/011/PRG/SGG of 28 January 1997, all work likely to alter or degrade the ecosystem or vegetation is prohibited in the core zone of the park. According to article 2 of the decree, buffer zones are intended for the sustainable management of resources for resident populations.

4.2.2. Water legislation

The Water Code (Law L/ 94/ 005 /CTRN of 15 February 1994) defines the water resources of the Republic of Guinea and the measures to be taken to ensure a permanent inventory of water quantity and quality, its protection, development and optimum use, taking into account the social, economic and cultural needs of the Nation.

It establishes that the water resources of the Republic of Guinea are an integral part of the natural public domain of the State and as such are not subject to appropriation. However, they may be subject to a precarious and limited right of use, subject to prior authorisation (article 4). All uses of water other than domestic (personal) are subject to prior authorisation or concession (article 7) and the use of water for the supply of drinking water has absolute priority over all other uses (article 20).

4.2.3. Forestry legislation

■ The Forestry Code of 22 June 1999, revised in 2017

The Forestry Code (Law No. L/99/013/AN of 22 June 1999 adopting and promulgating the Forestry Code) sets out the legal framework for the protection of forests in Guinea. The Code covers all aspects of the use and conservation of commercial and community forests. It sets out the requirements for the classification,

management, use, protection and reforestation of Guinea's forests. In addition, a national forestry policy and action plan were adopted in 1990 (decree no. 056 of 5 February 1990), establishing a strategy for the sustainable development of the forestry sector.

Revised in 2017 (ordinary law U2017/060/AN of 12 December 2017), the forestry code sets out the rules for managing and protecting the forest estate. The forest code also determines the role of the forest police. For example, Article 58 prohibits, with a few exceptions, the felling of trees without a permit in designated forests and non-designated forest areas (areas with a minimum density of non-agricultural trees of 10% and a minimum size of 0.5 ha). Article 80 stipulates that the construction of infrastructure in forest areas will be authorised by the minister responsible for forests, who will issue a tree-felling permit or a permit for clearing land where necessary. This authorisation will set out the measures for the protection and regeneration of forest resources within the framework of the Forestry Code and related texts.

The Forestry Code also deals with the protection of forest resources. Forests can be classified by the Guinean state or local authorities by decree. The purpose of classifying a forest area by decree is to enable the protection and development of forest resources through sustainable and balanced use, the development of the classified area and the protection of the environment.

4.2.4. Pastoral Code

The Pastoral Code (Ordinary Law I/2024/008/CNT of 07 February 2024) defines the general rules governing the practice of traditional, semi-intensive and intensive livestock farming in the Republic of Guinea. According to the Code, pastures are divided into 3 categories: natural pastures, post-cultivated pastures and created or developed pastures. It prohibits the roaming of animals and regulates the keeping and movement of animals. Among other things, the Code deals with access to pastures and rights of use, the use of water resources in relation to pastoralism and transhumance, the settlement of conflicts, and focuses on the rational management of fodder and water resources for the benefit of livestock.

4.2.5. Air quality standards

Air quality standards in Guinea are used to protect the environment and human beings from harmful or unpleasant air pollution.

They are defined in the Guinean standard (NORME GUINEENNE NG 09-01-011 : 2012 /CNQ : 2004). They are presented in the table below.

Table 15 : Guinean air quality standard. Source: Guinean standard NG 09-01-011 : 2012/CNQ:2004

Pollutant	Averaging period	Value
Nitrogen dioxide (NO ₂)	Annual average	100 µg/m ³ (Ambient air quality)
		40 µg/m ³ (immission limit value)
	24-hour average	150 µg/m ³ (Ambient air quality)
	1 hour Maximum 4	400 µg/m ³ (Ambient air quality) 200 µg/m ³ (immission limit value)
Particulate matter (PM ₁₀)	24 hours	230 µg/m ³ (Ambient air quality)

Pollutant	Averaging period	Value
		260 µg/m ⁽³⁾ (immission limit value)
	Annual average	50 µg/m ⁽³⁾ (Ambient air quality)
		80 µg/m ⁽³⁾ (immission limit value)

4.2.6. Noise standard : Guinean standard NG 09-01-012: 2012 / CNQ: 2004 on "Maximum exposure limits to certain chemicals and noise in the workplace".

The Guinean Standards Institute defines different acceptable noise levels for specific times of day and types of area, including residential, commercial and industrial areas, as shown in the table below.

The Guinean regulations refer to the IFC noise limits for the night, 45 dB(A) for residential areas and 70 dB(A) for industrial areas. During the day, however, it sets a stricter limit of 50 dB(A) and defines an additional sensitive period between 13:00 and 15:00, for which a lower threshold of 5 dB(A) is recommended (45 dB(A)).

Table 16: Guinean noise standard. Source: NG 09-01-012 : 2012 / CNQ:2004

Period	Maximum ambient noise level Leq over 1 hour [dB(A)]		
	Class 1 residential area	Class 2 commercial area	Class 3 industrial area
06:00 - 13:00	50	55	
1pm - 3pm	45	50	70
4pm - 10pm	50	55	
10pm - 6am	45	50	

4.2.7. Regulations governing facilities classified for environmental protection purposes

Presidential decree no. 200/PRG/SGG/89 of 8 November 1989 (promulgated under article 73 of the Environmental Code) on the legal regime for facilities classified for environmental protection sets out the administrative and financial requirements applicable to classified facilities.

Classified facilities are installations which, because of the nature of their activities or the actual volume involved, require special authorisation under Guinean environmental legislation. Order n°03/8003/PRG/SGG of 21 October 1993 sets out the technical nomenclature for facilities classified for environmental protection and lists all industrial activities covered by Presidential Decree 200/PRG/SGG/89 for which an integrated permit is required. This decree sets thresholds for each industrial activity that reflect the level of potential damage resulting from the activity and above which different requirements apply. Industrial sites are classified as Class I or Class II sites depending on the level of damage caused to the environment.

Article 2 of Presidential Decree no. 200/PRG/SGG/89 requires the owner or operator of a classified facility to apply for environmental authorisation at the same time as applying for a building permit. In accordance with article R221-1 of the French Planning Code, planning permission must be obtained prior to the construction of any building. However, this permit can only be obtained after environmental authorisation has been obtained for a classified facility.

The application for authorisation must include contact details, the location of the facility, the nature and scale of the activities that the applicant plans to undertake, the corresponding numbers in the nomenclature (see decree no. 200/PRG/SGG/89 below), and the planned processes. This application must include 5 copies. Following the application, the Ministry of the Environment and Sustainable Development (MEDD) launches public consultations led by a commissioner. Consultation lasts 30 days. Authorisation is granted by a joint order of the Ministry of the Environment and the ministry responsible for the activity in question.

It should be noted that these requirements were adopted under the 1987 Environmental Code and have not been updated following subsequent reforms to environmental legislation. This procedure differs slightly from that described in the 2019 Environment Code. In the Environment Code, authorisation is provided by a joint order of the MEDD and the Ministry for Industry and Small and Medium-sized Enterprises.

The storage of cement, asphalt and other bituminous substances, fuel, flammable substances and the possible processing of quarry materials are likely to classify the project as Class I or II, with different authorisation, inspection and monitoring requirements. The applicable requirements will be updated on the basis of updated technical information once the final details of the construction project are determined. At this stage, the identified components of the project that will involve classified installations are as follows:

- Storage of asphalt, pitch, bitumen, tar (in solid form): Class I for a storage capacity of more than 40,000 kg, Class II for a storage capacity of less than 40,000 kg;
- Crushing, grinding and screening of stone, pebbles and ores: Class I for an annual processing capacity of more than 150,000 tonnes, Class II for an annual processing capacity of between 5,000 and 150,000 tonnes;
- Storage of lime, cement or gypsum: Class II facilities in urban areas, where capacity exceeds 50 tonnes;

Fuel storage (considered to be a category 2 flammable liquid): class I for storage capacity in excess of 300 m³ and class II for storage capacity between 30 m³ and 300 m³.

■ Land and property code

Act L/99/013/AN of 30 March 1992 adopting and promulgating the Land and Property Code sets out the general legal framework establishing the rules applicable to Guinean land. In addition to defining the concept of owner (the State, local authorities and private individuals may also be owners), the code also deals with infringements of property rights. Articles 55 to 83 deal with the conditions and stages for carrying out Expropriation in the Public Interest (ECUP). The Land and Property Code deals mainly with registered property and details the process for registering titles, leases and deeds. It defines two land registration procedures:

- By the land plan: this is an administrative document, not a title per se, which is kept at municipal level in towns and at community level for rural development in rural areas.
- By registering land ownership: this leads to the issue of a title deed. The document is kept at the land registry office.

In practice, these land registration procedures have not been fully implemented in rural areas, where customary rights predominate; in the absence of formal private ownership, land is essentially state property.

■ Town planning code

Law L/98 n° 017/98 of 13 July 1998 adopting and promulgating the law on the town planning code of the Republic of Guinea (also known as the town planning code) defines the responsibilities of the Guinean state in the management and development of the country. This control is exercised through the Schéma National d'Aménagement du Territoire (SNAT) and the Plans d'Aménagement Régionaux (PDAR), which provide the various levels of government with the tools to influence urban development.

In addition to the Town Planning Code, the Guinean government has published the Rural Land Policy Declaration (Decree D/2001/037/PRG), which aims to promote rural economic and social development by guaranteeing property rights and rules favourable to agricultural development in rural areas, improving the sustainable management of resources and enabling the development of a transparent and fair land market. This decree constitutes the strategic framework for rural land management.

4.2.8. Legal framework for social protection and employment

■ The Labour Code

The Labour Code of 10 January 2014 is the main source of legislation governing labour practices and relations in Guinea. It contains all the texts applicable to individual and collective relations between workers and employers carrying out professional activities in the mixed and private sectors (Article 1). It enshrines the right to work for all, equal opportunities and treatment for citizens in terms of access to vocational training and employment without discrimination on grounds of origin, race, sex, religion or philosophy, and respect for human dignity in employment (articles 2 et seq.). It also prohibits forced labour, all forms of violence in the workplace and sexual harassment (articles 4 et seq.). Finally, it specifies restrictions on night work for women in factories, plants, mines and quarries, building sites, workshops and their outbuildings of any kind (Articles 136.1 and 136.2), as well as details on the employment of children (Article 137.1 and following of Chapter VII: Child labour).

■ Social protection

Law L/94/006/CTR of 14 February 1994 on the Social Security Code is the main source of Guinean legislation governing the protection of workers and their families against economic or social poverty and against difficulties resulting from a significant loss of income.

■ The Public Health Code

The public health code (law L/97/021/AN of 19 June 1997 on the public health code) ensures the protection and promotion of health, and the rights and obligations of the individual, the family and the community throughout the territory of the Republic of Guinea.

Decree D/253/24/PRG on occupational health creates a national occupational medicine service within the Department of Health and Public Hygiene and defines the role and responsibilities of this department. It provides for compulsory prior consultation with the Ministries of Industry, Public Health, the Environment and Public Works for technical advice and official authorisation before any development project. The decision taken must include a feasibility study mentioning the harmful effects of the project on the health of the populations concerned and these same effects on the balance of the natural environment (articles 98 to 100).

■ Law on supplementary social insurance companies (Law no. 2021/0017/AN of 30 April 2021)

This law lays down the rules relating to supplementary social security companies in the Republic of Guinea. Complementary social security companies provide their members and their dependants with individual and/or collective benefits, in addition to those provided by the social security system.

■ Local content law L/2022/0010/CNT of 22 September 2022

In order to strengthen policies aimed at improving the economic impact of investment projects in Guinea, the country has adopted a law on local content. The aim of this law is to create general requirements for all local and international companies (with the exception of micro, small and medium-sized enterprises) with regard to local employment, technology transfer and the use of Guinean subcontractors. This law applies to all sectors and all projects, whether financed by public or private funds.

In terms of employment, the law lays down requirements concerning the employment of local staff (art. 14), the recruitment plan (art. 15) and training (art. 16):

- Quotas are set for 4 categories (managers, supervisors, skilled workers and unskilled workers), the proportion of which increases as the project progresses. Only the quotas for unskilled workers are set at 100% for the entire project phase;
- A recruitment plan detailing skills and labour requirements, as well as the system for promoting Guinean workers within the company, must be drawn up and approved by the Local Content Regulation and Control Authority (ARCCL);
- A training plan, in particular to encourage the gradual replacement of foreign staff by Guineans when quotas are not met due to a lack of expertise.

The Local Content Act 2022 also provides that private companies that undertake activities in Guinea and enter into a co-contracting agreement with local companies or subcontract specific activities to them will benefit from certain advantages that will be defined in a subsequent regulation (articles 11 and 12).

The implementing decrees and orders mentioned in the Local Content Act 2022 have not yet been published, which explains why some of the provisions of the Local Content Act 2022 are not yet operational.

On the question of road infrastructure, Article 23 of the Local Content Code, which deals with the construction of earth roads, specifies that for "any project to build an earth road, whether to link two localities or for the purposes of preparatory work on railway lines, operators shall enter into co-contracting arrangements with one or more Guinean companies specialising in public works, selected by means of a private invitation to tender. The co-contracting companies subcontract part of the work to small and medium-sized Guinean companies, under the conditions set out in this law. These co-contracting and subcontracting agreements are submitted to the ARCCL for approval before coming into force.

4.2.9. Cultural heritage legislation

■ Law on the protection of Guinea's cultural heritage

Guinean National Law No. L/2016/ 063/AN of 05 October 2016 on the protection, conservation and enhancement of the national cultural heritage establishes the legal regime for the national cultural heritage, which includes a number of archaeological remains defined as monuments, groups of buildings and sites.

4.2.10. Legislation on roads and construction

■ Law on the protection of Guinea's national road heritage

Guinea's national law L/2016/074/AN, "Protection of the national road heritage of the Republic of Guinea", provides definitions and rules regarding the construction, use and maintenance of roads in Guinea. Article 3 defines the elements included in the right-of-way of a road. Articles 4 and 10 define the width of the road right-of-way in Guinea, which can be up to 100m wide, and is set at a minimum of 40m for national roads, unless otherwise decided in consultation with the authorities. This law also includes details of the traffic permitted on Guinean roads, signage requirements, grounds for eviction and penalties.

■ Housing and Construction Act

The purpose of the Housing and Construction Act (L/2015/ 020/ A.N "Loi Portant Code De La Construction Et De L'habitation En République De Guinée") is to organise, regulate and promote investment, production, proper operation and management in the fields of construction and housing throughout the national territory.

The law defines the requirements for destruction, construction and alteration permits, as well as for the issue of certificates of conformity. It details the responsibilities of the various entities involved in construction work and the considerations relating to project design.

Although much of the law under review relates exclusively to housing construction, several sections apply to the RN 32 road project.

For example, Section 22 states that no well shall be dug within 25 metres of a waste water installation of any kind (latrine, septic tank, cesspit, underground sewer). Article 23 stipulates that no one may, without authorisation and justification from the competent authority, erect a building less than 40 m from a new cemetery and less than 25 m from existing cemeteries.

4.2.11. Other Guinean laws and regulations applicable to the project

The Guinean authorities are working to define Guinean environmental, health and safety management standards. These were adopted by Order A/2015/N°342/MIPMEPSP/CAB of 27 February 2015 and apply to the Project:

- Guinean standards: NG 09-01-010: 2012 / CNQ: 2004 relating to new standards for wastewater discharges;
- Guinean standards: NG 09-01-011: 2012 / CNQ: 2004 concerning new standards for emissions of atmospheric pollutants (as detailed above in section 5.2.3.6);
- Guinean standards: NG 09-01-012: 2012 / CNQ: 2004 concerning new standards on exposure to chemicals and noise in the workplace (as detailed previously in section 5.2.3.7); and

Guinean standards: NG 09-01-013: 2012 / CNQ: 2004 relating to new environmental inspection procedures for industrial and commercial facilities.

4.3. Institutional framework for environmental and social management in Guinea

Guinea's legal framework requires the preparation of environmental and social studies. These requirements are set out in the 2019 Environmental Code and its implementing decrees. This section details the ESIA process and the requirements applicable to the Project.

■ ESIA requirements in the Environment Code

Article 25 of the French Environment Code specifies the need for an environmental and social impact assessment for projects which, due to their nature, scale or location, may have an impact on the environment or human health. The text also addresses other environmental assessments for such projects, including strategic environmental assessments (for policies, plans and programmes) and environmental audits (for project monitoring). Article 29 of Section 2 defines the minimum content of a detailed environmental and social impact assessment report:

- A description of the project ;
- A basic assessment of the project site and its environment;
- An assessment of the foreseeable consequences of the project on the human and natural environment;

- A list and description of the measures envisaged by the promoter to avoid, reduce if possible or compensate for the consequences of the project on the environment, including residual impacts;
- A presentation of the alternatives;
- An estimate of the corresponding costs;

This article also specifies the obligation to draw up an environmental and social impact statement for low-impact projects (NIES).

Article 31 stipulates that when the ESIA is deemed satisfactory, the Ministry of the Environment will issue an environmental certificate to the developer.

■ **Order A/2023/1595/MEDD/CAB/SGG amending Order A/2022/1646/MEDD/CAB/SGG of 25 July 2022 on the administrative environmental assessment procedure**

This decree, published in 2023, has the same functions as the previous decree A/2022/1646/MEDD/CAB/SGG, but provides additional details on the publication of environmental assessment reports, public participation and the costs inherent in the environmental procedure.

Article 15 of Chapter III of the decree stipulates that the promoter of a project must submit an environmental impact assessment to the competent supervisory authority for projects, works or installations that may, due to their size or the nature of their activities, have an impact on the environment. It defines the categories of projects or activities and the type of studies they require according to the impact they are likely to have on the environment:

- **Category A:** High-risk projects or activities likely to have very negative impacts and/or risks, generally irreversible, most often felt in an area larger than the sites covered by these projects. These projects are subject to a detailed Environmental and Social Impact Assessment (ESIA).
- **Category B:** projects or activities presenting a significant risk and whose negative environmental impact is less serious than that of category A projects. These projects are subject to a simplified ESIA or an environmental and social impact statement.
- **Category C:** Projects or activities presenting a moderate or even low risk, with minor negative impacts on the biophysical and human environment. Subject to environmental and social requirements.
- **Category D:** Projects or activities whose negative impact on the biophysical and human environment is insignificant. Not subject to specific requirements.

Annex A of this decree specifies the classification of common projects and activities and the corresponding thresholds.

The entire submission and authorisation procedure is managed by the Guinean Environmental Assessment Agency (AGEE). The formal examination of the authorisation file is carried out by the CTAE for category A and B projects, an ad hoc multidisciplinary team made up of representatives of the various ministries involved in the project. The final environmental compliance certificate is issued by the ministry responsible for the environment.

The environmental and social impact assessment procedure comprises the following stages, listed in Article 16:

Preliminary review (project notice followed by preliminary review)

The proponent must submit a request, accompanied by the project notice (presentation of the project), to assess the level of environmental assessment required by the AGEE within the MEDD. The AGEE is responsible for proposing a categorisation to the MEDD within five working days. The MEDD will then inform the promoter within seven working days.

Scoping (preparation of the scoping report and terms of reference for the environmental and social impact assessment)

The scoping report and terms of reference will be submitted to the MEDD. The AGEE is responsible for examining them and informing the Minister of the Environment within ten days. The terms of reference must specify the reasonable timeframe envisaged for submission of the ESIA.

ESIA (carrying out the study, reviewing/analysing the report)

This is the current stage from which this report is produced.

The ESIA must be carried out in accordance with the terms of reference. The minimum content of a detailed environmental and social impact assessment report is defined in Article 24:

- A non-technical summary that provides a succinct summary of the information provided in the chapters ranging from the project description to the environmental and social management plan;
- An introduction presenting the report;
- The context and justification for the project, the objectives and expected results of the project;
- Presentation of the methodology;
- A description and comparative analysis of the alternatives;
- A description of the different possible variants for carrying out the project in terms of geographical location (site, corridor, area), technological availability (processes, operating methods) or operational techniques, as well as a comparison of these variants and the justification for the chosen variant;
- A full description of the project, including activities, developments and associated works planned during the construction, operation and closure phases, as well as a description of discharges, including associated equipment and facilities. This description also includes an estimate of the costs of the project and the timetable for its implementation in the various phases, as well as the determination of the geographical limits of the project area;
- An analysis of the political, legal and institutional framework of the project;
- An analysis of the initial state of the site and its environment: collection of basic data on water resources, soil, air, climate change, flora, fauna, biological diversity, physico-chemical and microbiological parameters, socio-economic conditions, cultural and archaeological heritage sites, etc. ;
- A description of measures and initiatives for adaptation and resilience to climate change and mitigation of its effects on biodiversity, in particular threatened or declining species and their habitats;
- The results of public consultations, with a description of the methods and processes applied;
- Identification and assessment of the environmental and social risks and impacts (positive or negative, direct, indirect or cumulative in the short, medium and long term) associated with the implementation of the project in its various phases;
- Assessment of greenhouse gas emissions;
- Assessment of losses of biodiversity and ecosystem services according to the mitigation hierarchy (avoid, mitigate, compensate and net gain);
- Effects on gender and vulnerable people;
- Assessment of cumulative effects on the main valued components;
- A proposal for measures to mitigate and compensate for risks and negative impacts and to enhance positive impacts, as well as specific greenhouse gas reduction and adaptation measures;
- Development of compensation measures for biodiversity losses, potentially in the form of offsets;

- A stakeholder engagement plan (SEP);
- The complaints management mechanism;
- An ESMP including an impact mitigation and/or enhancement programme, an environmental monitoring programme, a capacity building programme for stakeholders and a summary of the costs of the various programmes;
- An action plan for resettlement and compensation if necessary;
- A plan for the rehabilitation and closure of ancillary facilities;
- A plan for managing risks, hazards, disasters and environmental emergencies;
- A waste management plan;
- A cultural heritage management plan and any other associated plans;
- A general conclusion to the study;
- The appendices are made up of complementary documents (the terms of reference of the ESIA and/or complementary studies, the minutes of the public consultation) drawn up as part of the environmental and social impact study, maps, drawings, photos, laboratory results, photographic reports and articles deemed important for understanding the work; bibliographical references; professional references of the key experts who carried out the various parts of the study, etc.

The ESIA must be submitted to the MEDD for review. Additional information may be requested. The Technical Committee of Environmental Analysis (CTAE) and AGEE will assess the ESIA within 40 days of receipt of the report. Additional time taken by the promoter to respond to comments or provide additional information requested by the authority is not included in this timeframe.

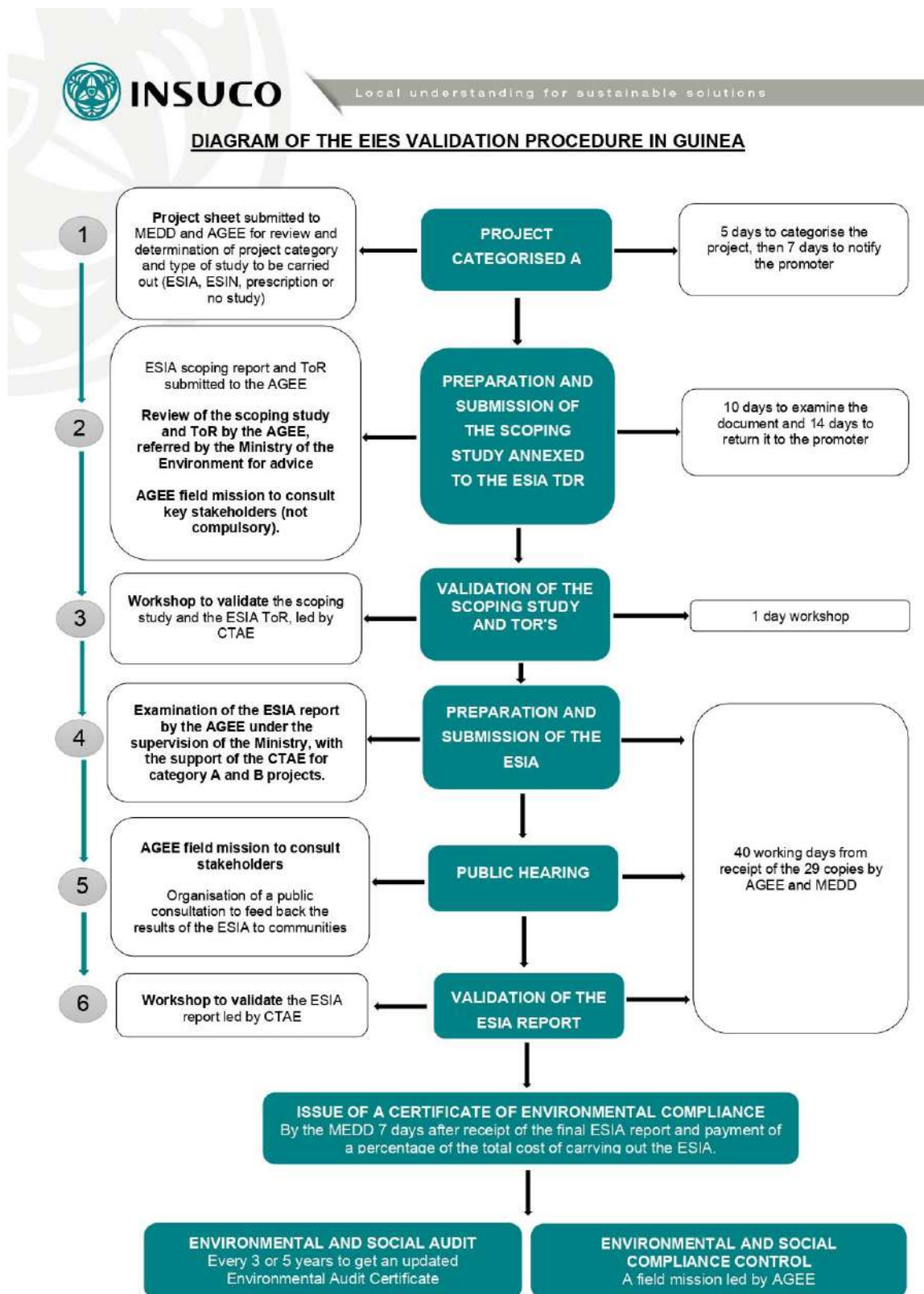
Making a decision on the project

After receiving the final ESIA report, the MEDD will take seven days to make a final decision. If the decision is positive, for category A projects, an environmental compliance certificate (ECC) valid for one year, renewable, will be issued.

Implementation, environmental monitoring, follow-up and control

After obtaining the ECC, the promoter must submit progress reports on the ESMP to the AGEE and the relevant sector ministry every six months. Failure to comply with the ESMP will result in the suspension of the ECC.

The figure below provides an overview of the ESIA preparation and approval process.



■ Additional permits or authorisations required

The ESIA report is part of a wider administrative context; QGMI will therefore also need to obtain all the permits and licences required by Guinean regulations, and in particular the following main environment-related permits:

- Environmental and social compliance certificate (following approval of the ESIA) issued by the Ministry of the Environment and Sustainable Development (MEDD);
- Clearance authorisation issued by the MEDD, including for trees likely to be cleared in the forest areas crossed by the project;
- Building permits issued by the prefectures concerned;
- Environmental authorisations relating to the project's activities under the classified facilities regime, where applicable.

It should be noted that, in accordance with Article 2 of Presidential Decree 200/PRG/SGG/89, applications for environmental permits will be made at the same time as applications for building permits. The building permit will be obtained after the environmental permits have been obtained for activities falling under the classified facilities regime if the final design of the project involves classified facilities.

4.3.1. Project institutions

■ Ministry of Infrastructure and Public Works (MITP)

The MITP is responsible for designing, developing, implementing and monitoring government policy in the fields of infrastructure and public works. This area of activity includes the Guinean road network.

As such, it is responsible for drafting laws and regulations relating to infrastructure and public works, in liaison with the relevant department, and for ensuring that they are applied. More specifically, the MITP is responsible for :

- Drawing up infrastructure and public works development strategies, in collaboration with the departments concerned;
- Promoting investment in infrastructure and public works;
- Commissioning and technical feasibility studies for projects and programmes in the ministry's areas of responsibility;
- Designing and implementing construction and rehabilitation projects for national and prefectural roads, primary urban roads, expressways, motorways and interchanges in collaboration with the departments concerned;
- Design, implement and monitor construction projects and crossing structures;
- Organise and supervise maintenance operations on national and prefectural roads, urban roads and engineering structures;
- Monitor the implementation of road, port, airport and rail infrastructure projects in liaison with the relevant departments;
- Ensuring the protection of structures in the Ministry's areas of responsibility, setting up weighing, relief and rain barrier systems and ensuring their proper operation;
- Install, maintain and rehabilitate river ferries and ensure their operation;
- Develop and implement base mapping projects for a national territory;
- Promote the use of local materials and appropriate techniques for road construction;
- Ensuring the quality of materials used in the construction of public works, airport, rail and port infrastructure;

- Manage road, port, airport, rail and public works infrastructure projects;
- Contribute to the qualification of small and medium-sized companies, design offices and inspection offices operating in the infrastructure and public works sector;
- Promote safety and security measures in the infrastructure and public works sectors;
- Take into account the issue of people with reduced mobility in the design of structures;
- Take account of the environmental dimension in development programmes and projects;
- Promoting gender equality and equity in the department's activities;
- Participating in national, sub-regional, regional and international meetings on issues within the department's remit.

■ Road Management Agency (AGERROUTE)

The Agence de Gestion des Routes (AGERROUTE GUINEE SA) is a public company governed by law L/2017/0056/AN of 08 December 2017, creation decree D/202/200/PRG/SGG of 05 July 2021. It manages a National Road Network (RRN) comprising 2,780 km of paved roads, also known as Bitumen Roads (BR), and 4,796 km of unpaved roads, known as Stabilised Earth Roads (SER). Every year, it invests a substantial budget in the maintenance and rehabilitation of these roads.

AGERROUTE is generally responsible for the construction, rehabilitation and maintenance of roads, bridges and other engineering structures, as well as the management of the classified road network.

In addition, AGERROUTE is responsible, unless otherwise stipulated, for the delegated management of road projects on behalf of the minister responsible for roads, within the framework of special financing agreements that may bind the State to financial backers. In this case, it acts as the executing agency for the Ministry of Roads.

AGERROUTE, representing the MITP, is the only authority empowered to issue permits for the laying and removal of pipes, or for the occupation of the right-of-way of classified roads.

All public project owners are required to obtain the opinion of the ministry responsible for roads, represented by AGERROUTE, before issuing any building permit.

Any occupation of classified road rights-of-way must be approved in advance by AGERROUTE.

AGERROUTE also carries out construction, rehabilitation and maintenance work on the rest of the national network on behalf of the Ministry of Roads. Where appropriate, a performance agreement may be signed with the beneficiary public authorities.

■ The Ministry of the Environment and Sustainable Development (MEDD)

The role of the Ministry of the Environment and Sustainable Development is to design, draw up, implement and monitor government policy in the fields of the environment and sustainable development. In particular, it is responsible for :

- Drawing up policies and strategies for environmental protection, sustainable management of renewable natural resources, sanitation and the living environment, and supervising their implementation;
- Ensure that the principles of environmental protection and preservation of natural capital are taken into account in sectoral policies;
- Contribute to building the technical capacity of stakeholders working in the environmental field;
- Ensure the stability of catchment ecosystems and the quality of water resources;
- Promote environmental governance;
- Ensure the quality of life of urban and rural populations;

- Consider all measures to prevent and reduce ecological risks;
- Ensure disaster risk prevention and reduction;
- Contribute to disaster preparedness, response and recovery;
- Combating environmental fraud;
- Combating plant and wildlife crime in collaboration with stakeholders;
- Combating all forms of pollution, nuisance and environmental degradation;
- Promoting adaptation, mitigation and resilience to the effects of climate change;
- Promote good environmental practice in sectoral development actions in urban and rural areas;
- Promote and develop sub-regional, regional and international cooperation in the field of the environment and sustainable development;
- Support sectoral ministries in achieving sustainable development objectives in their respective areas;
- Participate in the negotiation of bilateral and multilateral environmental agreements;
- Coordinating the implementation of multilateral environmental agreements to which Guinea is a party;
- To ensure the mobilisation of the resources needed to carry out environmental activities and preserve natural capital;
- Promote research, education and awareness-raising in the field of the environment and the preservation of natural capital for sustainable development;
- Providing technical advice on the feasibility of socio-economic development programmes and projects;
- Issue environmental permits;
- Ensuring the preservation of ecosystems and the sustainable conservation of biological diversity;
- Ensuring compliance with the "avoid, reduce and compensate" negative impact mitigation hierarchy in all development projects;
- Promote gender equality and equity in the department's activities;
- Participate in sub-regional, regional and international meetings, symposia, conferences, seminars and forums in the Ministry's areas of expertise.

To support it in its missions, a number of institutional stakeholders are attached to the Ministry, as described in Decree D/2022/0042/PRG/SGG of 20 January 2022 on the remit and organisation of the Ministry of the Environment and Sustainable Development.

- The current national directorates are the Direction Nationale des Pollutions, Nuisances et Changements Climatiques (National Directorate for Pollution, Nuisance and Climate Change), the Direction Nationale des Forêts et de la Faune (National Directorate for Forestry and Wildlife) and the Direction Nationale de l'Assainissement et du Cadre de Vie (National Directorate for Sanitation and the Living Environment). Their mission is to design, develop and implement government policies in these areas. To this end, they comprise support services, attached services and decentralised services;
- The Direction Générale des Conservateurs de la Nature, which is responsible for enforcing the regulations in force in all protected areas and in the forestry sector;
- Centre National de Surveillance et d'Observations Environnementales ;
- National Centre for the Protection of the Marine Environment and Coastal Zones;
- The National Centre for Disaster Management and Environmental Emergencies;
- The Centre for the Restoration and Integrated Development of the Fouta-Djallon Massif;

- The environmental analysis laboratory.

The ministry is also assisted by a number of autonomous public bodies:

- Guinean Environmental Assessment Agency;
- Guinean Agency for the Promotion of Biodigester Technology;
- Guinean Office for National Parks and Wildlife Reserves;
- Guinean Timber Office;
- Centre de gestion de l'environnement des monts Nimba-Simandou ;
- N'Zérékoré Forestry Centre;
- The Environment and Natural Capital Fund.

In Guinea, the State is decentralised into local authorities: the region, the urban commune and the rural commune. Together with the State, these authorities contribute to regional administration and planning, economic, social, health, cultural and scientific development, environmental protection and the improvement of living conditions.

■ The Ministry of Agriculture and Livestock (MAGEL)

The Ministry of Agriculture is responsible for designing, drawing up and implementing government policy in the areas of agricultural development and food security.

As such, it is specifically responsible for

- Designing and drafting agricultural legislation and regulations and ensuring that they are applied,
- Designing, drafting, implementing, monitoring and evaluating national agricultural development strategies,
- Promoting the private sector in the development of agricultural production sectors,
- Designing, implementing and monitoring agricultural development programmes and projects,
- Ensuring that hydro-agricultural development infrastructure, rural buildings and agricultural tracks are put in place,
- Designing and defining applied research areas in rural development and food security,
- To promote technology transfer, agricultural advice, mentoring, support for rural women and the structuring of the rural world,
- Contributing to the achievement of food security,
- To draw up an agricultural map,
- To set up a database on the agricultural sector,
- Support the emergence of a dynamic private sector for the production, supply and local distribution of agricultural inputs and equipment,
- Encourage the development of agro-industrial and export crops,
- Ensure that agricultural statistics are kept,
- Strengthening the information and communication system for stakeholders in the agricultural sector,
- overseeing plant protection, information, awareness-raising and public education in this area,
- Ensuring the rational management of natural resources in terms of securing land tenure and soil fertility,
- To participate in the implementation of the regional economic integration policy,

- Helping to set up and strengthen credit and savings structures that are adapted to and accessible to rural producers and operators,
- To set up mechanisms for resolving conflicts between farmers and livestock breeders,
- Participating in sub-regional and international meetings, symposia, conferences, seminars and negotiations on issues relating to the Ministry's areas of competence,
- To take account of the environmental dimension in the sector's programmes and projects;
- To promote gender and equity in the sector's activities.

■ The Guinean Environmental Assessment Agency (AGEE)

The AGEE is the agency responsible for coordinating the EIA review and approval process. It was created by decree D/2022/0364/PRG/CNRD/SGG of 25 July 2022, formerly the Bureau Guinéen des Études et Évaluations Environnementales (BGEÉE), which was responsible for coordinating the EIA review and approval process.

According to the decree of 20 July 2022, the AGEE is responsible for promoting, coordinating and supporting programmes, projects and initiatives that encourage environmental and social assessment, as part of a participatory and integrated approach involving all stakeholders. As such, it is responsible for :

- Promoting the government's national environmental policy in the field of environmental assessment;
- Examining opinions on draft policies, strategies, plans, programmes and projects and classifying them where appropriate;
- Ensure that the environmental and social dimensions are taken into account in policies, plans, programmes and projects;
- Appraise the terms of reference and environmental assessment reports: strategic environmental assessment; environmental and social management framework (ESMF) and resettlement policies (RPP); environmental and social audit (E&S audit); environmental and social impact assessment (ESIA), including RAP and compensation plans, according to predetermined compliance criteria;
- Determining the nature and extent of the impact of an existing facility by means of an external environmental audit (EEA);
- Overseeing the organisation of public consultations under the direction of a commissioner of enquiry;
- Coordinating the public hearings of the Technical Committee for Environmental Analysis (CTAE);
- Working with technical and social services, associations and non-governmental organisations to develop and adopt a legal framework for compensation to protect the economic and social rights of people affected by public utility projects;
- Ensure the implementation of RAPs and compensation plans, in collaboration with the technical departments concerned, in accordance with best practice;
- Create a database of environmental and social impact assessments, strategic environmental assessments, environmental and social management frameworks and external environmental and social audits, as well as a geographic information system (GIS);
- Carry out, on an exceptional basis, environmental and social impact assessments for certain public projects, with the authorisation of the Minister for the Environment, at the expense of the petitioner or project owner;
- Preparing and submitting certificates of environmental compliance (CECs) and environmental authorisations for signature by the Minister for the Environment;
- Monitor the implementation of environmental and social management plans in collaboration with the relevant technical departments;

- Work to build the capacity of AGEE departments;
- Ensure the mobilisation of resources for AGEE activities.

The CTAE, referred to by the AGEE, is the interministerial committee responsible for assisting the Ministry of the Environment and Sustainable Development in analysing and approving the terms of reference and ESIA reports. The ESIA for the project must be carried out on the basis of the terms of reference approved within this administrative framework.

■ Regions

The main role of the Region is to provide a forward-looking regional vision, at administrative level, to define a regional ambition with all national and regional stakeholders, and to support and coordinate the diversity of actions and initiatives in the region. It also provides legal and technical assistance to local authorities.

The region's responsibilities include

- Support for regional economic sectors;
- Protection of the environment;
- Maintenance of road infrastructure between the regions.

■ Prefectures

Under the decentralisation laws, the prefect is the representative of central government at local level in his or her administrative district. He is therefore the representative of each minister and of the government as a whole. The prefect is therefore responsible for implementing all environmental issues at decentralised level.

Under the authority of the prefect, the sub-prefects are responsible for representing the State in the sub-prefectures. It should be noted that each prefecture has set up a prefectural environmental and social monitoring committee, whose main task is to ensure the effective implementation of the environmental and social management plan at prefecture level.

■ Urban and rural communities

Rural and urban communities are decentralised entities of the State, with independent budgetary management and development choices.

Their responsibilities are as follows:

- Planning, local development, land use, housing and urban development;
- Safety, environment and quality of life (health and hygiene);
- Commercial facilities and economic infrastructure;
- Management of the municipality's assets and property.

They are responsible for preparing or commissioning the preparation of the main town planning documents and town planning and zoning plans for the local authority, updating them and ensuring that they comply with national guidelines.

■ Decentralised and deconcentrated services related to roads and transport

Decentralised government departments involved in roads and transport consist mainly of prefectural directorates of infrastructure and public works.

■ Bodies responsible for protecting the environment and plant and animal resources

The various decentralised and deconcentrated government departments with a link to the environment are as follows:

- Regional environment and sustainable development inspectorates ;
- Prefectural environment and sustainable development departments;
- The Communal Environment and Sustainable Development Departments of the City of Conakry;
- Forestry districts.

4.4. International standards

The RN 32 road project is financed by international financial institutions. These require the project to comply with international environmental and social sustainability standards. The standards applicable to this project are as follows:

- IFC E&S Sustainability Performance Standards (2012) ;
- World Bank Environmental Health and Safety General Guidelines (2015);
- World Bank Environmental Health and Safety Guidelines (IFC EHS Guidelines, 2007) for toll roads;
- Equator Principles IV (EP IV) (2020) and related guidance;
- Organisation for Economic Co-operation and Development (OECD) Common Approaches (2016);
- UKEF's environmental, social and human rights due diligence and monitoring policies and practices;
- International good industry practice, including other applicable standards.

This list is subject to change depending on the financial institutions involved in financing the project.

4.4.1. IFC Environmental and Social Sustainability Performance Standards (2012)

The most widely recognised international sustainability standards are the International Finance Corporation's Environmental and Social Performance Standards (IFC, 2012), commonly known as the *IFC Performance Standards*. The IFC, a subsidiary of the World Bank Group, has a mandate to support private sector development in developing countries. Its Sustainability Framework, revised on 1 January 2012, is now considered one of the most comprehensive frameworks for environmental and social management.

The IFC Performance Standards are a central element of this framework. This set of eight thematic standards sets out the principles for integrating environmental, health and safety considerations into projects. They are designed to help project developers avoid, mitigate and manage risks and impacts so that they develop their activities in a sustainable manner. The IFC Environmental Performance Standards are listed below:

- PS 1 - Environmental and Social Risk and Impact Assessment and Management: defines the requirements for ensuring appropriate E&S management, policy implementation and accountability, including through an environmental and social impact assessment for which IFC PS 1 defines the requirements.
- PS 2 - Labour and working conditions: this standard defines requirements to ensure fair labour management and safe and healthy working conditions.
- PS 3 - Resource Efficiency and Pollution Prevention: sets out requirements to ensure an appropriate level of pollution prevention and control.
- PS 4 - Community Health, Safety and Security: sets out requirements to ensure that adverse impacts of the project on the receiving community are managed and controlled.

- PS 5 - Land Acquisition and Involuntary Resettlement: sets out requirements to minimise the negative social and economic impacts of involuntary resettlement, land acquisition or land use restrictions.
- PS 6 - Biodiversity conservation and sustainable management of living natural resources: this standard sets out requirements to ensure that project impacts on nature, ecosystems, habitats and biodiversity are managed appropriately.
- PS 7 - Indigenous Peoples (IPs): PS 7 defines the requirements for the protection of indigenous peoples.
- PS 8 - Cultural Heritage: defines the requirements to protect cultural heritage from the adverse effects of project activities, to support its preservation and to promote the equitable sharing of benefits arising from the use of cultural heritage.

Note on the applicability of IFC PS 7 on indigenous peoples

It should be noted that there is no universally accepted definition of Indigenous Peoples, as outlined in IFC Performance Standard 7. Depending on national contexts, these populations may be referred to by various terms such as indigenous ethnic minorities, aborigines, hill tribes, minority nationalities, scheduled tribes, first nations, etc.

Despite this lack of definition, the IFC NOS7 refers to indigenous peoples as a distinct social and cultural group with the following characteristics, to varying degrees:

- Self-identification as members of a distinct indigenous cultural group and recognition of that identity by others ;
- Collective attachment to geographically distinct habitats or ancestral territories in the project area and to the natural resources of these habitats and territories;
- Customary cultural, economic, social or political institutions that are distinct from those of the dominant society or culture; or
- A distinct language or dialect, often different from the official language(s) of the country or region in which they reside.

PS7 also recognises that indigenous peoples, as social groups with identities different from those of the dominant groups within national societies, are often among the most marginalised and vulnerable segments of the population. As such, NP7 requires the adoption of specific measures to mitigate the vulnerability of indigenous peoples both in terms of stakeholder engagement and the mitigation of negative impacts and the provision of positive impacts.

In Guinea, there is no legal or institutional framework dealing with the issue of indigenous peoples. According to Guinean legislation, there are no officially recognised indigenous groups in Guinea. Although Guinea is a member of the ILO, it has not ratified ILO Convention 169 on Indigenous and Tribal Peoples of 1989. However, Guinea has voted in favour of the UN Declaration on the Rights of Indigenous Peoples.

In Guinea, the term "indigenous" refers to a recognised historical precedent in the settlement process: members of the original community settled on a site, locality or micro-region are recognised as indigenous. In other words, this is the status attributed to the collective of descendants of the locality's founding lineages. As such, indigenous peoples have the following characteristics:

- Indigenous peoples belong to a specific cultural group, without this belonging being exclusive or characteristic of their autochthony. For example, the Malinkés - the majority ethnic group identified during socio-economic surveys - are found elsewhere in the sub-region;
- These people can claim a collective attachment to a geographically limited habitat and access to the resources found there;

- Indigenousness is defined principally by the possession of traditional political power within their communities, particularly in terms of conflict management and land management. These customary institutions coexist with, but do not compete with, the formal local authorities;
- The language spoken by the indigenous populations is intrinsically linked to ethnicity, while French is the official language used in the country.
- Indigenous populations do not suffer from vulnerability or marginalisation by dominant non-indigenous individuals within national society, but rather from recognised customary authority. It should be noted, however, that minority ethnic groups (i.e. non-indigenous) may suffer discrimination in access to resources insofar as they are not indigenous.

Given the situation of indigenous peoples in the Guinean context, IFC PS 7 does not apply to the Project. Nevertheless, this study endeavours to collect data on the ethnic groups present in the study area, and will identify ethnicity as a factor of vulnerability if this is the case.

4.4.2. World Bank Environment, Health and Safety General Guidelines (2015)

In addition to the IFC PS, IFC and the World Bank Group have also developed general and sector-specific environment, health and safety (EHS) guidelines. The EHS guidelines are designed to be used in conjunction with the IFC SPs and provide guidance to users on common EHS issues that may apply to various industry sectors. The applicability of these guidelines should be tailored to the hazards and risks of a project based on site-specific variables, host country context, environmental assimilative capacity and other project factors deemed relevant by qualified and experienced assessors. The main guidance documents applicable to the project are as follows:

- Environmental, Health and Safety (EHS) Guidelines, 2015 and 2008
- Environmental, Health and Safety Guidelines for the extraction of construction materials, 2007

The IFC EHS Guidelines are technical reference documents that contain general and sector-specific examples of international good practice. The sector-specific EHS guidelines integrate information relevant to the specific facility or project and provide guidance on environmental, occupational health and safety (OHS) and community OHS aspects, as well as performance indicators and monitoring arrangements.

Where Guinean environmental regulations differ from the levels and measures presented in the EHS Guidelines, the project will be required to comply with the more stringent provisions.

4.4.3. World Bank Environmental Health and Safety Guidelines (IFC EHS Guidelines, 2007) for toll roads

The World Bank's EHS Guidelines for Toll Roads (2007) are considered relevant to the construction, operation and maintenance of large sealed road projects, including associated bridges and viaducts, as well as smaller scale sealed and unsealed road projects. These guidelines are therefore considered essentially applicable to the project.

The guidelines identify industry-specific impacts that may occur as a result of road projects during the construction and operation phases, and propose best practices for preventing and mitigating impacts. The guidelines classify issues into three categories: the environment, occupational health and safety, and community health and safety.

Recommendations relating to environmental issues cover the prevention and mitigation of impacts associated with habitat alteration and fragmentation, stormwater, waste, noise, air emissions and

wastewater. Occupational health and safety recommendations cover physical hazards, chemical hazards and noise. Community health and safety recommendations cover risk mitigation for pedestrian safety, road safety and emergency preparedness.

The guidelines also provide performance indicators and monitoring recommendations for assessing the impact, adequacy and success of prevention and mitigation measures. The document provides sources for exposure limits for hazardous substances or impact thresholds for noise levels.

The recommendations also refer to other relevant internationally recognised standards, such as the World Bank's General EHS Guidelines and EHS Guidelines for Construction Materials Extraction, or the US National Cooperative Highway Research Program.

4.4.4. Equator Principles IV (EP IV) (2020) and accompanying guidelines

The Equator Principles (EP) are intended to serve as a common reference and risk management framework for financial institutions to identify, assess and manage environmental and social risks when financing projects.

According to these principles, which have been adopted by many international financial institutions to ensure that projects financed or advised are developed in a socially and environmentally responsible manner, projects can be categorised according to the extent of potential environmental and social risks and impacts, including those related to human rights, climate change and biodiversity. This categorisation is based on the IFC's environmental and social categorisation process. The categories are as follows:

- Category A - Projects with potentially significant, adverse, irreversible or unprecedented environmental and social risks and/or impacts;
- Category B - Projects with limited potential adverse environmental and social risks and/or impacts that are few in number, generally site-specific, largely reversible and easily resolved through mitigation measures; and
- Category C - Projects with minimal or no environmental and social risks and/or impacts.

This ESIA assesses the human rights impacts of the project and ensures that, where such impacts are identified, the required mitigation measures are adopted.

4.4.5. OECD Common Approaches (2016)

The OECD Council Recommendation on Common Approaches for Officially Supported Export Credits and Environmental and Social Due Diligence (2016) is an agreement that sets out a harmonised framework for export credit agencies (ECAs) to identify, assess and manage the environmental and social risks of financed projects. The agreement was adopted on 28 June 2012 and revised on 6 April 2012. As an OECD recommendation, it is not binding, but constitutes good practice that should be followed by export credit agencies (ECAs) in OECD member states.

The OECD Common Approaches define the common terminology used to describe projects. They set out the general principles to be followed by ECAs and the selection criteria that determine whether a project falls into one of three categories: A, B and C.

The three classification categories are as follows

- Category A: a project is classified in category A if it is likely to have significant adverse environmental and/or social impacts that are diverse, irreversible and/or unprecedented. These impacts may affect a wider area than just the sites or facilities that are the subject of the works. In

principle, Category A includes projects in sensitive areas or located in or near sensitive areas. An illustrative list of Category A projects can be found in Annex I of the OECD Common Approaches.

- Category B: A project is classified as Category B if its potential environmental and/or social impacts are less adverse than those of Category A projects. As a general rule, these impacts are few in number, site-specific, with little or no irreversibility, and mitigation measures are more readily available.
- Category C: A project is classified as Category C if it has little or no potentially adverse environmental and/or social impacts.

Within this framework, UKEF and Santander Bank, as the project financing bodies, apply these common approaches and require that the project also comply with international standards such as the Equator Principles and the IFC Performance Standards. They therefore play an essential role in categorising the project (A, B or C) and defining the resulting environmental and social obligations.

The project is classified as category A under Guinean law. In view of the scale, diversity and potentially irreversible nature of the impacts pre-identified during the scoping phase, and in accordance with the OECD's Common Approaches, the project must be classified as **Category A**. This categorisation implies the completion of a full Environmental and Social Impact Assessment (ESIA), including an Impact Management Action Plan, as well as a mechanism for public consultation and disclosure of information, in order to ensure compliance with international standards (Equator Principles, IFC Performance Standards).

The Common Approaches then detail the requirements for the environmental and social review of projects, which differ depending on the category to which a project belongs. The standards against which projects must be assessed are also described. Category C projects do not require additional assessment. Category A projects must always be subject to an ESIA, while category B projects may disclose environmental and social information in an ESIA or in other assessment reports related to the project.

The common approaches also provide guidance on how a financing decision should be made on the basis of the assessment of environmental and social information and how projects should be monitored.

According to the OECD recommendation, project sponsors should compare projects against the relevant aspects of the IFC's eight performance criteria (where sponsors are private companies), or the World Bank's ten environmental and social criteria (where the sponsor is a sovereign debtor). Export Credit Agencies (ECAs) must also make project information publicly available at least 30 days before the final decision to support the project is made.

4.4.6. Project Categorisation

According to the OECD Council Recommendation on Common Approaches to Officially Supported Export Credits and Environmental and Social Due Diligence, and more specifically Annex I (Illustrative List of Category A Projects),

the project should be classified as Category A because it involves 'the construction of a new road, or the realignment and/or widening of an existing road, where such new road, or realigned and/or widened section of road, has a continuous length of 10 km or more'.

In addition, the project is expected to be classified as Category A because it is likely to increase resettlement requirements; it has a potential displacement of more than 10 km (in accordance with the OECD Common Approaches).

Given these factors, it is likely that the road project will have significant, diverse, irreversible or unprecedented environmental and/or social risks and/or impacts. Consequently, a comprehensive and transparent ESIA will need to be carried out to quantify the impacts and develop mitigation measures to

minimise the significant risks associated with the proposed project, as well as a public consultation and information disclosure mechanism to ensure compliance with international standards (Equator Principles, IFC Performance Standards).

4.4.7. UKEF's environmental, social and human rights due diligence and monitoring policies and practices

UKEF is the UK's export credit agency and its statutory function is to support exports. UKEF adopted its Environmental, Social and Human Rights Due Diligence and Monitoring Policy and Practices in its Corporate Report on 26 September 2022. This policy is designed to comply with:

- OECD Common Approaches on Officially Supported Export Credits and Environmental and Social Due Diligence;
- Equator Principles requirements;
- IFC Performance Standards.

In accordance with these standards, this policy enables :

- Identify environmental, social and human rights risks and conduct due diligence to ensure that projects comply with the local legal framework and applicable international environmental, social and human rights standards before UKEF support is granted;
- Monitor the environmental, social and human rights performance of projects to ensure that they are implemented and operated in compliance with the local legal framework and applicable international environmental, social and human rights standards.

Environmental, social and human rights risk identification and due diligence is carried out in parallel with commercial and financial underwriting, which includes anti-corruption and sustainable lending. UKEF therefore strives to

- Carry out the best possible assessments, based on the circumstances, information and timescales available to the agency, to require the mitigation of the most significant adverse environmental, social and human rights impacts, both for the environment and for those affected ;
- Undertake well-targeted environmental, social and human rights monitoring and oversight, proportionate to the likely magnitude of the risks and their impacts, taking into account UKEF's ability to influence the necessary changes and the commercial timescales involved.

4.4.8. International good industry practice, including other applicable standards

Apart from the ECOWAS standards (below) of which Guinea is a member, the country does not have a comprehensive set of standards for road construction, the country routinely uses standards from other countries, notably France. As a result, QGMI will be able to follow several of these standards, in particular for: road design, road pavement design, signage and road safety, and geotechnical design.

■ ECOWAS road standards

As the Republic of Guinea is part of ECOWAS, the project will follow the requirements specified by ECOWAS in its standards for the development of national roads (cf. ECOWAS A/DEC.6/7/96 of 27 July 1996).

Article 1 of this text provides as follows:

- The design speed for the construction of interstate roads is 100 km/h ;

- The maximum axle load for design is 13 tonnes and the maximum axle load for operation is 11.5 tonnes;
- The width of the road must be at least 7 m ;
- The shoulders must be at least 1.5 m wide on both sides.

■ French road standards

As Guinea does not have a complete set of standards for road construction, the country routinely uses standards from other countries, notably France.

One of these standards, which QGMI will follow for the design of the road (geometric standards, associated longitudinal profile and reference speeds) is the Technical Recommendation for the General Design and Geometry of Roads, from the Guide technique pour l'aménagement des routes principales, August 1994, produced by SETRA (*Service d'études techniques des routes et autoroutes*).

Several other French standards (or other national standards) may be followed for the design of the project, including, but not limited to, those mentioned below.

For the design of road pavements :

- French standard NF P 98-086. Structural design of pavements: (May 2019);
- Catalogue of typical new pavement structures (SETRA, 1998);
- Catalogue of new pavement structures and pavement design guide in Senegal (June 2015).

For road signs and safety:

- The order of 7 June 1977, published in the French Official Journal on 13 August 1977, on road and motorway signs;
- The order of 16 February 1988, published in the French Official Journal on 12 March 1988, relating to the approval of modifications to road signs and signals;
- Circular no. 88-49 of 9 May 1988 relating to approval and conditions of use.

For geotechnical design :

- French standard NF P 94-500
- French standard NF P 11-300

■ Other standards relating to road design

- French standard NF P 98-082. Pavements - Earthworks - Determination of road traffic for pavement design (January 1994) ;
- French standard NF EN 12591: Bitumens and bituminous binders - Specifications for road bitumens. (2009).

4.5. Gap Analysis of national and international standards

4.5.1. Analysis

Three types of gap may result from the analysis:

- High - Guinean law does not take into account the issues raised by the Performance Standard (PS) and results in the application of the PS to the Project;

- Low or moderate - Guinean law does not take full or exact account of the requirements of the CWS and results in the concomitant application of Senegalese law, supplemented by the requirements of the CWS;
- None - Guinean law takes sufficient account of the requirements of the NOS. National standards and the CWS apply concurrently.

Where Guinean environmental and social legislation differs from the levels of measures set out in the WB/IFC group standards, the project is committed to complying with the most stringent. The gap analysis between Guinean national legislation and the WB/IFC Group standards is presented in the table below:

Table17 : Gap analysis between Guinea and IFC standards

Topic	NP 1	National legislation	Gap	Measure
Carrying out an environmental and social impact assessment	The Borrower will undertake an environmental and social assessment of the project to assess the environmental and social risks and impacts during the life of the project. The environmental and social assessment will be proportionate to the potential risks and effects of the project and will identify all direct, indirect and cumulative environmental and social risks and effects of the project in an integrated manner.	Any project for the development or construction of works or operations that is likely to harm the environment is subject to a prior environmental and social impact assessment (article 28 of the Environment Code).	No	The project must be the subject of an ESIA, as it is included in the list of projects subject to mandatory ESIA under both PS 1 and the legislation.
Identification and assessment of risks and impacts	The environmental and social assessment will result in an adequate, accurate and objective assessment and presentation of the risks and impacts of the project, and will be prepared by qualified and experienced people.	The impact analysis must focus on identifying and assessing the likely environmental impacts associated with the project. This phase involves the following steps: • Identification of the likely impacts of the project on the receiving environment; • Assessment of the direct and indirect, negative and positive environmental impacts; • Identification of impact mitigation measures. The detailed ESIA must include • A description of the project; • An analysis of the initial state of the site and its environment; • An assessment of the foreseeable consequences of implementing the project on the site and its natural and human environment (article 29 of the Environment Code).	No	The project must use an independent, qualified consultancy firm approved by the national authorities to carry out the ESIA. The ESIA report must highlight all the probable and potential direct, indirect, positive and negative impacts of the project.

Topic	NP 1	National legislation	Gap	Measure
ESMP	Develop and implement an environmental and social management plan that describes the measures to be taken to eliminate or compensate for adverse social impacts and the actions required to implement these measures.	The ESIA must present appropriate actions or measures to prevent, eliminate, reduce, compensate or compensate for negative impacts, or to increase the benefits of positive environmental impacts. The impact study report must specify the actions, works, devices or corrective measures planned for the various phases of the project. If it is not possible to reduce or eliminate negative impacts through mitigation measures, compensatory measures such as compensation for expropriated land must be considered. All mitigation measures must be contained in the ESMP. Without prejudice to any other requirements that may be formulated by the authorities, the detailed ESIA must include : • A statement and description of the measures envisaged by the petitioner to avoid, reduce if possible or compensate for the harmful consequences of the project on the environment, including residual impacts; • A presentation of possible alternative solutions and; an estimate of the corresponding costs (article 29 of the Environment Code).	No	The project must ensure that the ESIA report contains an ESMP.

Topic	NP 1	National legislation	Gap	Measure
Environmental and social audit	As part of the environmental and social assessment, the Borrower shall include in the assessment methods and tools an environmental and social audit to determine the nature and extent of environmental and social concerns related to the project or activities under construction or operation. This audit defines and justifies the appropriate measures and actions to mitigate these concerns, estimates the cost of these measures and actions and recommends a timetable for their implementation. For some projects, the environmental and social assessment may take the form of an environmental or social audit; for others, the audit will form part of the assessment.	Throughout the project's life cycle, the promoter or its agent is required to carry out an annual environmental audit to ensure that, at every stage, the project complies with the environmental obligations set out in the impact study report approved by the Technical Committee for Environmental Analysis (CTAE), the ESMP and the regulations in force. Environmental audits are compulsory and must be carried out periodically. There are two types of environmental audit: • Internal audits, for which the company is responsible; • External audits initiated by the Ministry responsible for the environment (article 39 of the Environment Code). The environmental audit enables the Ministry in charge of the environment to ensure that the activity complies with regulations, norms and standards, in order to require corrective measures or impose sanctions in the event of non-compliance with the ESMP (article 38 of the Environment Code).	Low	The project must continuously monitor the effective implementation of the ESMP and call on an independent consultancy firm to carry out the annual internal audit in order to make any necessary corrections and anticipate the risks of sanctions that may result from the MEDD's external audit.
Grievance management	The study will need to describe the process for resolving disputes relating to restrictions on resource use that may arise between or among affected communities, and grievances that may be raised by community members who are dissatisfied with eligibility criteria, community development plans or the actual implementation of the project.	National legislation does not provide a mechanism for resolving grievances outside of disputes arising during expropriation.	High	The project must put in place a project-specific grievance mechanism to deal with specific concerns raised by individuals in a timely manner.
Disadvantaged or	The Borrower shall ensure that persons or communities affected by the project are not prejudiced or discriminated	There is no provision in national legislation for disadvantaged or vulnerable groups.		The project must ensure that special consideration is given to those individuals or groups who

Topic	NP 1	National legislation	Gap	Measure
vulnerable groups	against, with particular attention to indigenous peoples, minorities and disadvantaged or vulnerable sections of the population, especially where the project is likely to have adverse effects or where its development benefits are to be shared.		High	are more likely to suffer from the effects of the project and/or are more limited than others in their ability to enjoy the benefits of a project. The project should require specific measures and/or assistance for such individuals or groups as they are likely to be excluded from, or unable to participate fully in, the general consultation process. In this respect, age-related considerations, in particular the elderly and minors, should be taken into account and the risk of their being separated from their community avoided or minimised.
Consultation and participation of affected communities	The Bank recognises the importance of early and continuous stakeholder engagement and thorough stakeholder consultation. The Bank will require the Borrower to engage with stakeholders, including communities, groups or individuals affected by proposed projects, and other interested parties, by disseminating information, consulting and promoting informed participation, in a manner commensurate with the potential risks and impacts of the project on affected populations. The Bank will be entitled to participate in consultations to understand the concerns of the affected populations and how the Borrower will address them as part of the design and mitigation measures envisaged in relation to the project, in accordance with the provisions of SEN 10. As part of its due diligence, the Bank will monitor	The promoter must initiate a communication process before, during and after the impact study in order to take into account the interests, values and concerns of local and regional populations, and involve them in the project planning process (point 2.6 of the general ESIA guide subject of the adoption of Order A/2013/474/MEEF/CAB of 11 March 2013).	None	The project must conduct its assessment process in a concerted manner with the involvement of the affected communities and all stakeholders in order to gather their expectations and concerns regarding the implementation of the project. A transparent and informed information and communication process in an accessible language must be put in place with all stakeholders.

Topic	NP 1	National legislation	Gap	Measure
	the Borrower's stakeholder engagement and consultations. Stakeholder engagement will be an integral part of the environmental and social assessment. The Borrower will continue to engage with stakeholders throughout the life of the project and will provide them with information in a manner appropriate to the nature of their interests and the potential environmental and social risks and impacts of the project.			

5. Analysis of project alternatives

5.1. Introduction

Assessing alternatives, also known as analysing alternatives, is a key stage in managing the environmental and social risks of a project. It involves assessing the options that are technically and financially feasible for reducing potentially significant impacts.

The need for an alternatives analysis is defined in International Finance Corporation (IFC) Performance Standard (PS) 1 (2012) (footnote 11):

"For greenfield development projects or major expansions with specifically identified physical features, aspects and facilities that are likely to have potentially significant environmental or social impacts, the client will carry out a full environmental and social impact assessment, including a review of alternatives where appropriate."

In addition, IFC Performance Standard PS 3 (2012) requires the assessment of technically and financially feasible alternatives to eliminate, reduce or manage impacts related to resource efficiency and emissions, including water use, greenhouse gases (GHGs), air emissions and emissions to land (including waste streams).

This chapter presents the justification for the project, followed by an analysis of the various feasible project and design alternatives, including the "no project" scenario, the alternative to the existing route, alternative sites for quarries and the alternative for construction camps.

This assessment describes how potential environmental and social impacts are taken into account in the design phase and justifies the alternatives selected, focusing on those alternatives where environmental and social outcomes are a determining factor in the choice of the preferred alternative.

The project and design alternatives considered for the proposed project are as follows:

- No Project Alternative;
- Alternative to the existing route;
- Alternative quarry sites; and
- Alternative sites for construction camps.

Following consideration of these alternatives, the selected project components were developed as part of the design process. Chapter 5: Project Description provides a detailed description of the project design option that was considered for the ESIA process.

5.2. Description of alternatives (social, environmental and economic considerations)

In line with IFC performance requirements, the purpose of the analysis of alternatives is to examine different location, design, technology and process options in order to avoid, reduce or mitigate adverse environmental and social impacts. This chapter presents a comparison between the chosen scenario and the main alternatives (route, life stock, quarries), including the "no project" option, using technical, economic, environmental and social criteria to justify the final choice of project.

■ Alternative 'without project'

The alternative 'without project', within the framework of this ESIA, corresponds to the situation where the Project would not be implemented.

The *Table18 : Advantages and disadvantages of the "no project" alternative* below summarises the consequences of adopting the "no project" option.

Table18 : Advantages and disadvantages of the "no project" alternative

Advantages	Disadvantages
No impacts caused by the construction and operation phases: economic and physical displacements, pollution, risk of road accidents, etc.	- Missed opportunity for socio-economic development of the region: increased mobility of goods and people, easier access to basic goods and services, opening up of agricultural and pastoral areas, development of trade, etc. - Road impassable in rainy season due to stagnation of water on the carriageway: isolation of communities. - Little economic investment. - Difficult access to basic services: health, education, civil status, etc.

The "no project" option would lead to a continuation of current conditions, i.e. a lack of quality access and better connections between local communities. This situation would not ensure the economic and social integration of rural areas, as envisaged in the PRI 2022-2025 and Vision 2024 for an emerging and prosperous Guinea. Negative effects would include a gradual deterioration in the condition of the road, a decrease in its use, increased isolation of the area, as well as increased safety risks, leading to a higher rate of incidents and accidents.

■ Alternative to the RN 32 route

The Project aims to improve the RN 32 road. Consequently, there are few alternatives to the selected route. These alternatives have been proposed taking into account physical, urban planning, environmental and social constraints.

The first solution is to maintain the existing route rather than design a new road. Building on the existing route significantly reduces the social and environmental impacts that would inevitably result from opening up a completely new route. It should be noted, however, that during the final design phase, **certain micro-routings may be considered and adopted in order to adapt the existing road to the technical standards adopted and to reduce the social and environmental impacts, particularly in the sensitive areas identified.** In this context, the ESIA may recommend specific adjustments where these effectively reduce the impact.

The second alternative consists of building a new road, following a completely different route from the current one. Building a new road, and therefore a new route, would have greater environmental and social impacts.

The choice of route for the RN 32 is that of the first solution, i.e. maintaining the current route but with a few micro-routings to improve road safety and avoid sensitive sites identified in the ESIA.

The micro-routing consists of minor adjustments to meet technical requirements, such as optimising the minimum radius and improving intersections to improve traffic flow and safety, in accordance with the applicable design standards described in chapter 3 : Project description.

In particular, during the design phase, modifications to the existing road were adopted to allow vehicles to maintain a speed of 80 km/h in safe conditions. To achieve this, the angles of some curves will need to be adjusted, creating **some minor deviations from the existing road**. This is likely to occur in places where the existing curves are steeply banked.

The following figures show some examples of the micro-route adjustments applied in the design. As shown in the figures, the current alignment (yellow line) could undergo some micro-routing (blue line) to smooth out sharp bends and improve safety conditions. These micro-routings will be definitive when the project is implemented (before the completion of the Resettlement Action Plan) and will be defined in a Final Preliminary Design.

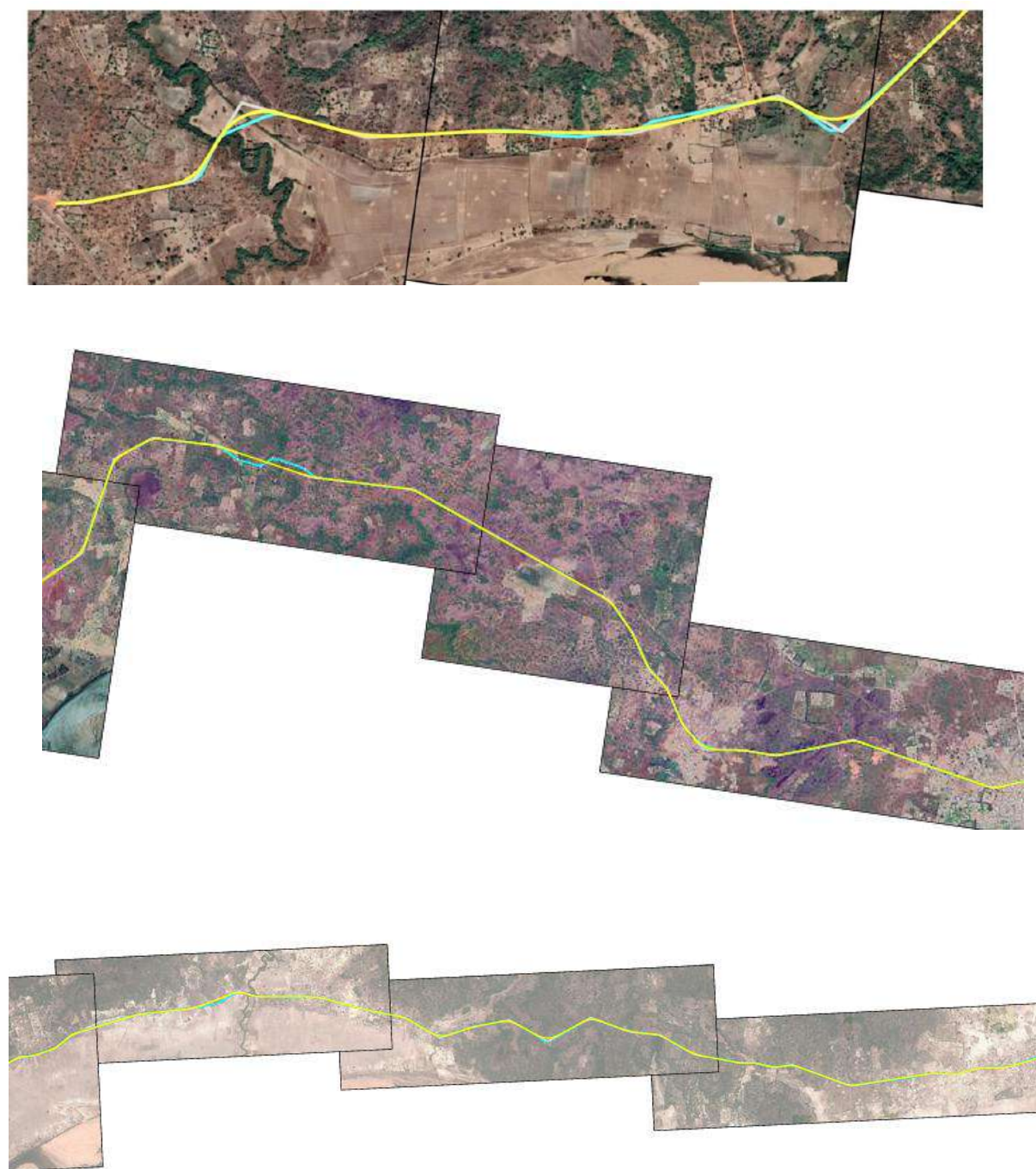


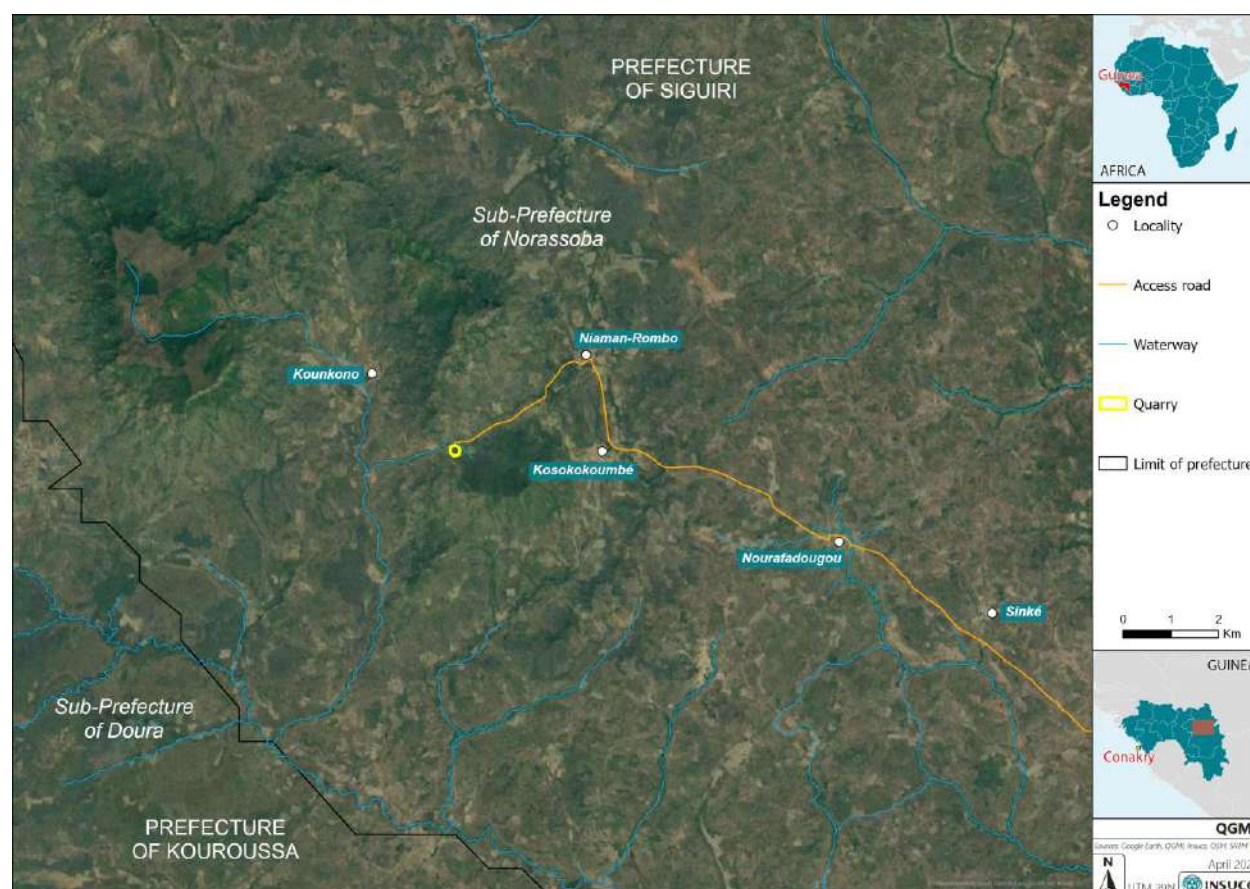
Figure20 : Examples of adjustments to the route of the road between Koumana and Iri-Kiri (in yellow the current route, in blue the micro-routings). Source: APS report, 2021

■ Quarry variants

QGMI plans to source gravel, sand and aggregates from a new quarry in the region. Several quarries were selected and analysed for rock quality. Two were selected as feasible options. These were the Kounkono quarry and the Kouroukoro quarry.

Kounkono quarry

The Kounkono quarry, with an estimated surface area of 35,000 m², is an area of granite outcrops not yet exploited, located at the end of the 32 kilometres linking Norassoba to the village of the same name (Map 13) via an existing track in an advanced state of disrepair. To create this quarry, the track will be widened, levelled and improved by adding lateritic materials. The track will be widened by 7 metres, except in the town of Norassoba where the track, which is wide enough, will be rehabilitated. A diversion of the rehabilitated track will be envisaged to avoid the village of Nourafadougou. 4 bridges will also be rehabilitated along this track.



Map 13 : Location of the Kounkono quarry, Source: Insuco, 2025

Kouroukou quarry

→ The Kouroukoro quarry, with an estimated surface area of 35,000 m², is an area of granite outcrop not yet exploited, located 2 km via a track (in good condition) from the town of Kouroukoro, then approximately 140 km from the project's KP 0 to Koumana, via the RN 2. To build the quarry, the track will be widened by 7 metres, levelled and improved by adding lateritic material.



Map 14 : Location of the Kouroukoro quarry, Source: Insuco, 2025

Table 19 : Advantages and disadvantages of the alternatives for both careers

Criteria	Kounkono Quarry Alternative	Kouroukou Quarry Alternative
Social (Resettlement, employment, health)	<u>Advantages:</u> <u>Job creation and local economic development due to the repair of the access road to the quarry and the creation of jobs at the quarry.</u> <u>Improved access to localities along the access road, although limited to a few years as it is not part of a long-term policy to improve access by the state or municipal administration.</u> <u>No physical relocation: no residences within the quarry's right-of-way and optimisation of the route of the rehabilitated access road, making physical relocation unnecessary.</u> <u>Disadvantages:</u> Economic displacement: ○ At the access road level: land, agriculture (food crops, market gardening and plantations), wooded areas, gold panning and artisanal/commercial AGR. ○ At the quarry level: land, agriculture (food crops) and wooded areas. An engineering site within the quarry's right-of-way, but easily relocatable (quick processing without community tensions). Traffic disruption limited to the access road, which has low traffic.	<u>Advantages:</u> Job creation and local economic development due to the refurbishment of the access road to the quarry and the creation of jobs at the quarry. No physical relocation: no residences within the quarry and access road right-of-way. <u>Disadvantages:</u> Limited traffic disruption for the access road, which is short, but significant disruption on the national road to the RN 32 due to the long distance (140 km).
Environmental (Biodiversity, soil, water, air)	<u>Disadvantages :</u> Air pollution due to greenhouse gas emissions caused by road traffic along the access road and on the quarry site Air pollution along the access road and at the quarry. Noise pollution due to noise emissions caused by road traffic along the access	<u>Disadvantages:</u> Significant air pollution due to greenhouse gas emissions caused by road traffic on the national road to the RN 32, due to the considerable distance (140 km). Air pollution on the national road to the RN 32 due to the significant distance

	road and on the quarry site, 2.2 km as the crow flies from the village of Kounkono.	(140 km), the access road and the quarry.
	Impact on the natural habitat at the quarry.	Noise pollution due to noise emissions caused by road traffic on the national road to the RN 32 due to the significant distance (140 km), along the access track and on the quarry site 1 km as the crow flies from the town of Kouroukoro and a primary school. Destruction of natural habitat at the quarry.
Technical, feasibility, economic	Advantages: <u>Quarry closer to the RN32 (30 km), significantly lower risks and costs associated with transport.</u>	Disadvantages: <u>Quarry located far from the RN32 (140 km), significantly higher risks and costs associated with transport</u>

In terms of environmental and social impacts, **the choice of granite quarry falls on Kounkono**. Considering that the environmental and social impacts on both sites are similar, the choice is primarily linked to the impact of a longer transport distance in the case of the Kouroukoro quarry, and the opening up of the area between Norassoba and the Kounkono quarry, although this positive impact will be limited to a few years as it is not part of a long-term policy of opening up the area by the state or municipal administration. However, the choice of the Kounkono quarry is conditional on the necessary optimisation of the access road, which will be rehabilitated from Norassoba, in order to avoid any physical relocation.

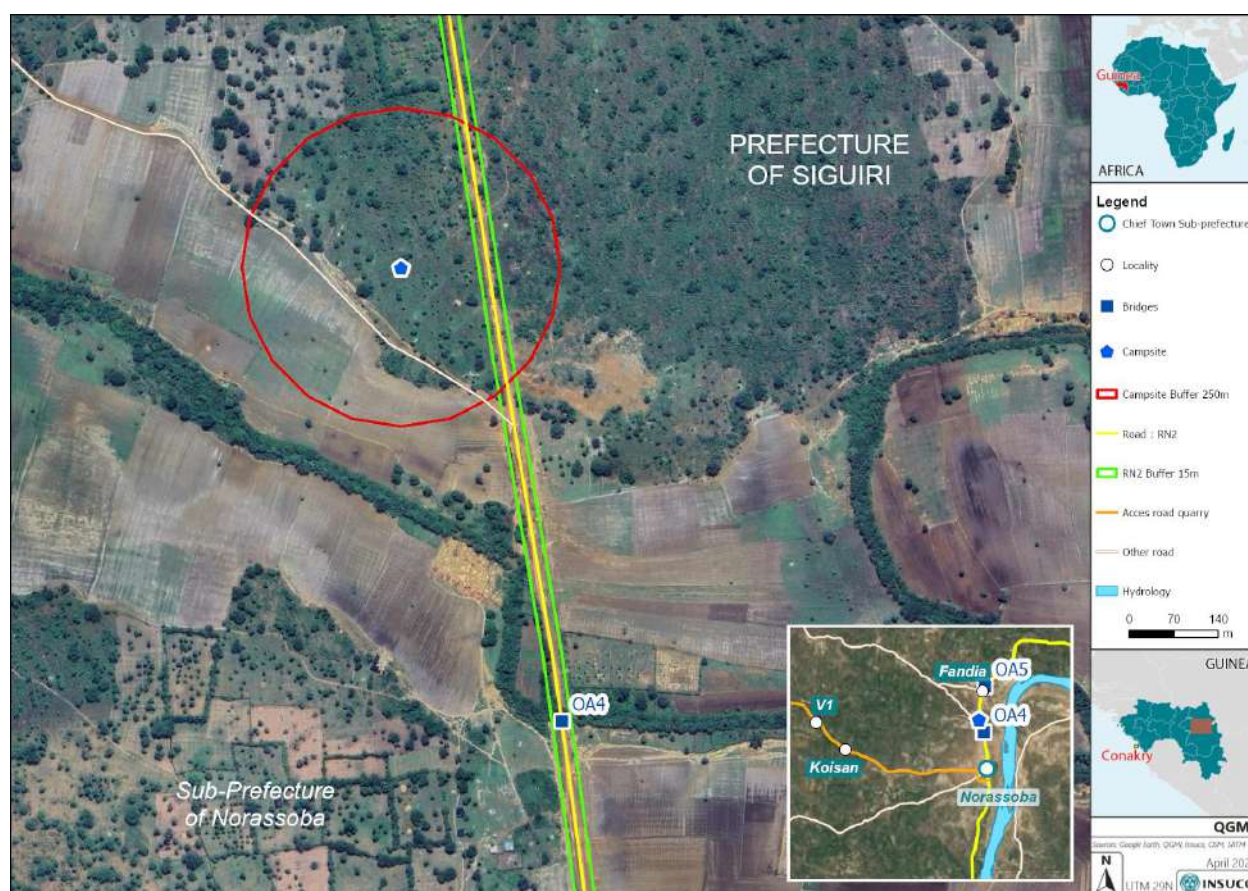
■ Variant for the living quarters

The base camp will house accommodation, a canteen/refectory, a clinic, offices, a laboratory, concrete and asphalt plants, workshops, generators, fuel depots and a refuelling station, storage areas, cleaning and machine maintenance areas.

At the time of framing - the exact location of the living quarters was not known. It is planned to be located on the outskirts of Norassoba.

During the ESIA, two variants for the exact location of the base camp were explored.

The first variant would be a base camp located close to the river (south-east of the RN 32), but this option was discarded because this area is subject to flooding, there is a greater risk of pollution of the river and it is closer to existing houses. The second option is a base camp located to the north of the river and to the east of the road. The area is less prone to flooding. This option was chosen (see Map 15 :).



Map 15 : Location of the base camp in the Norassoba sub-prefecture, Source: Insuco, 2025

5.3. Alternatives and variants selected

In view of the opportunity that this project represents for the development of the Upper Guinea region, as well as the development and poverty reduction programme and the development of trade with neighbouring countries, **the alternative with the project has been selected.**

The analysis of the alternatives concerning the route, which was between building a new road, not following the current route, or retaining the current route with micro-routing, highlighted the advantages and disadvantages from a social, environmental, technical and economic point of view. **The alternative of following the current route with possible micro-routing was selected.**

The choice of quarry location was the subject of a comparative analysis between two quarries. In view of the advantages and disadvantages from a social, environmental, technical and economic point of view, **the Kounkono quarry was selected.**

The base camp chosen is on the outskirts of Norassoba, towards Fandia, north of the river and east of the road.

The impact study is based on these alternatives and variants of the chosen project.

6. Description of the initial state of the physical, biological and human environment

6.1. Description of the initial state of the physical environment

6.1.1. Review of existing data

Numerous references were consulted for the initial description of the physical environment. These are included in the list of references (Appendix 6 Bibliography). The following references are particularly important sources:

- Ministère des Mines, de la Géologie et de l'Environnement, 2006 Carte géologique de la Guinée, 1 :500.000.
- DIALLO.A.B., DIALLO.S., FEYBESSE.J.L. (1999) - Notice explicative de la Carte géologique de la Guinée à 1/200000, feuille n° 27-28. Sirakoro-Bamako Ouest, Conakry: Ministère des Mines de la Géologie et de l'Environnement, Feuille n°27-28, 22 p.
- EGAL.E., LAHONDERE.D., LACOMME.A., et al. (1999) - Notice explicative de la Carte géologique de la Guinée à 1/200000, feuille n° 12, Siguiri, Conakry : Ministère des Mines de la Géologie et de l'Environnement, Feuille n°12, 25 p.
- BOUVERT Y. (2003): "Carte Morphopédologique de la République de Guinée à 1/500 000ème", IRD éditions, p.471
- THIEBLEMONT D. Géologie et pétrologie de l'Archéen de Guinée : une contribution régionale à la formation de la croûte continentale. Geochemistry. Université de Bretagne occidentale - Brest, 2005. tel-00830519f
- MAIGNIEN ROGER. Le cuirassement des sols en Guinée (Afrique occidentale) Strasbourg: Service de la carte géologique d'Alsace et de Lorraine, 1958. 246 p.
- YOSSEI M. (2015). 3D geophysical modelling used for structural interpretation in southern Mali and northeastern Guinea, West Africa. Thesis submitted to the Faculty of Science, University of the Witwatersrand, Johannesburg, in fulfilment of the requirements for the degree of Master of Science p.162.
- Modelling and basic data from Meteoblue (meteoblue.com).
- River flow data on ADHI: Trambly, Yves; Rouché, Nathalie, 2020, "ADHI: African Database of Hydrometric Indices", <https://doi.org/10.23708/LXGXQ9>.
- Maps produced by the "Zonage agroécologique de la république de Guinée" (ZAEG) project (<https://zaeg.anasa.gov.gn/>).
- Risk assessments by ThinkHazard! (thinkhazard.org).

It should be noted that data certainly exists for work related to local ESIs, including that for the Kouroussa gold mine, but the reports do not appear to be publicly available.

In addition to the literature review, the various natural features crossed by the project were observed, photographed and geo-referenced during the fieldwork, which helped to consolidate the descriptive map base of the environments. Sampling and collection of the analytical samples required to characterise the physical environment of the study area were also carried out, as described in Section 2.2.2.

6.1.2. Field studies

6.1.2.1. Sampling mission

The initial campaign for the ESIA of the RN 32 project from Koumana (Irikiri) to Niandankoro in Guinea was carried out from 17 to 21 March 2025 for measurements of the physical environment in the dry season and from 12 to 13 July 2025 for the rainy season.

The following samples were taken during the dry season:

- 9 soil samples, including 1 rock sample from the Kounkono quarry;
- 11 water samples, including :
 - 5 groundwater
 - 6 surface waters.

In situ measurements of noise intensity and air quality were taken at 7 points along the project route. Continuous 24-hour noise measurements were taken at points AB1, AB2, AB3, AB4, AB5 and AB7, as shown on the map below. At point AB6, noise intensities were measured on an ad hoc basis.

During the rainy season, the following samples were taken:

- 9 soil samples
- 13 water samples, including :
 - 3 groundwater
 - 10 surface waters

Air quality measurements were taken at 7 points along the route, not necessarily at the same locations as in the dry season, depending on the accessibility of the land and the relevance to the initial state of the Project's physical environment (*Table 20, Map 17, Map 25*). Continuous 24-hour sound intensity measurements were taken at 6 sites (including one in the quarry area and one on the track leading to the quarry). A spot measurement of noise intensity was taken to the south of the quarry area.

The sampling sites are numbered by season according to their position on the Project route.

Table 20. GPS coordinates of water and soil sampling points and those of air quality and noise measurements. (WGS84 projection)

Season	Station	Type	Site	Latitude	Longitude	Altitude (m)
Dry	AB1	Air and noise	Road	10.697046	-9.680750	373.0
Dry	AB2	Air and noise	Road	10.809087	-9.510041	356.0
Dry	AB3	Air and noise	Road	10.921931	-9.483184	352.9
Dry	AB4	Air and noise	Road	11.078695	-9.243666	357.4
Dry	AB5	Air and noise	Quarry + runway	11.006251	-9.720305	441.4
Dry	AB6	Air and noise	Quarry + runway	11.007006	-9.720152	436.0
Dry	AB7	Air and noise	Quarry + runway	11.005950	-9.719823	459.7
Dry	SOL1	Soil	Road	10.697231	-9.680818	375.9
Dry	SOL2	Soil	Road	10.707625	-9.645722	375.6
Dry	SOL3	Soil	Road	11.020805	-9.372206	340.9
Dry	SOL4	Soil	Road	11.038961	-9.390520	362.6
Dry	SOL5	Soil	Road	11.088632	-9.321986	357.2

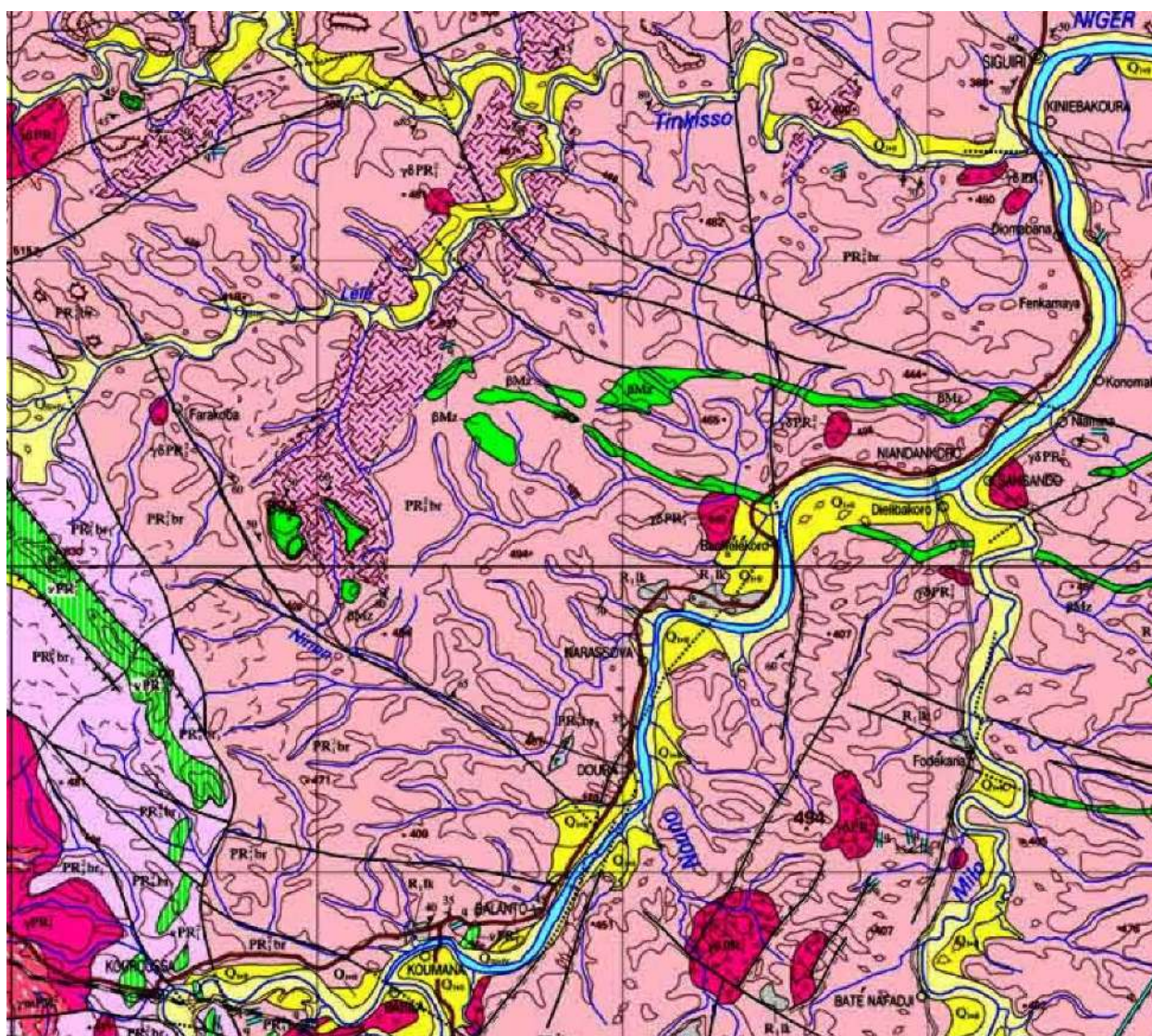
Season	Station	Type	Site	Latitude	Longitude	Altitude (m)
Dry	SOL6	Soil	Road	11.087221	-9.327179	345.9
Dry	SOL7	Soil	Road	11.083520	-9.303356	349.1
Dry	SOL8	Soil	Road	11.071516	-9.244178	339.1
Dry	SOL9	Soil (rock)	Quarry + runway	11.0061262	-9.7196639	460.1
Dry	SW1	Surface water	Road	10.688273	-9.674114	361.8
Dry	SW2	Surface water	Road	10.809087	-9.510041	356.0
Dry	SW3	Surface water	Road	10.839596	-9.483148	345.3
Dry	SW4	Surface water	Road	10.963863	-9.485232	374.0
Dry	SW5	Surface water	Road	11.070348	-9.244069	316.1
Dry	SW6	Surface water	Quarry + runway	11.005753	-9.721245	436.5
Dry	UW1	Groundwater	Road	10.697117	-9.680761	373.2
Dry	UW2	Groundwater	Road	10.707736	-9.646097	375.0
Dry	UW3	Ground water	Road	10.921888	-9.483414	350.9
Dry	UW4	Groundwater	Road	10.985526	-9.458736	372.1
Dry	UW5	Groundwater	Road	11.088632	-9.321986	357.2
Rainy	AB1	Air and noise	Road	10.696900	-9.680692	369.9
Rainy	AB2	Air and noise	Road	10.754251	-9.545078	372.3
Rainy	AB3	Air and noise	Road	10.923165	-9.483229	372.0
Rainy	AB4	Air and noise	Road	11.078832	-9.245763	367.6
Rainy	AB5	Air and noise	Quarry + runway	11.006648	-9.720478	360.3
Rainy	AB6	Air and noise	Quarry + runway	10.988620	-9.646031	360.8
Rainy	AB7	Air and noise	Quarry + runway	10.989231	-9.735483	362.4
Rainy	SOL1	Soil	Road	10.697552	-9.680538	362.6
Rainy	SOL2	Soil	Road	10.700485	-9.662439	367.2
Rainy	SOL3	Soil	Road	10.996612	-9.371685	383.8
Rainy	SOL4	Soil	Road	11.013343	-9.371944	360.8
Rainy	SOL5	Soil	Road	11.024918	-9.372535	358.8
Rainy	SOL6	Soil	Road	11.085124	-9.316144	362.6
Rainy	SOL7	Soil	Road	11.079312	-9.244628	363.8
Rainy	SOL8	Soil	Road	10.963985	-9.485528	366.1
Rainy	SOL9	Soil	Quarry + runway	11.003661	-9.717652	366.2
Rainy	SW1	Surface water	Road	10.700730	-9.674611	364.8
Rainy	SW2	Surface water	Road	10.720222	-9.559072	361.6
Rainy	SW3	Surface water	Road	10.748821	-9.547162	373.2
Rainy	SW4	Surface water	Road	10.808935	-9.510260	376.3
Rainy	SW5	Surface water	Road	10.941648	-9.485080	378.1
Rainy	SW6	Surface water	Road	10.964347	-9.485025	377.1
Rainy	SW7	Surface water	Road	11.089007	-9.322063	367.1

Season	Station	Type	Site	Latitude	Longitude	Altitude (m)
Rainy	SW8	Surface water	Road	11.078048	-9.241944	368.6
Rainy	SW9	Surface water	Road	11.019136	-9.367612	366.1
Rainy	SW10	Surface water	Quarry + runway	11.007546	-9.719190	371.3
Rainy	UW1	Groundwater	Road	10.696900	-9.680692	369.9
Rainy	UW2	Groundwater	Road	10.923165	-9.483229	372.0
Rainy	UW3	Groundwater	Road	11.078832	-9.245763	367.6

6.1.3. Geology

The geological context of the project area was analysed on the basis of the national geological map of Guinea at a scale of 1:500,000 (Map 16 : G). Analysis of this map shows that the geological formations expected along the route consist of Mesozoic, Tertiary-Quaternary and Palaeoproterozoic formations. The geological formations crossed by the road include the following:

- Mesozoic and Tertiary-Quaternary formations consisting of clayey sands or gravelly alluvial sandy silts, associated with deposits of the upper Niger and its tributaries (Kobane, Sirakoro, Malimane rivers). Shown in yellow on Map 16 : G
- Palaeoproterozoic formations dominated by Silurian (Gothlandian) shales and Devonian (Wesphalian) sandstones. Various facies, such as shales, shaly sandstones and quartzites, may also be present. In pink on the Map 16 : G
- Mesozoic formations consisting mainly of intrusive granite, often metamorphosed into gneiss (granite gneiss), cut by dolerite flows. Shown in green on Map 16



Map 16 : Geological map of the study area. The legend is given in the text above (Ministère des Mines, de la Géologie et de l'Environnement, 2006 Carte géologique de la Guinée, 1:500,000).

6.1.4. Soils

6.1.4.1. General description

From a lithological point of view, the project area is characterised by the presence of four main soil types:

- Hydromorphic alluvial soils, present in low-lying and depressed areas. The characteristics of these soils are as follows: lack of structure, heterogeneous texture, variable from one point to another, high porosity and good surface aeration, lack of profile differentiation. These are sandy or sandy-clay soils, with a high sensitivity to water due to the presence of a higher proportion of the sandy fraction. Present along watercourses. In blue on Map 17 : .

- Loose tropical ferruginous soils. Found along watercourses, they are hydromorphic at depth and form a transition zone between ferrallitic soils and hydromorphic soils (shown in yellow on Map 17 :).
- Ferrallitic soils in medium topographic positions and on flood glacia; these soils (formerly known as lateritic soils) have poorly differentiated, deep profiles (sometimes over ten metres), with shallow, progressive horizons, and are brightly coloured, with predominantly red and yellow tones. The accumulation of aluminous and ferric neo-formation products can lead to a lateritic armour, which hinders the development of these otherwise chemically poor soils. In light brown on Map 17 : .
- Skeletal soils on sandstone or limestone with lithic outcrops on the "higher" parts. The soils in this class have an (A)CR or (A)C profile. Organic matter is virtually absent, but not biological activity. There is no evolution of the mineral matter, which remains in a crude state, often mechanically fragmented. Soils in this class are found in deserts, but also in any other environment where, for one reason or another (flooding, volcanic eruption, intense and brutal erosion), a massive or divided rock has been placed in new conditions. Over time, these soils are likely to evolve as soon as biological activity begins. In dark brown on Map 17 : .

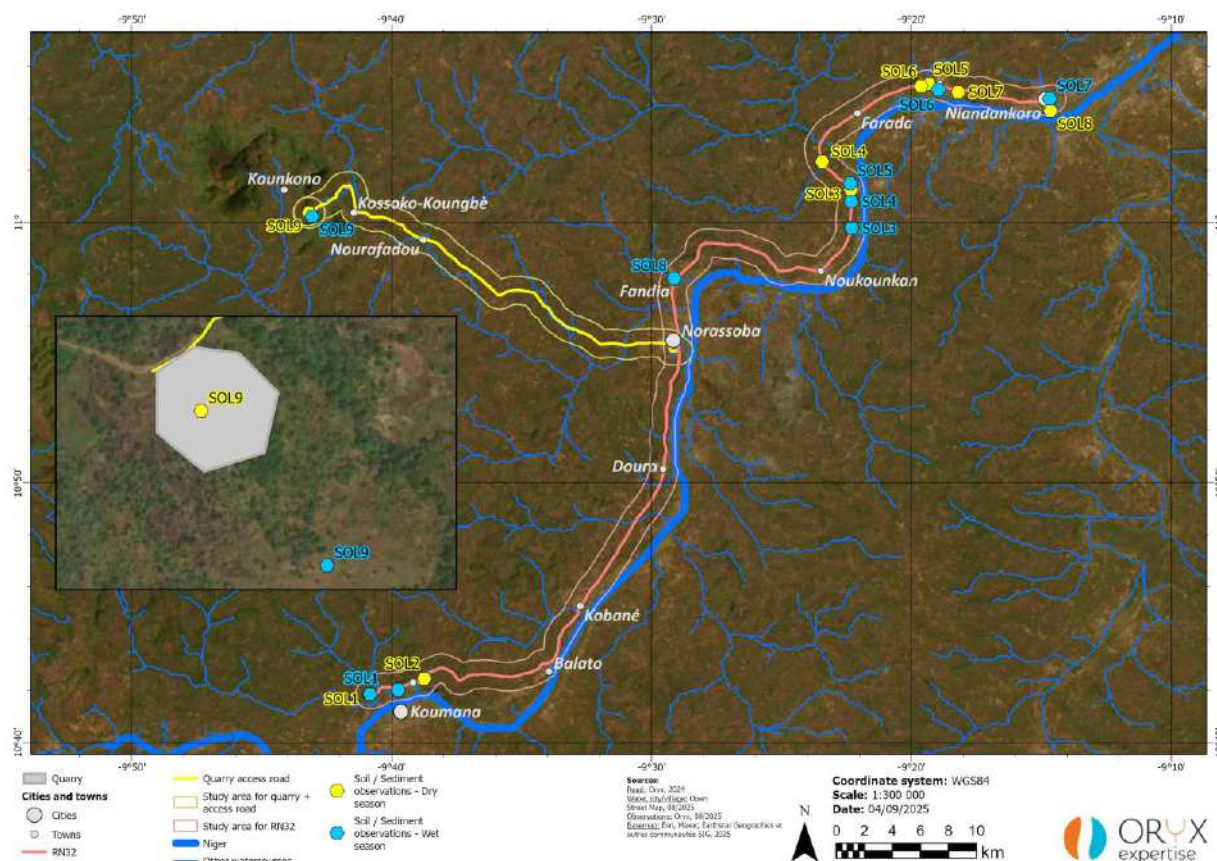
The characteristics of these different soils, with their varying agronomic aptitudes, are a determining factor in the distribution of plant landscapes and their agricultural development. The soils are generally fertile in the region, but they are being severely degraded as a result of man's action on the plant cover (bush fires, deforestation, shortening of fallow periods), on the soil (various forms of pollution, extraction, salinisation of the land) and under the influence of rainfall, which encourages erosion.



Map 17 : Soil map of the study area. The legend is detailed in the text above (Boulvert, 2003).

6.1.4.2. Sample analysis

For the soil analysis, 9 samples were taken during each of the two field missions along the RN 32 and in the quarry area. The Map 18 shows the location of these various sample.



Map 18 : Localisation of soil samples

The soils analysed are rich in iron oxide, calcium, potassium, silica and chlorine. The results show that the coarsely analysed soils (clayey, lateritic, sandy) can be classified as ordinary soils according to French standards for ordinary soils. Exceedances of the thresholds for ordinary soils for iron and aluminium oxides are normal given the tropical and lateritic soil of the region. The rock sample shows much higher values explained by its entirely mineral nature compared with the other samples.

Table 21. Chemical composition of soils - major elements (ppm) - Dry season (values in bold indicate exceedances of ordinary soil standards)

Stations	Fe _{(2)O₃}	CaO	K ₂ O	SiO ₂	Al _{(2)O₃}	MgO	P _{(2)O₅}	TiO ₂
SOL1	23,7	0,48	0,56	67,57	0,87	0	0,07	0,51
SOL2	12,58	0,34	0,56	77,05	0,84	0	0,06	0,72
SOL3	2,84	0,3	0,2	84,82	0,57	0	0,48	0,84
SOL4	15,32	0,31	0,61	73,85	1,03	0	0,52	0,78
SOL5	35,8	0,46	0,47	53,94	1,74	0	0,06	0,55
SOL6	3,49	0,26	0,48	83,01	0,56	0	0,5	0,75

Stations	Fe _{(2) O₃}	CaO	K ₂ O	SiO ₂	Al _{(2) O₃}	MgO	P _{(2) O₅}	TiO ₂
SOL7	18,07	0,41	0,47	64,51	1,09	0	0,08	0,74
SOL8	7,76	0,45	0,61	79,77	1,07	0	0,08	0,72
Granitic rock	6,98	6,93	4,6	72,5	12,66	0	0	0,23
Ordinary soil standards	1,085	1,91	2	-	0,83	-	-	-

Table 22. Chemical composition of soils - major elements (ppm) - Rainy season (values in bold indicate exceedances of ordinary soil standards)

Stations	Fe _{(2) O₃}	CaO	K ₂ O	SiO ₂	Al _{(2) O₃}	MgO	P _{(2) O₅}	TiO ₂
SOL1	19,41	0,21	0,25	70,93	0,77	0	0,06	0,42
SOL2	2,25	0,2	0,73	85,75	0,61	0	0,07	0,76
SOL3	1,36	0,18	0,2	82,91	0,64	0	0,6	0,75
SOL4	9,47	0,21	0,36	79,91	0,93	0	0,06	0,64
SOL5	4,12	0,79	0,37	84,8	0,78	0	0,55	0,94
SOL6	10,55	0,5	0,59	78,03	0,6	0	0,09	0,5
SOL7	2,77	0,31	0,49	82,77	0,89	0,37	0,46	0,96
SOL8	4,25	0,25	0,41	79,89	0,99	0,39	0,64	1,07
SOL9	3,89	0,4	0,38	82,07	0,69	0	0,08	1,64
Ordinary soil standards	1,085	1,91	2	-	0,83	-	-	-

In terms of minor elements, the soils analysed contain traces of heavy metals such as copper, chromium and barium. The soil sample taken near Damissakoura in the dry season is particularly contaminated compared with the other samples (Co, Ni, Cu, Mo). Collected near a watercourse, the high levels of pollutants can probably be attributed to artisanal gold panning and the use of pesticides. Levels of mercury and cyanide were not measured, but since these highly polluting elements are used in gold-panning practices, they are likely to be present in gold-panning areas. The levels measured are generally lower in the rainy season than in the dry season due to the dilution, run-off and deep-draining effect caused by heavy rainfall.

Table 23. Chemical composition of soils - minor elements (in ppm) - Dry season (values in bold indicate thresholds exceeded)

Minor elements	SOL1	SOL2	SOL3	SOL4	SOL5	SOL6	SOL7	SOL8	Granitic rock	Ordinary soil standards
S	869,69	448,5	662,47	722,42	591,15	678,18	622,52	683,38	321	-
Cl	2339,64	2116,92	2057,32	2325,74	2323,24	2380,98	2879,98	2398,06	2946	-
V	402,21	242,69	118,25	283,02	693,44	130,77	312,88	205,29	159	-
Cr	512,61	276,63	108,26	327,28	1090,33	108,58	344,12	258,33	319	-
Mn	122,7	344,5	61,45	137,56	177,35	<LOD	481,43	435,1	845	-
Co	<LOD	<LOD	<LOD	324,48	592,13	<LOD	895,22	<LOD	<LOD	8
Ni	52,38	30,77	<LOD	<LOD	64,62	<LOD	<LOD	<LOD	71	40
Cu	54,81	29,9	<LOD	61,2	53,43	<LOD	51,5	19,58	89	30
Zn	119,71	55,37	69,1	55,39	41,66	30,41	44,71	68,56	39	50
As	84,86	307,17	4,31	45,9	47,02	14,04	76,25	24,16	5	-

Se	<LOD	<LOD	1	<LOD	<LOD	1	<LOD	1	<LOD	-
Rb	17,54	20,25	10,3	23,53	8,88	17,71	15,65	27,16	10	-
Sr	21,25	30,19	19,7	18,92	13,05	22,92	22,25	54,99	210	-
Zr	411,26	257,39	569,18	730,03	201,49	701,94	415,38	376	59	-
Nb	12,6	17,79	27,04	22,75	15,23	21,01	19,22	22,77	9	-
Mo	2,85	4,35	1	<LOD	19,61	1	6,27	1	<LOD	8
Pd	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	-
Ag	<LOD	<LOD	<LOD	<LOD	7,82	<LOD	6,26	<LOD	<LOD	-
Cd	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	-
Sn	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	-
Sb	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	-
Ba	304,1	285,41	132,1	160,63	305,63	316,08	263,48	380,12	398	-
W	<LOD	39,83	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	-
Bi	<LOD	<LOD	10,54	<LOD	<LOD	<LOD	<LOD	10,48	<LOD	-
Au	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	-
Pb	13,02	3,68	11,09	<LOD	8,09	5,07	14,35	13,19	12	10

Table 24. Chemical composition of soils - minor elements (ppm) - Rainy season (values in bold indicate threshold exceeded)

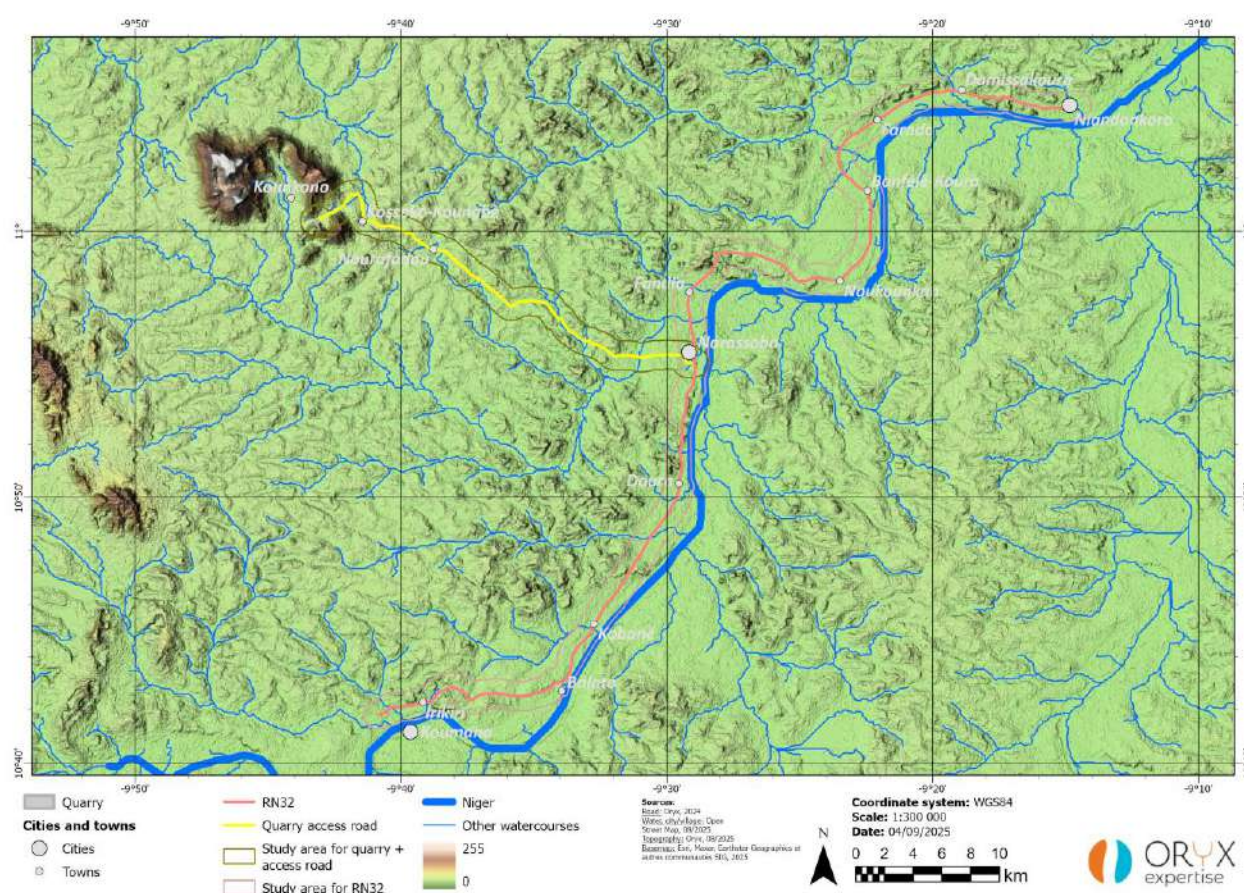
Minor elements (ppm)	SOL1	SOL2	SOL3	SOL4	SOL5	SOL6	SOL7	SOL8	SOL9	Ordinary floor standards
S	149,58	240,43	522,74	269,89	787,18	470,29	650,13	723,74	512,86	-
Cl	2392,95	2411,22	2410,74	2383,08	2568,68	2441,98	2737,15	2778,67	2746,08	-
V	265,31	132,35	76,11	213,02	159,08	172,23	147,23	138,06	171,21	-
Cr	404,46	108,03	44,51	284,69	154,59	264,4	123,83	121,78	137,57	-
Mn	<LOD	<LOD	<LOD	<LOD	<LOD	249,97	<LOD	103,27	157,55	-
Co	<LOD	<LOD	<LOD	<LOD	<LOD	293,99	<LOD	<LOD	<LOD	8
Ni	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	40
Cu	37,92	<LOD	<LOD	13,56	19,92	24,16	<LOD	<LOD	<LOD	30
Zn	44,03	37,01	15,23	25,93	136,16	56,17	49,89	29,38	33,84	50
As	59,24	10,39	<LOD	7,01	4,67	28,6	9,55	10,97	6,04	-
Se	<LOD	1	1	1	1	<LOD	1	<LOD	1	-
Rb	6,28	35,66	8,13	10,92	27,12	16,86	29,62	21,2	29,62	-
Sr	7,81	29,93	8,27	10,91	53,19	32,13	25,63	18,48	40,34	-
Zr	301,87	448,92	504,62	430,56	560,39	463,89	560,46	671,65	295,68	-
Nb	12,95	22,35	17,21	17,78	33,22	12,44	31,17	28,66	25,62	-
Mo	<LOD	1	1	1	1	<LOD	1	<LOD	1	8
Pd	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	-
Ag	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	-
Cd	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	-
Sn	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	-

Sb	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	-
Ba	256,06	324,02	131,87	193,18	86,1	351,76	184,72	163,25	134,43	-
W	<LOD	39,83	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	-
Bi	<LOD	7,5	6,96	<LOD	16,53	<LOD	10,14	<LOD	<LOD	-
Au	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	-
Pb	<LOD	7,08	<LOD	7,93	56,6	<LOD	7,72	5,42	<LOD	10

6.1.1. Topography

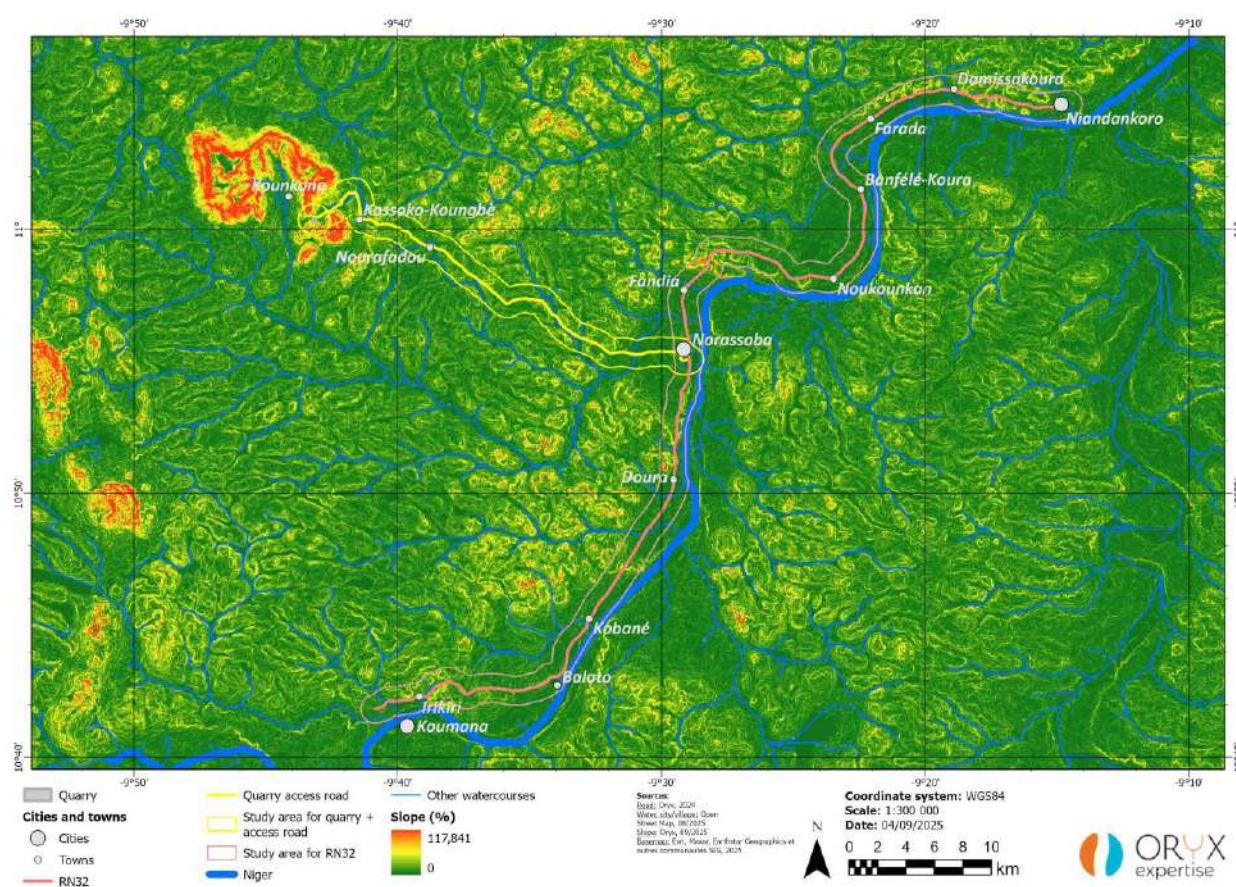
6.1.1.1. General description

The topography in the study area is relatively flat with an altitude of 350m to 650m (Map 19 :). The RN 32 follows the Niger valley and the track leading to the Kounkono area crosses low-lying hilly areas. The Kounkono area is a higher isolate with a more accentuated relief linked to the presence of particular geological structures (granite massif). The RN 32 study area lies between 346 and 451 metres above sea level, with the highest areas to the north of Fandia. The study area for the quarry and the track leading to it lies between 350 and 634m above sea level.



Map 19 : Relief map of the study area

Slopes of the study area are displayed on Map 20. The majority of the study area is flat or almost flat (green areas), the strongest slopes being found around Kounkono and north of Fandia on the NR32, where the current road follows the curves of the landscapes



Map 20 : Map of slopes, Source: Oryx 2025)

6.1.1.2. Local analysis

Analysis of the spatial relief map reveals several morphological units that are directly related to the nature of the underlying geological formations. Three structural units have been identified in the catchment areas that cross the RN 32 (see Figure 21):

- Cusp-shaped schist-sandstone plateaus located to the NW and SSW of the RN32, particularly in the villages of Malimane, Dalagbé and Tabakoro (these villages are located north of Iririki at a distance of between 1 and 5 km). They reach a maximum altitude of 860 m; these plateaus are deeply carved by small backwaters, tributaries of the upper Niger, which isolate residual hills at altitudes varying between 600 and 800 m;
- Straight, hardened, fairly steep connecting slopes, dominated by ferrallitic soils and soils that have evolved little through vertical inputs;
- The lowlands, with an altitude of between 450 and 300 m, occupy 76% of the catchment area.

Analysis of the topography along the RN 32, with elevations typically between 350 and 500 metres, highlights the importance of careful planning to ensure the safety and sustainability of the infrastructure. The moderate topography presents challenges in terms of drainage and natural hazard management.

The topography of the study basins is analysed using a digital terrain model (DTM) with a spatial resolution of 12.5m. It is used in this study both to determine relief units and landforms, and to characterise catchment areas and drainage networks.

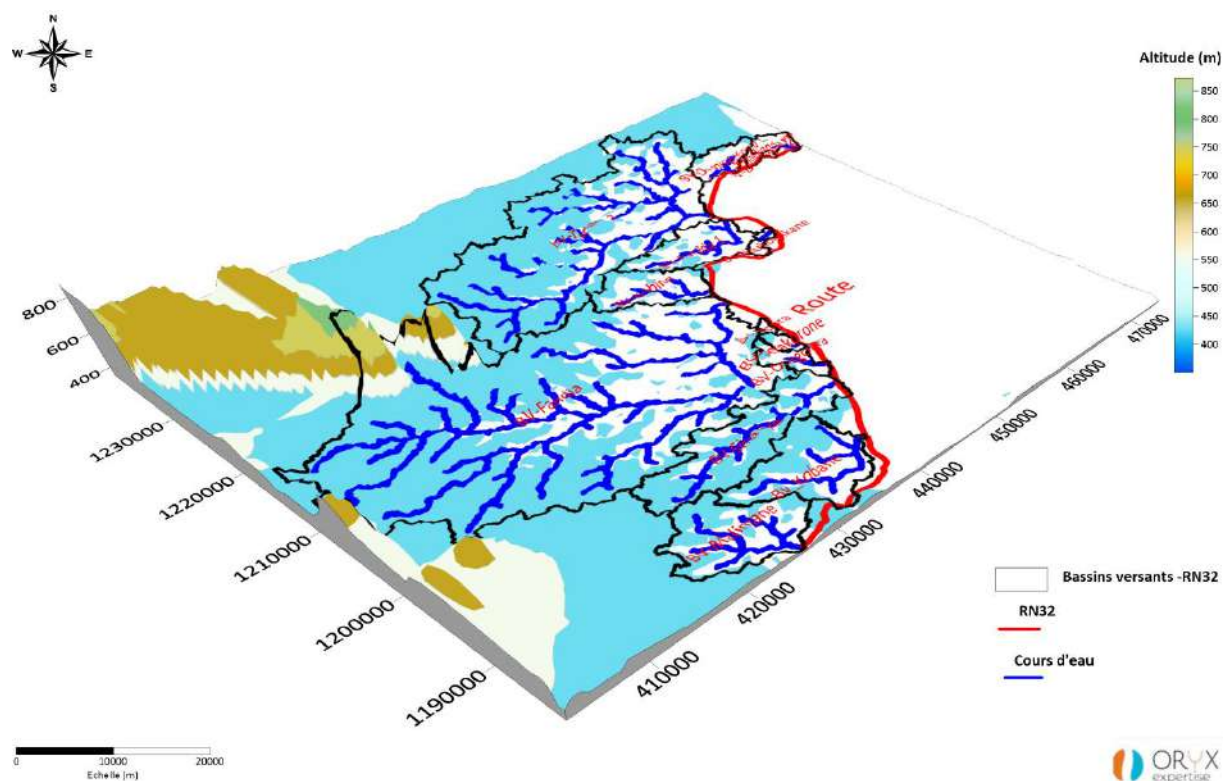


Figure 21 : 3D DTM of catchment areas

6.1.2. Climate, temperatures, precipitation and winds

6.1.2.1. Data sources

The two reference climate stations are shown in Table 25 below.

Table 25. List of weather stations near the study area

Station	Type	Latitude	Longitude	Altitude (m)	Distance from road (km)
Kouroussa	Rainfall station	10.65	-9.86	401	0,75
Siguiiri	Rainfall station	11.40	-9.17	358	31

Unfortunately, the data from local stations often only take certain measurements into account, sometimes have interrupted series, and are often fairly recent and therefore lack historical perspective. In order to obtain a better understanding of the local climate, it is therefore necessary to consult services which model on the basis of global data. Meteoblue's History+ data was consulted for this ESIA. Meteoblue was founded at the University of Basel in Switzerland and after its privatisation specialised in weather and climate data. Meteoblue's modelling enabled us to choose a site in the middle of the study area (Fandia, 10.5 north and 9.48 west, at an altitude of 360m).

6.1.2.2. Climatic context

Generally speaking, the climate belongs to the Sudano-Guinean domain, of the Middle Sudanian type according to the classification of the Aubreville and Aw (tropical savannah) indices of the Köppen-Geiger system. This climate extends between the 9th and 12th parallels. The average annual water vapour pressure is fairly high: 19 to 22 hPa. Average annual rainfall decreases from SSW to NNE, from 1,500 mm (Kouroussa) to 1,250 mm north-east of Siguiiri, with a maximum commonly recorded in August. The rains set in from April to May, before falling sharply in November.

The climate in the study area is transitional tropical, with Guinean and Sudanian variants, the mechanisms and processes of which are controlled by the St Helena and Saharan anticyclones (Egypto-Lybian anticyclone) and the Saharan depression, which structure and organise the major seasons observed there: the rainy season and the dry season.

Three major flows affect the study area alternately:

- The Harmattan, a hot, dry wind originating from the Egypto-Lybian anticyclone, affects the study area during the dry season. It is one of the main sources of dust emissions in the region and, by extension, in the study area.
- The Saharan depression, which pushes the intertropical front (ITF) northwards, allows it to rise and ;
- The monsoon, a trade wind deflected from its original path, originates from the St Helena High in the South Atlantic. It creates the conditions for rainfall as the Meteorological Equator (ME) rises in the study area.

6.1.2.3. Temperature

Figure 22 illustrates the annual temperature cycle at Fandia using Meteoblue data for 2024. It is clear that maximum temperatures fall during the period from June to October (rainy season). The temperature range is also reduced during this period. This is undoubtedly linked to the fact that this is also the rainy season, with significant cloud cover.

Maximum daily temperatures can exceed 40°C from March to June, but fall to around 30°C from July to October. Daily lows are generally between 15°C and 25°C.

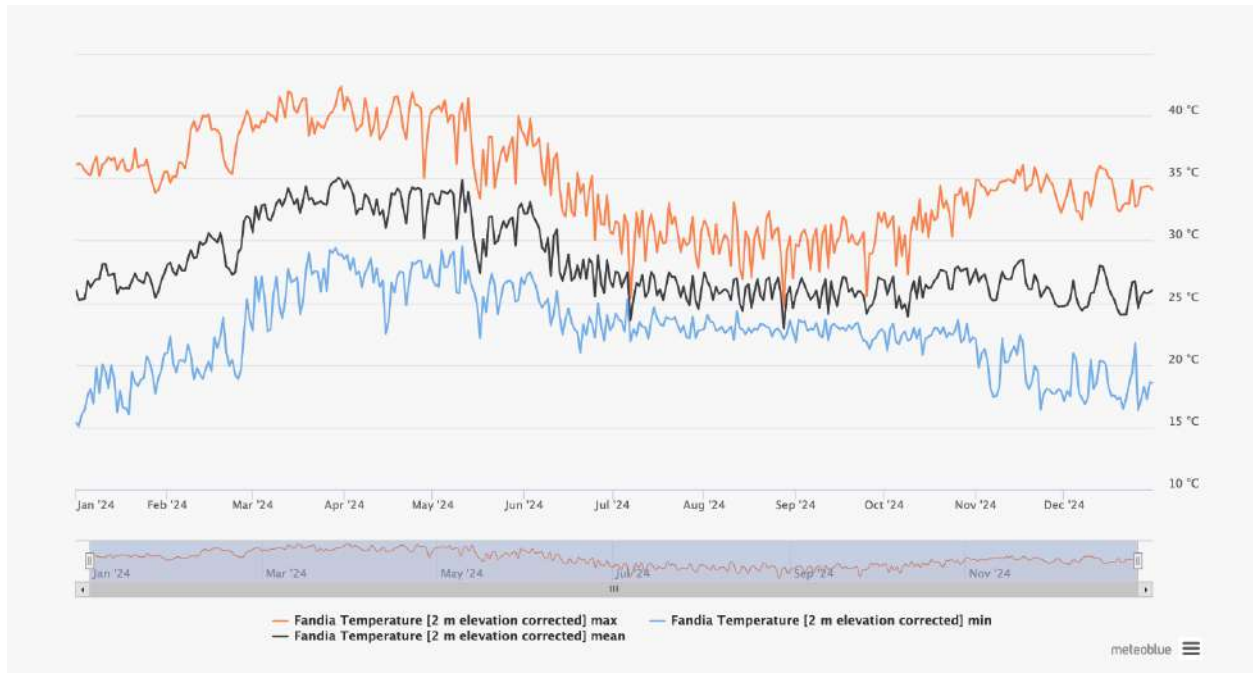


Figure 22. Temperature at Fandia (2m) in 2024 (Meteoblue)

The annual bimodal temperature curve is well described in the evolution of the temperature in the soil (28-100 cm), but obviously with a much smaller amplitude than in the air (Figure 23 and Figure 24).

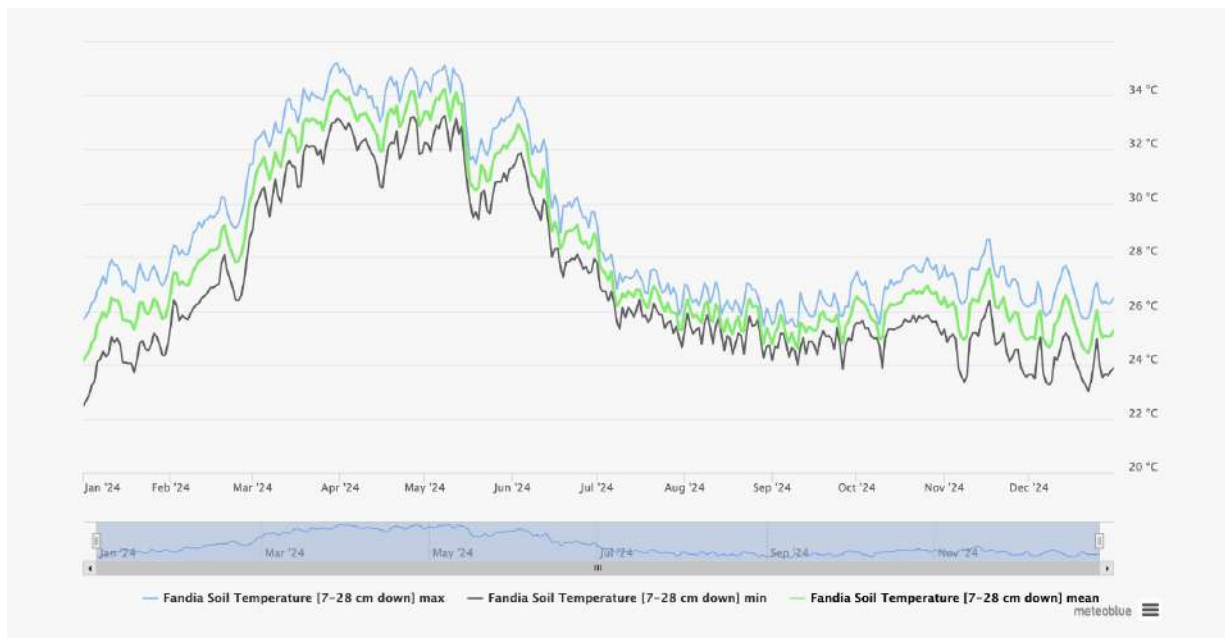


Figure 23. Soil temperature at Fandia (7-28 cm) in 2024 (Meteoblue)

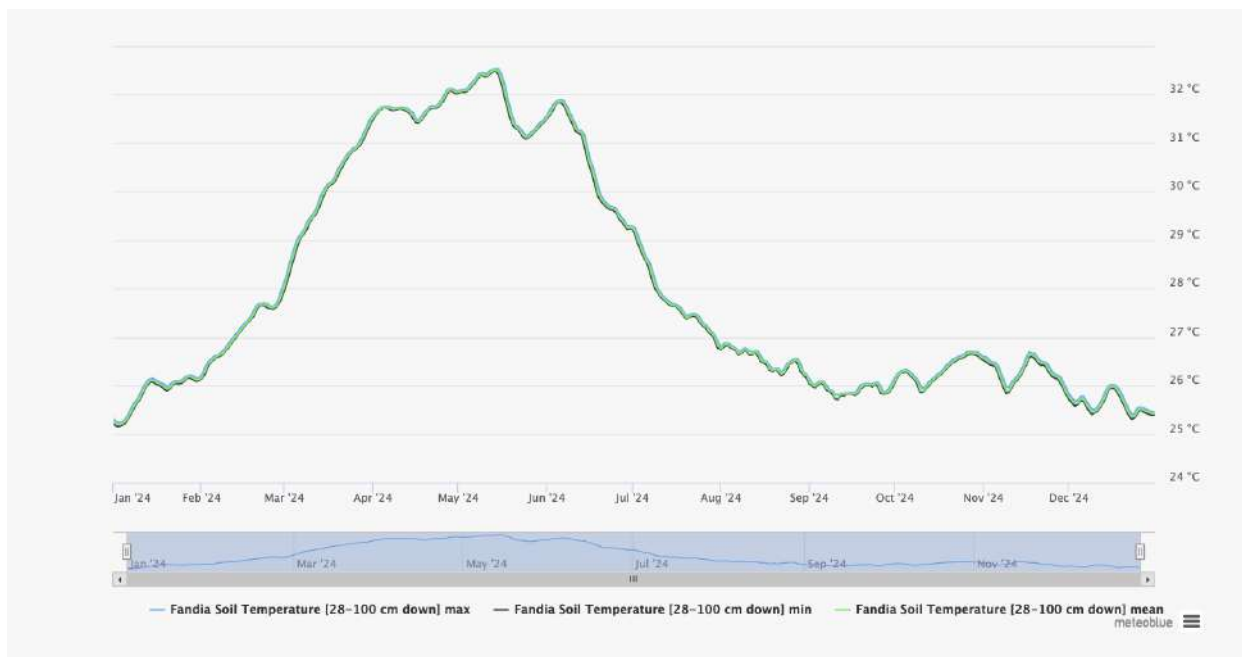


Figure 24. Soil temperature at Fandia (28-100 cm) in 2024 (Meteoblue)

Figure 25 shows the evolution of the temperature at Fandia between 1940 and 2024, demonstrating a gradual increase in temperature. This progression is shown even more clearly by comparing the data for 1940 and 2024 on a graph (Figure 26).

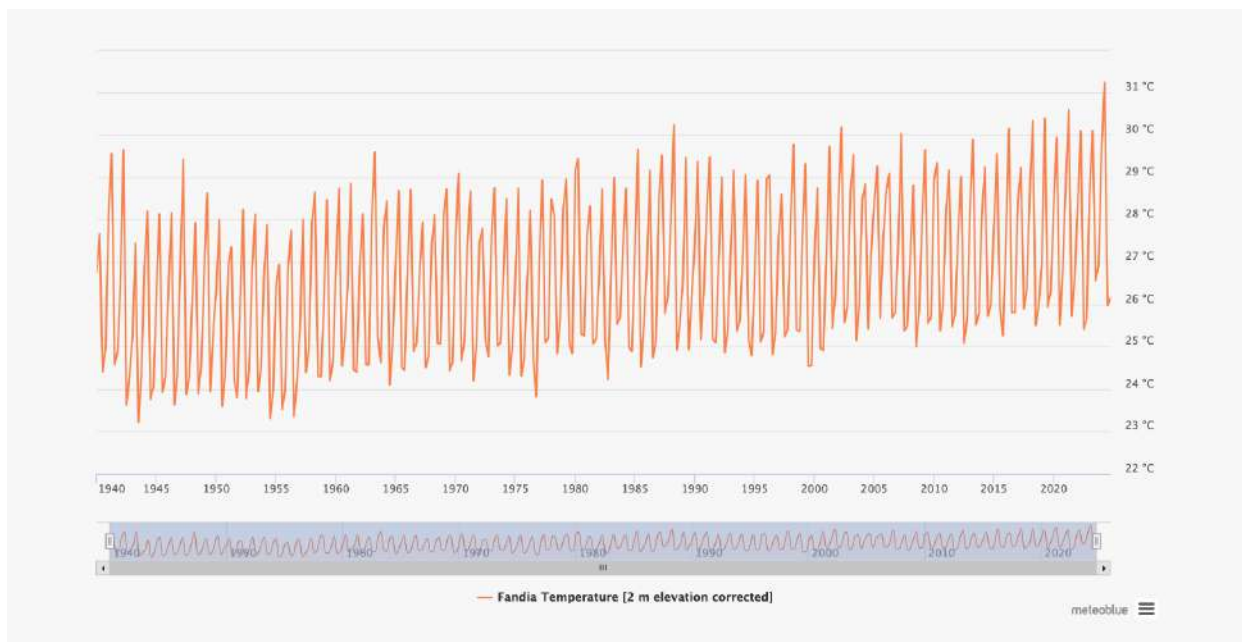


Figure 25. Temperature trends at Fandia between 1940 and 2024 (Meteoblue)

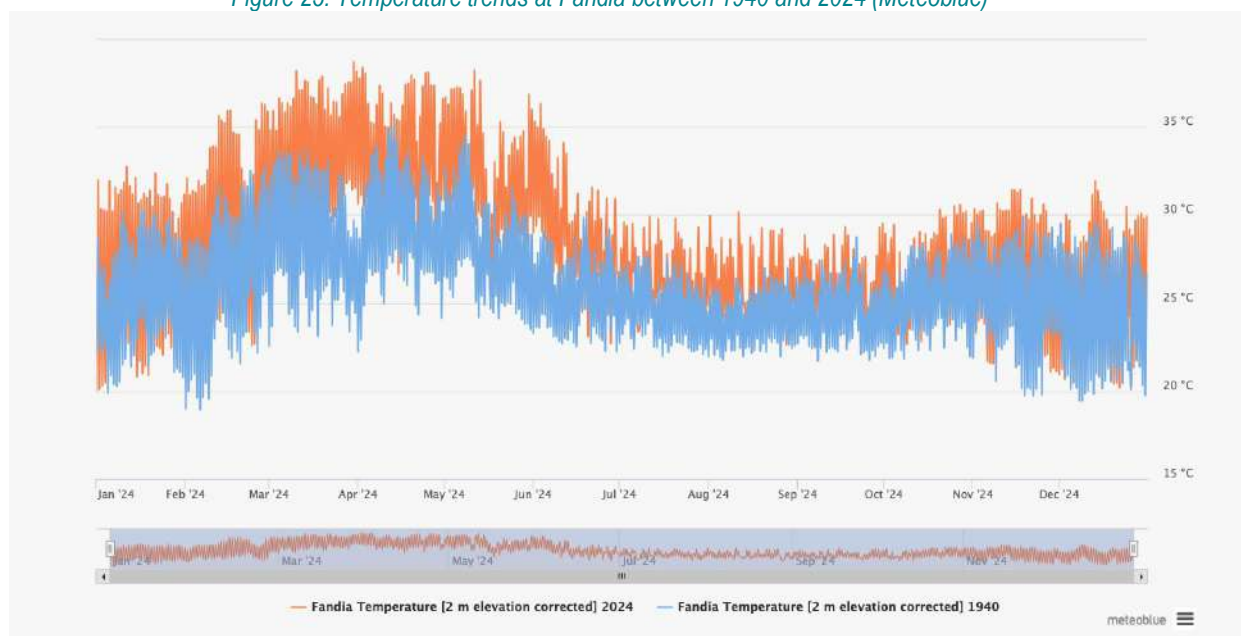


Figure 26. Comparison of temperatures at Fandia in 1940 and 2024 (Meteoblue)

6.1.2.4. Precipitation

Figure 27 shows the annual rainfall pattern at Fandia, with a very distinct rainy season from July to October. Rainfall varies greatly during this period, with daily peaks of up to 60mm.

Total annual rainfall varies between 750mm and over 1750mm, with an average of around 1000mm (Figure 28). The data shows a fairly steady decline in annual rainfall since the 1950s.

The average relative humidity varies considerably, with a peak during the rainy season and humidity minima outside the rainy season (Figure 29). High relative humidity is perceived by many people as an uncomfortable situation.

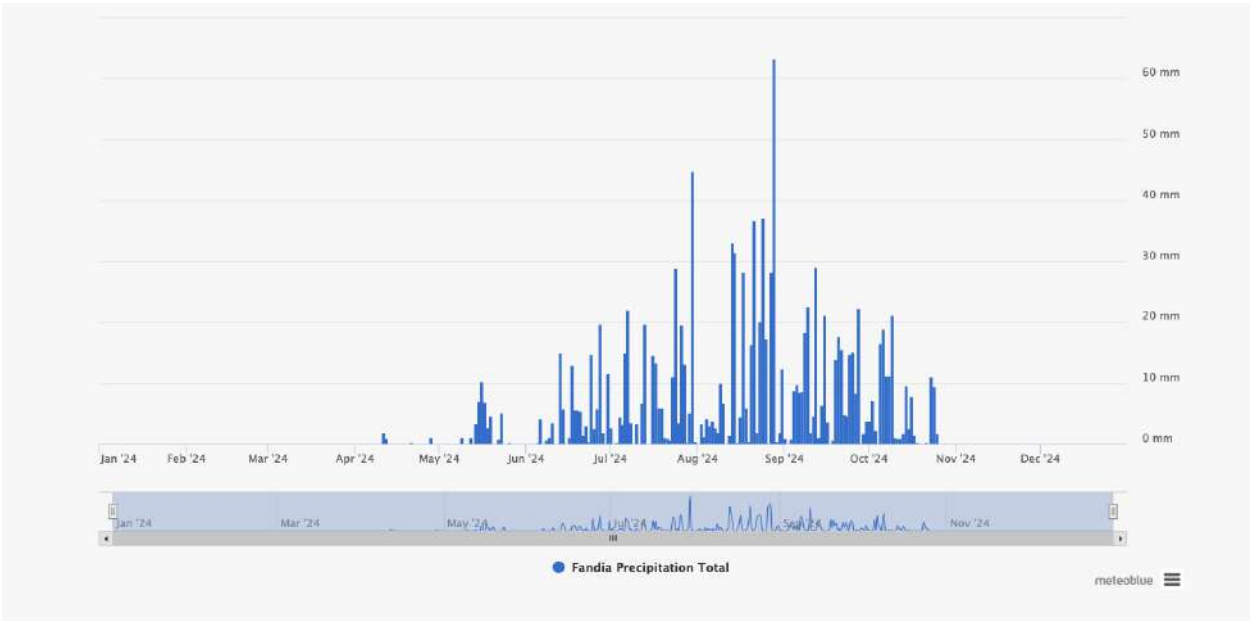


Figure 27. Annual rainfall pattern at Fandia in 2024 (Meteoblue)

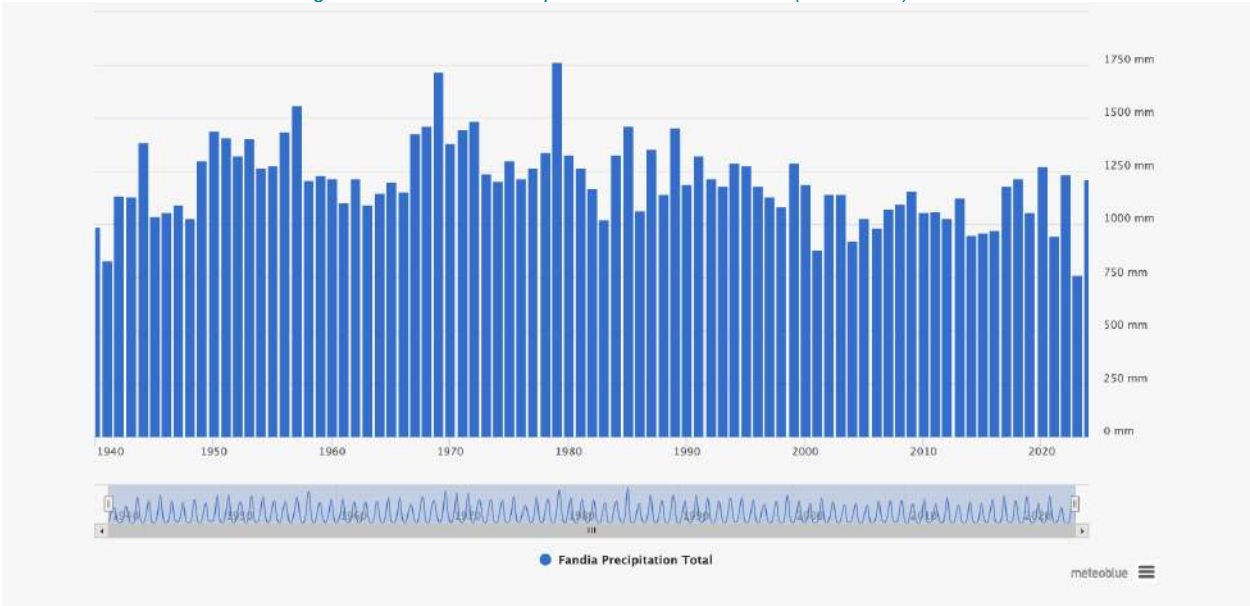


Figure 28. Precipitation trends at Fandia between 1940 and 2024 (Meteoblue)

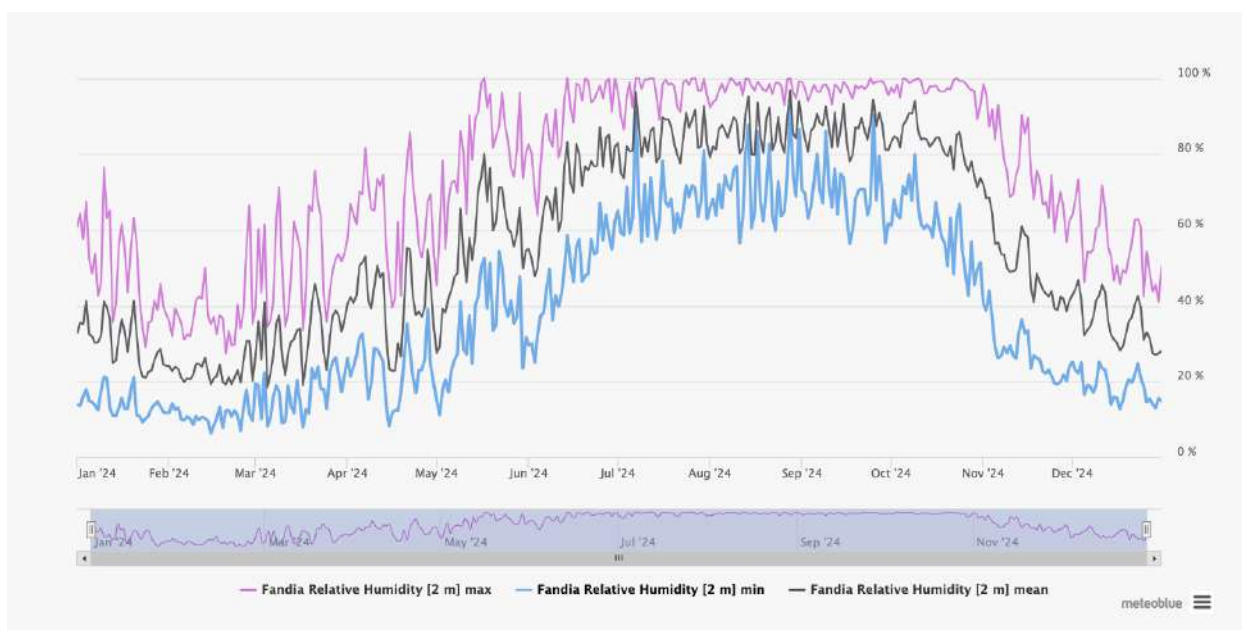


Figure 29. Relative humidity at Fandia in 2024 (Meteoblue)

6.1.2.5. Cloud cover and solar radiation

Figure 30 clearly shows the annual change in cloud cover at Fandia, with high cloud cover during the rainy season and much clearer skies during the dry season. Figure 31 shows the cloud cover in more detail, showing the presence of high-altitude clouds throughout the year. Figure 32 shows the reduction in solar radiation associated with clouds during the rainy season.

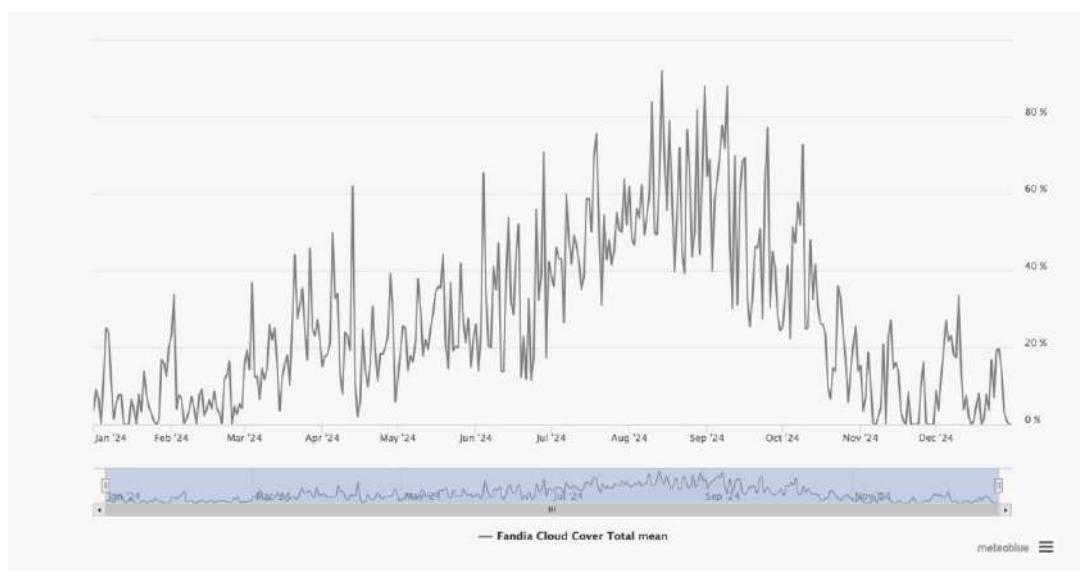


Figure 30. Annual change in cloud cover at Fandia in 2024 (Meteoblue)

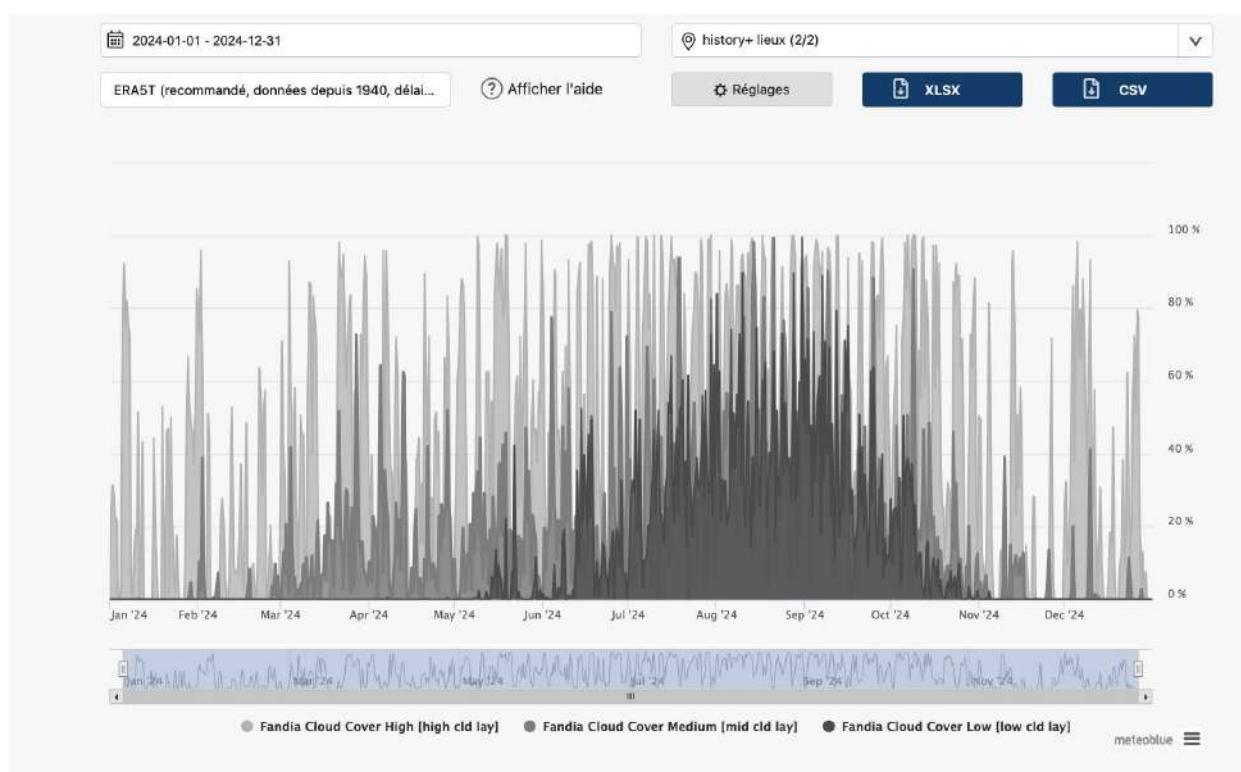


Figure 31. Detailed annual change in cloud cover at Fandia in 2024 (Meteoblue)

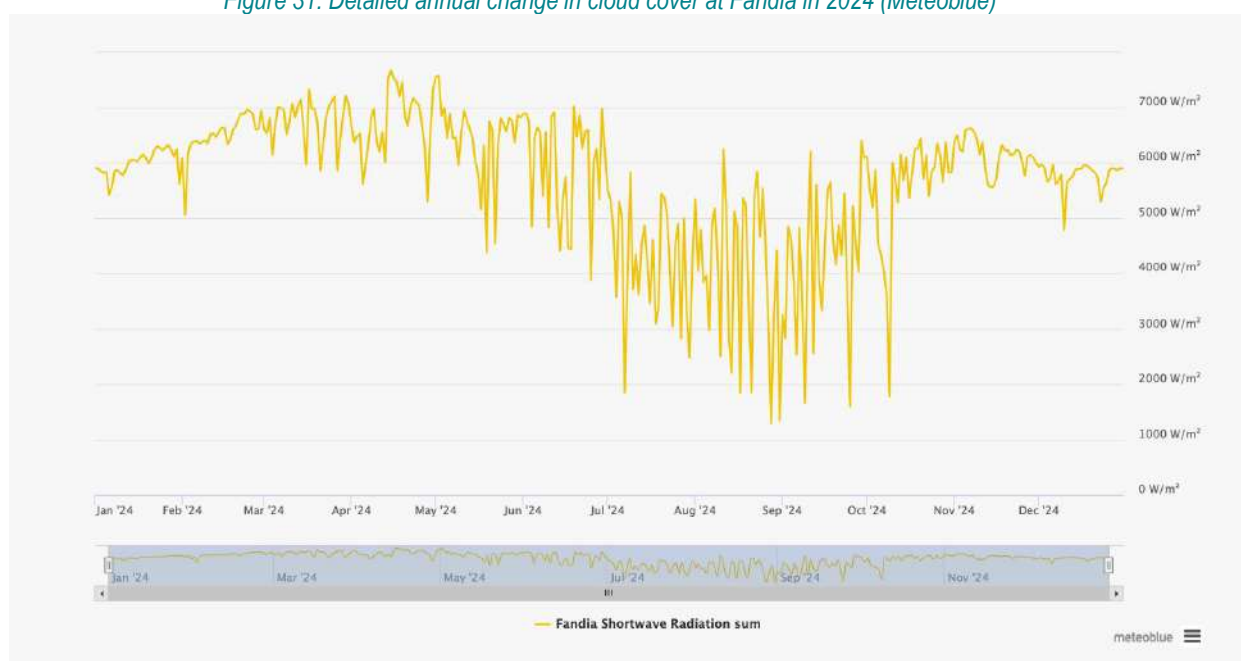


Figure 32. Solar radiation (shortwave) at Fandia in 2024 (Meteoblue)

6.1.2.6. Winds

Figure 33 shows the wind rose at Fandia for 2024. South-westerly winds clearly dominate. *Figure 34* shows wind speed and direction in 2024. Wind speeds are variable, but drop significantly from September to November. North-easterly winds dominate from November to March and south-westerly winds the rest of the year.

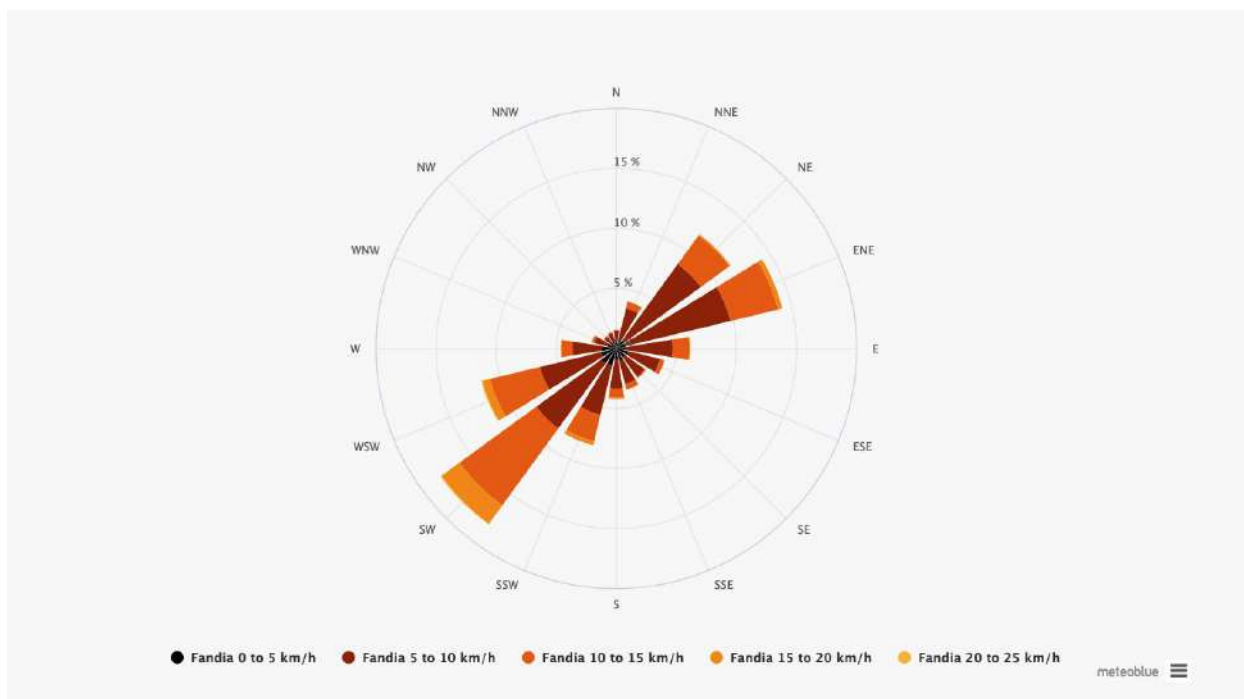


Figure 33. Wind rose at Fandia for 2024 (10m) (Meteoblue)

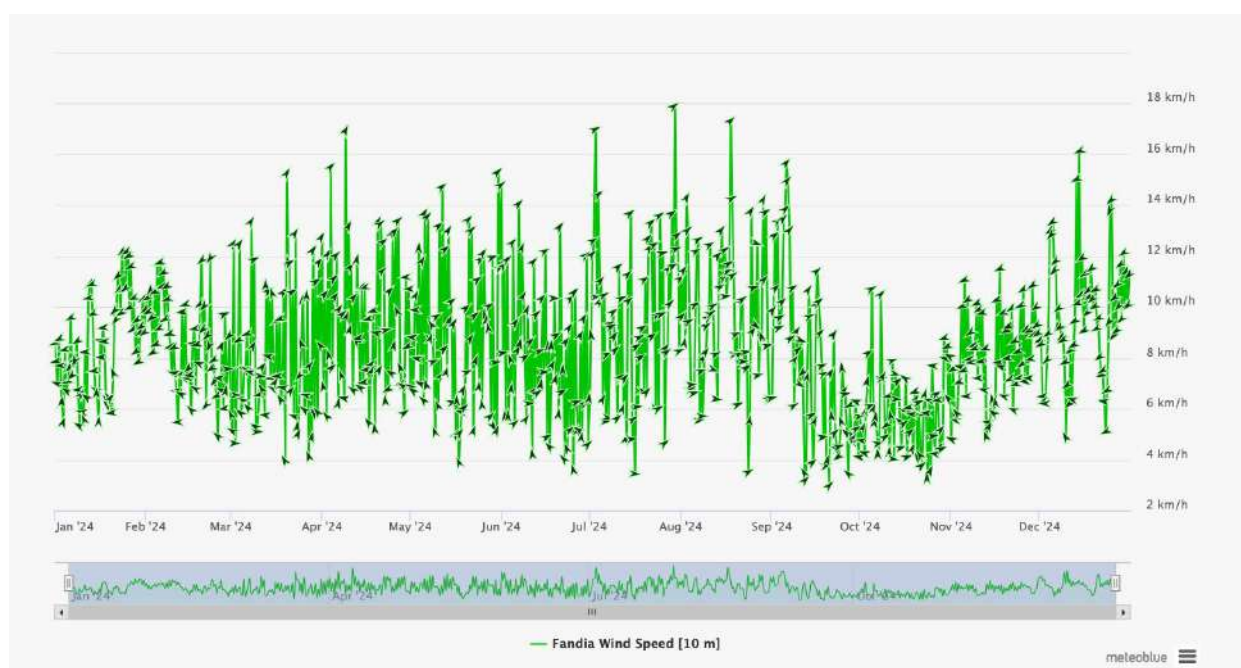


Figure 34. Wind speed and direction at Fandia for 2024 (10m) (Meteoblue)

6.1.2.7. Climate change

The National Strategy on Climate Change (ministère de l'Environnement, des Eaux et Forêts, 2019) describes the climate change observed in Guinea well:

"Climate change over recent decades has been characterised in Guinea by rainfall variations marked by a sudden alternation of wet and dry years, early flooding, rising temperatures and an upsurge in extreme weather events. These phenomena will become increasingly intense and frequent over the course of this century.

...The variation in projections for Guinea for the periods: 2020, 2030, 2050, 2075 and 2100 indicates that temperatures will be high throughout the country. Very high temperatures will be found in the north-east, west and north-west regions, and low temperatures in the south-east of the country. As for the ten-year variation in temperature, it is remarkable to note that each decade the average value increases by a few decimal points compared with the normal for the period.

... Rainfall projections for 2020, 2030, 2050, 2075 and 2100 show a downward trend throughout the country. Decadal variations show that the shift from climatological normals to lower values is quite remarkable".

The IOM office for Guinea has published a factsheet (Migration, environment and climate change) on the impacts of climate change for the different regions of Guinea. For Upper Guinea, they identify the following main climate risks:

- Increase in annual sunshine
- Disruption of rainfall patterns
- Rainfall deficit
- Reduction in average annual river flow

- Drying up of rivers

It is clear that the warming of the temperature seems to be confirmed by the data presented here for Fandia, in particular the gradual increase in temperature (Figure 25) and the increase in hot events from 1940 to 2024 (Figure 35).

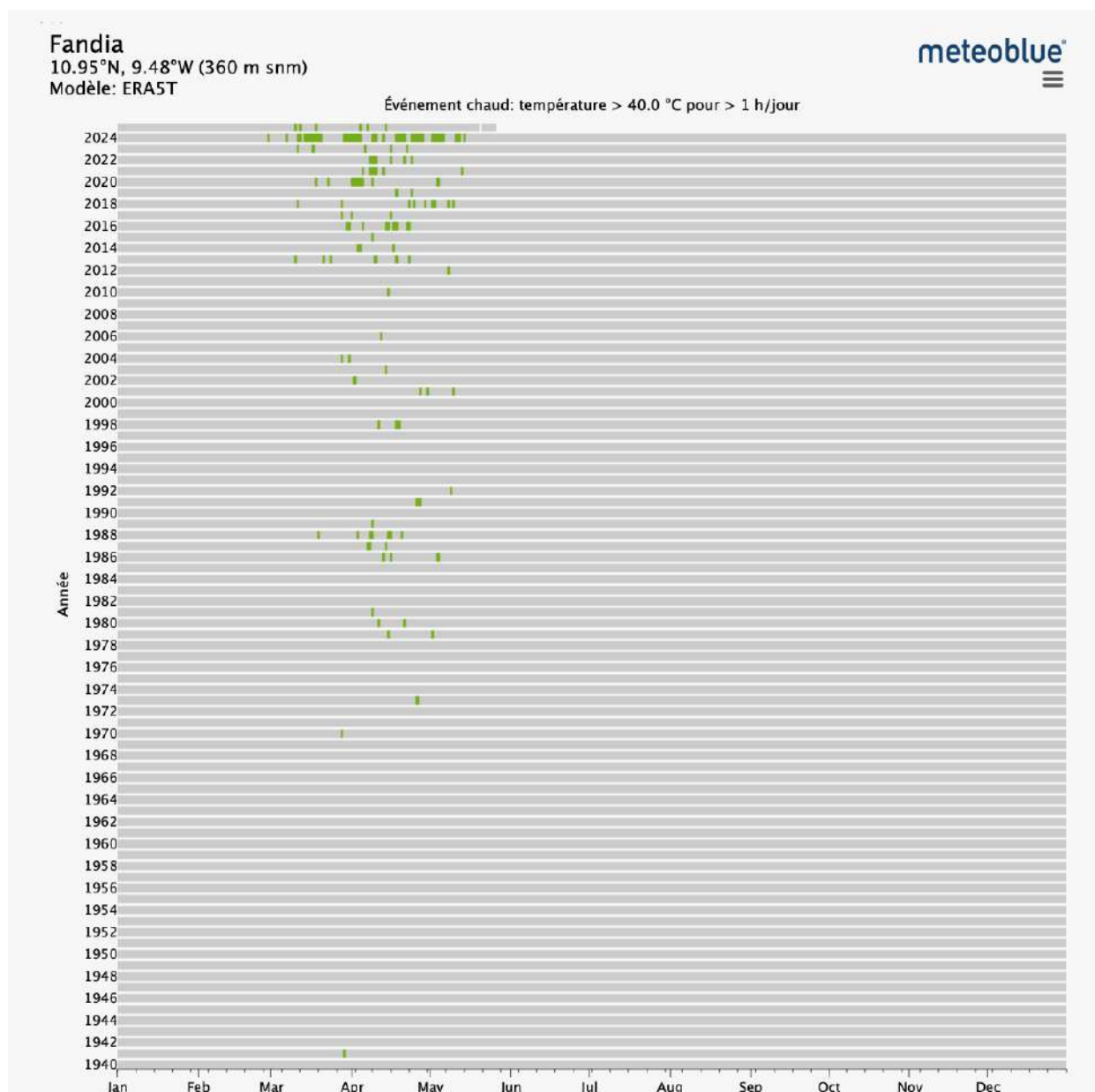


Figure 35. Days with temperature above 40 °C in Fandia from 1940 to 2024 (Meteoblue)

On the other hand, a summary analysis of the data does not show any obvious increase in hours of sunshine or solar radiation.

The decrease in rainfall since the 1950s seems fairly clear (*Figure 28*). The wettest periods do not seem to follow this downward trend (*Figure 36*).

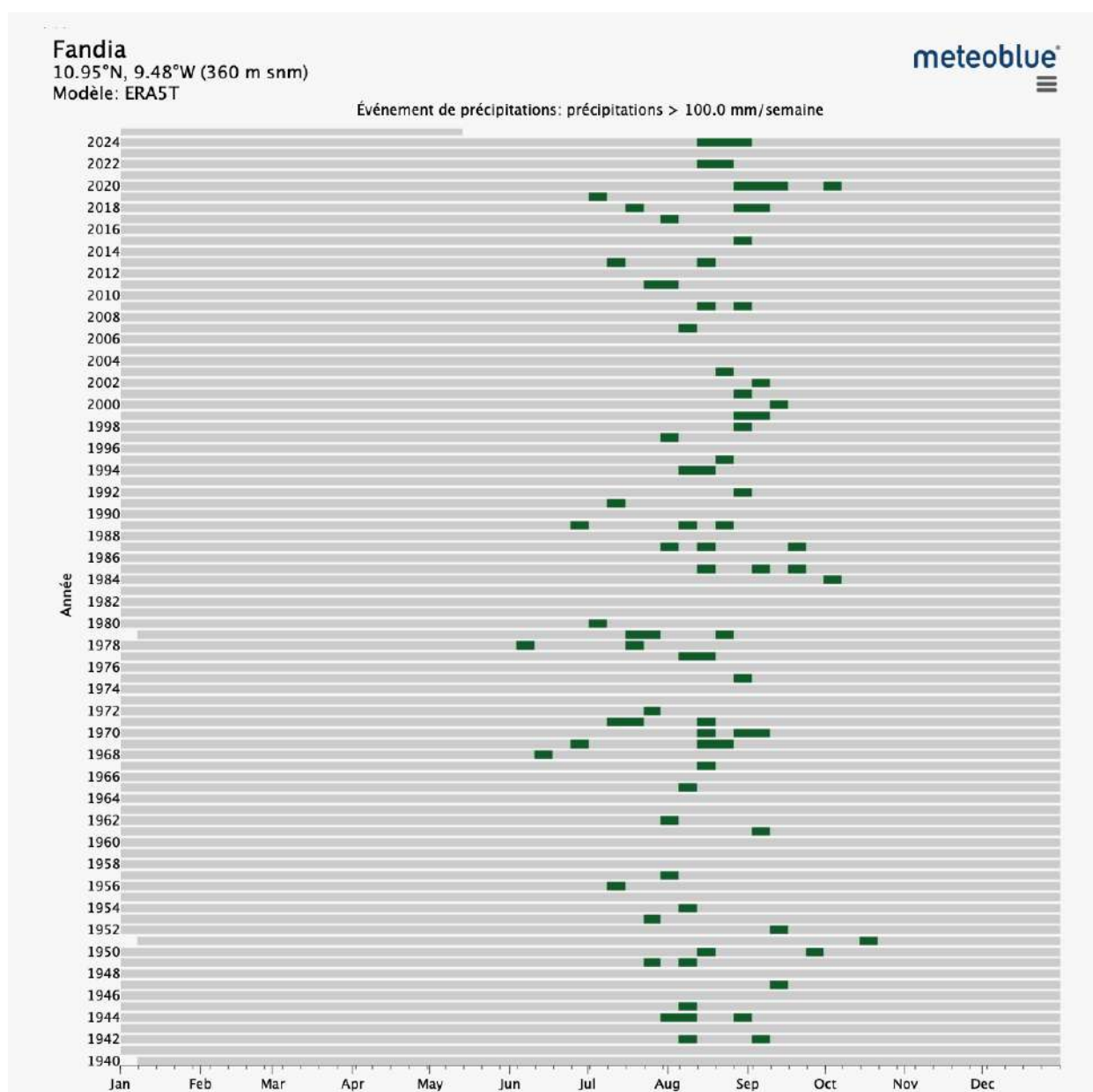


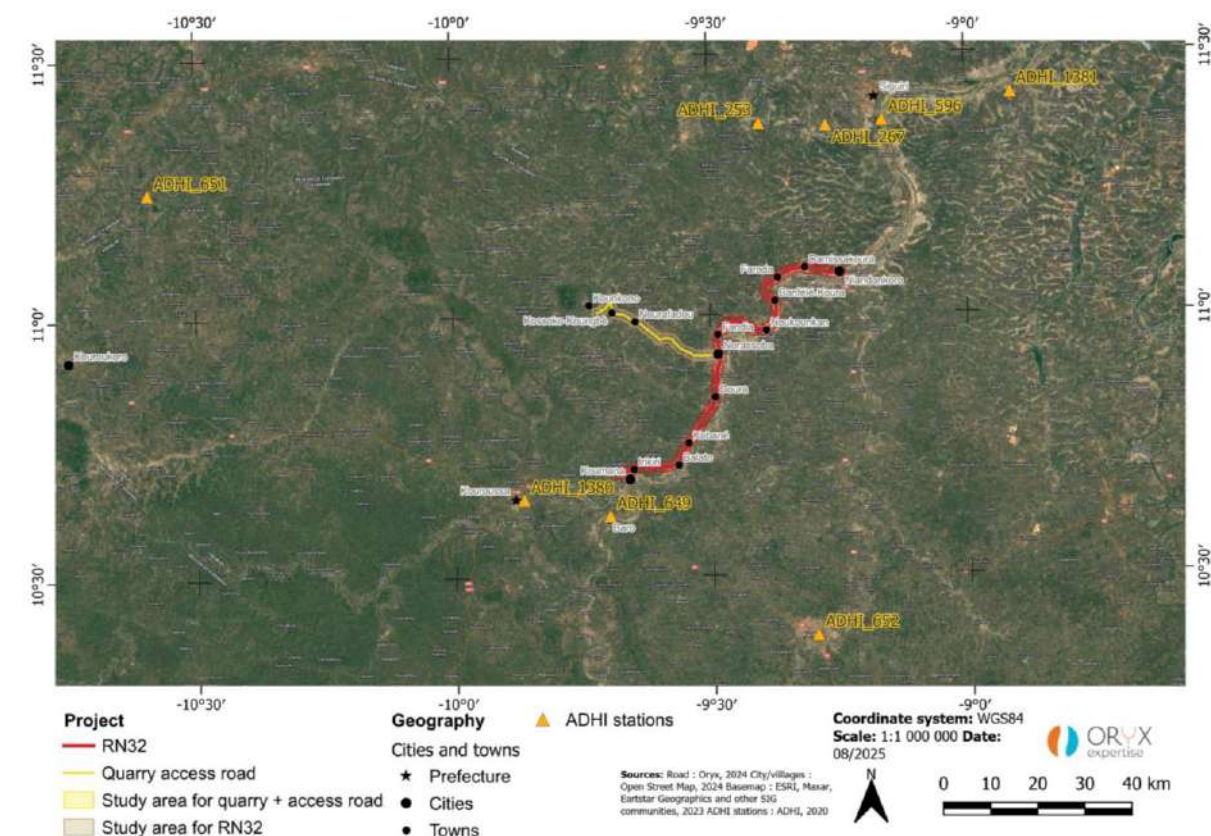
Figure 36. Rainfall events over 100mm/week at Fandia from 1940 to 2024 (Meteoblue)

The issues of changes in river flows are dealt with in the next section.

6.1.1. Hydrography

6.1.1.1. Data

The main hydrometric stations in the study area or upstream are described in Table 26 and their locations are shown in Map 21.



Map 21. Location of ADHI stations near the Project site

These stations represent data for the Niger and its main tributaries in Guinea (the Tinkisso, the Niandan and the Milo). The Kouroussa station on the Niger is before these tributaries and therefore has a relatively low flow, while the Siguiri (actually Tiguibiri) station is downstream of these tributaries and therefore has a much higher flow. The main data is derived from the ADHI database.

Table 26: Characteristics of hydrometric stations near the study area (derived from ADHI, 2020)

ADHI code	Station code	Station name	Source	Start data	of	End of data	Longitude	Latitude	Catchment area (km ²)	Average altitude (m)	Minimum altitude (m)	Maximum altitude (m)	Average annual precipitation (mm)	Average annual evapotranspiration (mm)	Mean annual temperature (°C)
ADHI_1379	1634100	TINKISSO to DABOLA	GRDC	1964		1975	-11.1200	10.7500	1260	721.8	893	502	1861.24	1509.93	25.45
ADHI_1380	1634400	NIGER RIVER to KOUROUSSA	GRDC	1950		2002	-9.8667	10.6500	17194	473.7	832	387	1902.72	1513.08	25.49
ADHI_1381	1634700	NIGER RIVER to DIALAKORO	GRDC	1954		1980	-8.9100	11.4200	687510	480.7	944	347	1810.65	1484.28	25.56
ADHI_251	GNQ0029	MILO to KONSANKORO	SIEREM	1955		1987	-9.0000	9.0000	887	776.5	909	625	2093.5	1281.66	23.7
ADHI_253	GNQ0048	TINKISSO to OUARAN	SIEREM	1954		1986	-9.4000	11.3667	18720	469.4	893	354	1572.34	1519.22	25.78
ADHI_267	GNQ4106	TINKISSO to DINGUIRAYE	SIEREM	1979		1995	-9.2700	11.3618	153	381.5	389	374	1315.56	1536.79	26.75
ADHI_596	GNQ0018	NIGER to TIGUIBERY (Siguri)	SIEREM	1952		1989	-9.1604	11.3702	68147	466.6	893	354	1810.65	1484.28	25.56
ADHI_642	NEWST07	NIANDAN in KISSIDOUYOU (NIANDAN SCIERIE)	SIEREM	1957		2017	-10.0167	9.2500	1376	563.8	639	511	2233.18	1387.9	25.01
ADHI_647	NEWST12	NIGER to FARANAH	SIEREM	1955		2017	-10.7495	10.0374	32065	509.8	832	446	1998.85	1502.89	25.32
ADHI_648	NEWST13	MILO at KEROUANE	SIEREM	1970		2017	-9.0333	9.2667	1714	711.3	909	522	2093.5	1281.66	23.7
ADHI_649	NEWST14	NIANDAN to BARO	SIEREM	1950		2017	-9.7000	10.6167	12882	503.3	944	383	1921.63	1443.09	25.22
ADHI_651	NEWST16	TINKISSO to TINKISSO	SIEREM	1955		2017	-10.5917	11.2444	6392	551.1	893	388	1697.52	1509.9	25.35
ADHI_652	NEWST17	MILO to KANKAN	SIEREM	1950		2017	-9.3000	10.3833	9463	580.7	909	387	1953.86	1373.37	24.68

Table 27: Flows at hydrometric stations near the study area (derived from ADHI, 2020)

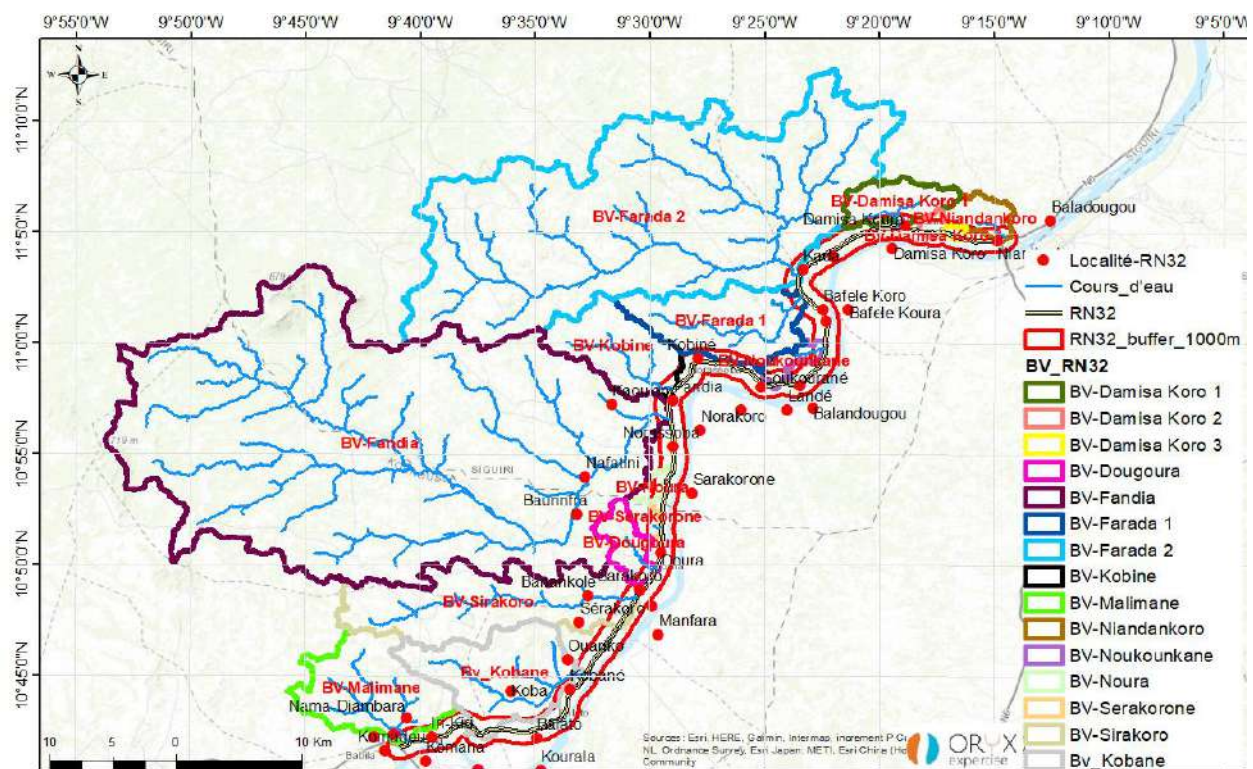
Name	ID ADHI	Mean daily flow (m ³ /s)	Standard deviation of daily flow	Minimum daily flow (m ³ /s)	Maximum daily flow (m ³ /s)	Frequency of days with no flow
TINKISSO to DABOLA	ADHI_1379	15.84	22.13	0	90	0.02
NIGER RIVER to KOUROUSSA	ADHI_1380	216.66	275.29	0.7	1710	0
NIGER RIVER to DIALAKORO	ADHI_1381	1101.49	1317.21	19	7110	0
MILO to KONSANKORO	ADHI_251	31.3	36.45	0.38	365	0
TINKISSO to OUARAN	ADHI_253	167.35	240.11	0	1470	0.02
TINKISSO to DINGUIRAYE	ADHI_267	51.16	83.66	0	354	0.05
NIGER to TIGUIBERY (Siguiri)	ADHI_596	1076.88	1340.1	14.6	7200	0
NIANDAN in KISSIDOUYOU (NIANDAN SCIERIE)	ADHI_642	42.77	47.19	0.32	381	0
NIGER to FARANAH	ADHI_647	62.55	72.66	0	341	0
MILO at KEROUANE	ADHI_648	39.36	44.17	0.02	263.33	0
NIANDAN to BARO	ADHI_649	212.21	265.38	0.03	1880	0
TINKISSO to TINKISSO	ADHI_651	77.48	105.54	0	359.43	0
MILO to KANKAN	ADHI_652	172.58	215.64	0	1040	0.01

6.1.1.2. Catchment areas

The Kouroussa-Niandankoro section is criss-crossed by some fifteen catchment areas, ranging in size from 1.54 (BV-Damisa Koro 3) to 759.7 km² (BV-Fandia). The Table 28 shows the geometric characteristics (area, perimeter and X and Y coordinates of outlets) of these basins, and the Map 22. Catchment areas along the RN 32 , their spatial layout.

Table 28. Basic geometric characteristics of the catchment areas on the Kouroussa-Niandankoro section of the RN 32

Catchment area	Area (Km²)	Y (UTM)	X (UTM)	Perimeter (Km)
BV-Damisa Koro 3	1.5	1225325.6	469618.2	7.7
BV-Damisa Koro 2	3.4	1225943.3	467807.0	10.1
BV-Noura	4.0	1204136.4	445601.8	15.1
BV-Serakorone	6.5	1201616.8	444891.8	15.2
BV-Noukounkane	8.1	1214562.2	456545.5	25.8
BV-Niandankoro	14.4	1226646.7	471588.4	25.3
BV-Dougoura	17.3	1199434.5	443483.7	32.4
BV-Damisa Koro 1	25.4	1227765.1	464889.3	36.1
BV-Kobine	53.1	1215618.3	442746.4	49.7
BV-Farada 1	66.9	1217826.2	451144.0	64.3
BV-Malimane	72.4	1187376.7	423414.1	62.9
Bv_Kobane	77.9	1188645.2	433333.3	66.0
BV-Sirakoro	112.2	1194529.4	432503.7	105.3
BV-Farada 2	475.9	1226519.7	444908.7	197.8
BV-Fandia	759.7	1207733.4	424118.2	233.8



Map 22. Catchment areas along the RN 32

6.1.1.3. Flows

Flows are linked to rainfall, with significant flows from August to November for the Niger at Kouroussa and Siguiri (Figure 37). As expected from the very different catchment areas joining the Niger between Kouroussa and Siguiri, variations in the flow of the Niger are greater at Siguiri than at Kouroussa. At Kouroussa, although the flow never reaches zero, it is very low from March to May.

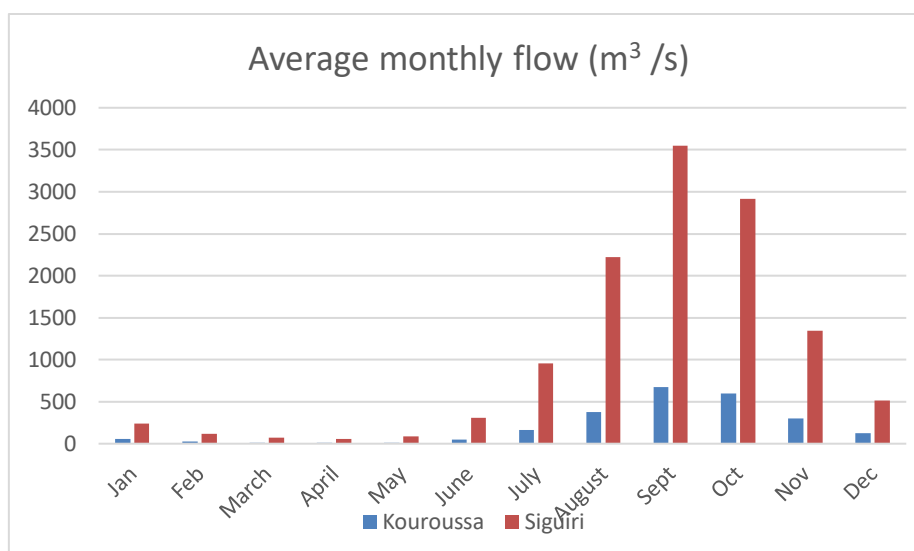


Figure 37 : Mean monthly discharge (m³/s) of the Niger at Kouroussa and Siguiri (ADHI data, 2020)

6.1.1.4. Annual variations in flow

The of recent decreases in rainfall.

Figure 38 shows annual variations in flow at Kouroussa and Siguiri over several decades. There is a clear trend towards decreasing flows, which is generally consistent with the observation of recent decreases in rainfall.

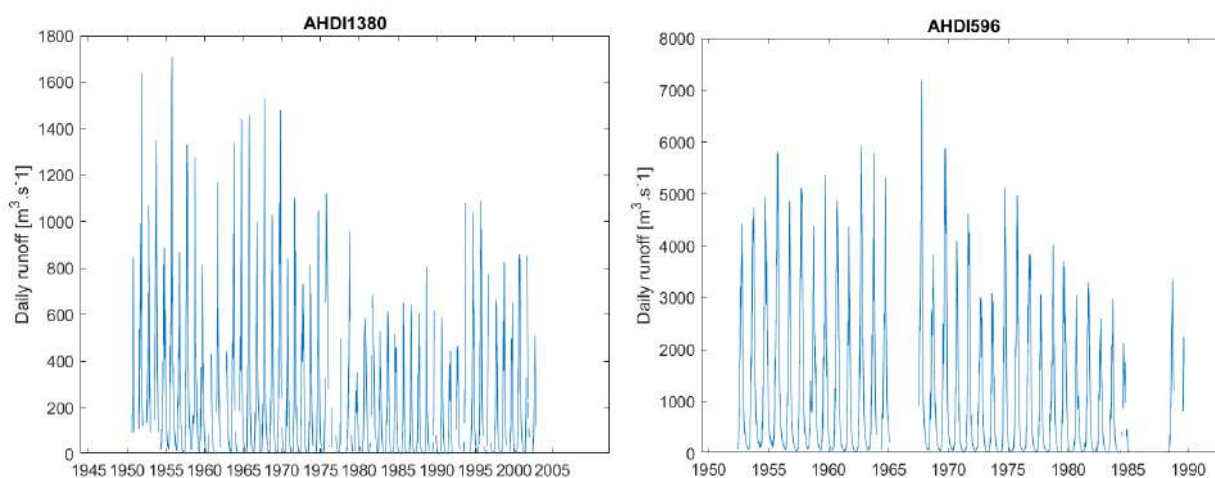


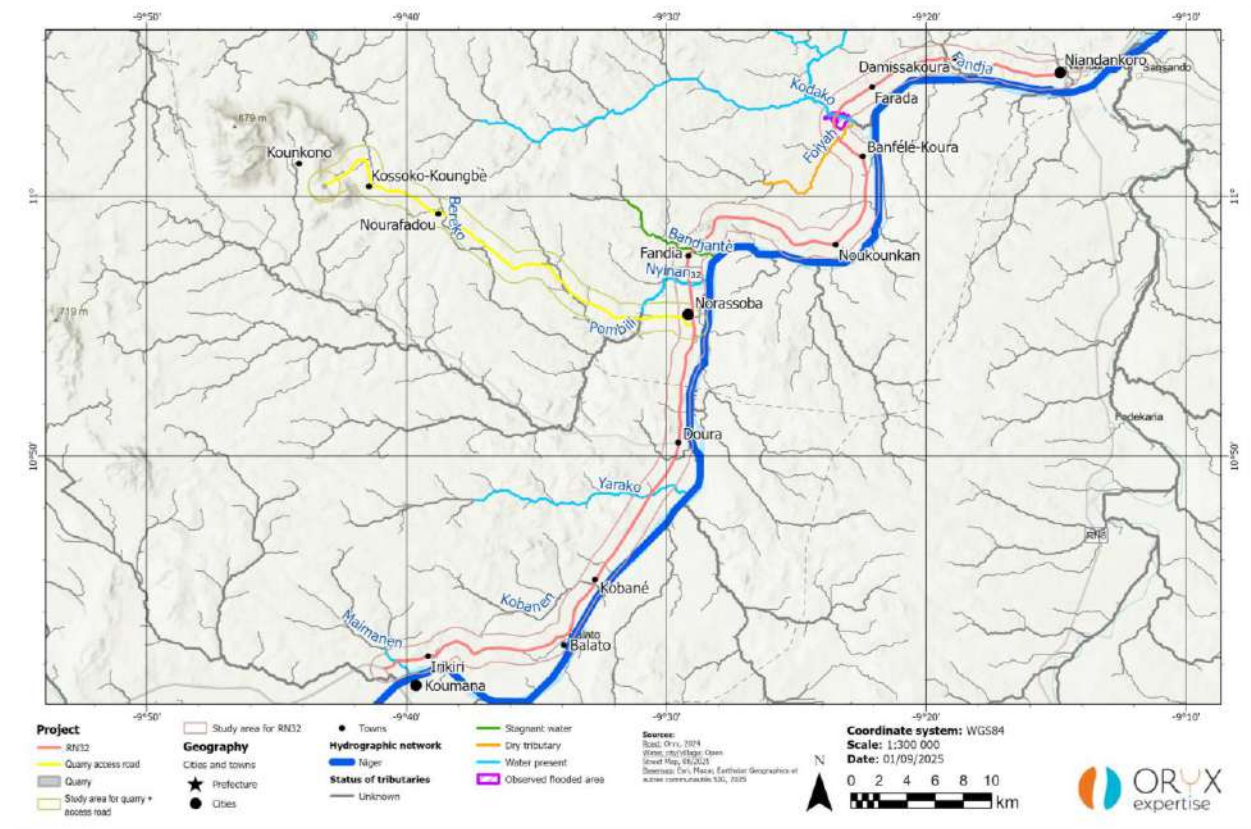
Figure 38 : Daily discharge at Kouroussa (left) and Siguiri (right) per year in m³/s (ADHI, 2020). Note that the abscissa and ordinate scales are different.

6.1.1.5. Rivers crossed by the project and flood zones

The project is crossed by several tributaries of the Niger, the most important of which are shown on Map 23, which are also at the level of the bridges and the Project's needs in terms of deconstruction/construction

of engineering structures. The only exception is the Fandja watercourse at the western exit of the village of Damissakoura (Photograph 10), which has a sluice gate at the junction with the RN 32 (no bridge).

Most of the major watercourses crossed by the Project are permanent watercourses, which do not dry up in the dry season, only showing a sharp reduction in flow.



Map 23: Localisation of the tributaries crossed by the Project and their status in dry season, and localization of the identified inundated area during wet season on the RN32



Photograph 10. Fandjia stream at Damissakoura (no bridge and stream-closing valve)

During the rainy season mission, an area of flooding on the RN 32 following heavy rains was identified (Photograph 11). This area is approximately 400m long and is located between Farada and Banfélékoura, at the level of crossing structure no. 7 (Map 23). The flooding is linked to the outflow of the Kadah tributary into the adjacent cultivated areas. No other areas of flooding were identified during the fieldwork.



Photograph 11 : Illustrations of the flood zone on the RN 32 during the rainy season field mission

6.1.1.6. Long-term trends

Climate change appears to be influencing the Niger's flow rates:

"The flows of the River Niger have been known for over a century at the Koulikoro station in Mali. The river's flow regime is highly sensitive to climatic variations. The drought since 1970 has considerably altered the river's flow rates at all stations. The Niger has been bringing less water to the Sahel over the past 40 years, but paradoxically the Sahel is producing more, due to the deterioration of surface conditions. Changes in the regional climate should continue to modify the river's regime (Ardoin-Bardin et al., 2009). However, it seems that it is the planned developments, especially in the upstream basin, that will have the greatest impact on flooding in the Inner Niger Delta". (Mahe et al., 2013).

Annual flows (of recent decreases in rainfall.

Figure 38) of the Niger near the study area show a fairly clear recent downward trend, despite considerable interannual variations. Care should be taken when identifying potential new bridges along the route not to assume that the downward trend in flows indicates a reduction in flood risk.

6.1.2. Groundwater

There is relatively little public data on the depth of groundwater and borehole flows in the study area. The "Ressources en eaux souterraines dans la région de la CEDEAO" map (BRGM et al., 2022) indicates that the study area lies in a zone of fractured aquifers of limited productivity with a drilling rate of around 0.1 to 0.5 L/s. The long-term average recharge is around 100 mm/year.

6.1.3. Water quality

Water quality analysis is of crucial importance for both human health and environmental protection. Water pollution is a change in the quality and nature of water that makes its use dangerous and/or disrupts the aquatic ecosystem. It can affect surface water (rivers, lakes) and/or groundwater. The main sources of water pollution are human activity, industry, agriculture and domestic and industrial waste dumps.

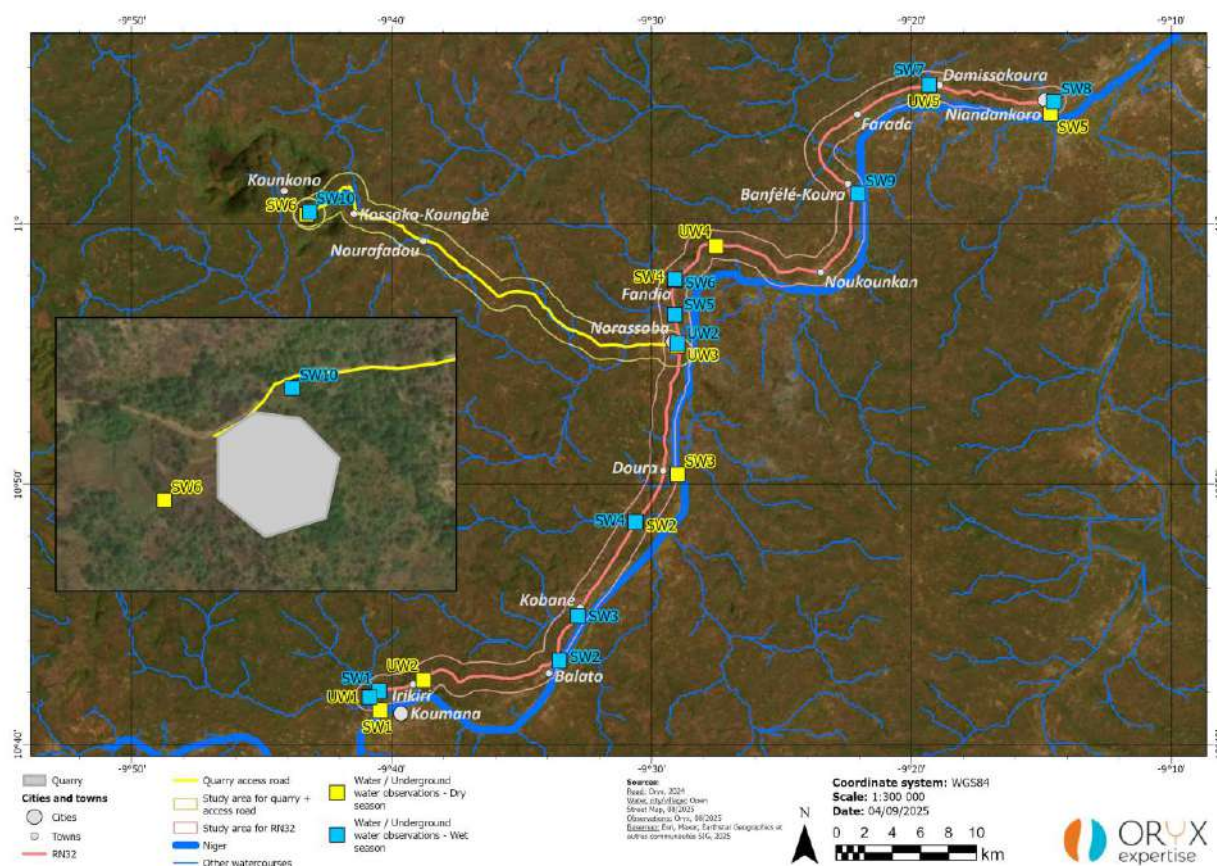
The parameters used to monitor water quality as part of environmental surveillance are as follows:

- standard physico-chemical parameters (pH, SS, Temperature, Salinity, Conductivity, Nitrates, Sulphates, Chlorides) ;
- trace metals (dissolved iron, manganese, copper, zinc, arsenic, cadmium, lead, selenium, mercury);
- microbial contamination (total coliforms, faecal coliforms, faecal Streptococci, *Escherichia coli*).

During the dry season, 11 stations were sampled, including 6 surface waters and 5 boreholes or drinking waters (Table 29 Table 31 Table 33)

During the rainy season, 13 water samples were taken and analysed, including 10 surface waters and 3 ground waters (Map 24,

Table 30, Table 32, Table 34)



Map 24: localisation of water samples

With the exception of sample SW6 at Kounkono, which was stagnant water with high conductivity near a field, the other surface water samples complied with the standards because their conductivity was less than 150 $\mu\text{S}/\text{cm}$. Surface water has low turbidity and is suitable for agriculture, animal watering and the aquatic environment. It contains traces of heavy metals such as arsenic and lead, especially in areas crossed by gold-panning sites.

Most groundwater is acidic due to the lateritic soils it flows through. It has low conductivity and high turbidity, which makes it unsuitable for drinking. It contains traces of heavy metals such as arsenic, especially in gold-mining areas. From a microbiological point of view, groundwater is not suitable for human consumption without prior treatment (chlorination, for example). All groundwater must be filtered before consumption, with the exception of the Norassoba borehole (UW3).

Significant variations in water conductivity and turbidity are observed between the dry and wet seasons, due to dilution caused by heavy rainfall.

Table 29. Physico-chemical analysis of water - Dry season (values in bold indicate threshold exceedances)

	Stations	pH	Cond	Turbidity	TA	TAC	Mg ²⁺	Ca ²⁺	Cl ⁻	SO ₍₄₎ ⁽²⁻⁾	NO ₍₂₎ ⁽⁻⁾	PO ₍₄₎ ⁽³⁻⁾
		-	µS/cm	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Surface water	SW1	7,7	89	2,76	0	360	8,64	48	21,3	0	0,26	0
	SW2	6,26	61	10,7	0	160	7,68	48	8,88	0	2,96	0
	SW3	7,01	77	2,23	0	120	8,64	80	23,08	0	0,56	0
	SW4	6,77	87	74,4	0	140	6,72	32	10,65	0	0,95	0
	SW5	6,67	78	9,15	0	160	6,72	96	15,98	0	0,68	0
	SW6	7,4	526	8,76	0	740	48,96	112	19,53	55,61	0,52	0
	Surface water standards	6.5-9	150	75	-	-	-	-	20	90	1	1
	Aquatic environment	6.5-9	400-600	-	-	-	5.76	8	20	0.01	20	0.2
	Irrigation	5.5-9.5	3000	-	-	150	6.25	40-120	140	-	24-240	-
	Watering	5.5-9	3000	5	-	-	250-400	1000	-	0.1	500-1000	-
Ground water	UW1	5,42	261	7,86	0	380	10,56	144	21,3	0	0,68	0
	UW2	5,42	54	79,1	0	80	3,84	80	8,88	0	0,85	0,08
	UW3	6,67	242	45,7	0	200	11,52	112	19,53	0	2,47	0
	UW4	5,29	56	26,7	0	120	3,84	96	14,2	0	0,68	0
	UW5	6,41	52	26,2	0	80	2,88	80	23,08	0	1,01	0
	WHO standards	6.5-9	1500	5	-	-	100	200	250	500	0.2	-

Table 30. Physico-chemical analysis of water - Rainy season (values in bold indicate threshold exceedances)

Stations	pH	Conductivity	Turbidity	TA	TAC	Mg ²⁺	Ca ²⁺	Cl ⁻	SO ₄ ⁽²⁻⁾	NO ₃ ⁽³⁻⁾	NO ₂ ⁽²⁻⁾	NH ₄ ⁺	PO ₄ ⁽⁴⁻⁾
	-	µS/cm	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Surface water	SW 1	6,81	36	34,7	260	100	10,56	96	15,98	1,22	1,15	0	0,09
	SW 2	7,03	33	52,7	0	400	7,68	48	12,43	1,73	0,22	0	0,17
	SW 3	6,38	25	12,9	0	160	2,88	64	15,98	107,77	0	0	0,04
	SW 4	6,2	22	15,8	0	180	5,76	96	12,43	0,35	0,04	0	0,09
	SW 5	6,54	40	51,2	0	140	5,76	48	19,53	2,42	0,44	0	0,13
	SW 6	6,46	28	106	0	260	4,8	64	17,75	2,25	0,06	0	0,54
	SW 7	6,18	48	48,7	0	200	8,64	80	15,98	2,16	1,41	0	0,01
	SW 8	5,59	66	31,4	0	140	2,88	64	24,85	0	2,01	0	0,11
	SW 9	6,75	49	48,8	0	160	7,68	48	15,98	0,18	0,28	0	0,21
	SW 10	7,15	360	12,4	0	400	12,48	240	19,53	0	0,06	0	0,06
Drinking water	Surface water standards	6.5-9	150	75	-	-	-	-	20	90		1	1
	Aquatic environment standards	6.5-9	400-600	-	-	-	5.76	8	20	0.01		20	0.2
	Irrigation standards	5.5-9.5	3000	-	-	150	45809	40-120	140	-		24-240	-
	Drinking standards	5.5-9	3000	5	-	-	250-400	1000	-	0.1		500-1000	-
	UW1	6,82	344	0,96	0	440	7,68	160	23,08	0	4,29	0	0
	UW2	6,96	288	1,76	1940	660	11,52	80	71	0	66,8	0	0,02
Drinking water	UW3	6,29	146	10,6	0	220	4,8	80	30,18	1,56	52,9	0	0,13
	WHO standards	6.5-9	1500	5	-	-	100	200	250	500			

Table 31. Heavy metal levels in water at sampling points (ppm) - Dry season. (values in bold indicate threshold exceedances)

	Stations	Zn	Cd	Sr	Ba	Cu	Ni	As	Co	Pb	K	Mo	Mn	Cr	Al
Surface water	SW1	<0,01	0.02	<0,01	<0,01	<0,01	<0,01	0.95	0.03	<0,01	3.9	<0,01	<0,01	<0,01	<0,01
	SW2	<0,01	0.03	<0,01	<0,01	<0,01	<0,01	3.18	<0,01	<0,01	1.15	<0,01	<0,01	<0,01	<0,01
	SW3	<0,01	0.03	<0,01	<0,01	<0,01	<0,01	3.15	<0,01	<0,01	3.47	<0,01	<0,01	<0,01	<0,01
	SW4	<0,01	0.02	<0,01	<0,01	<0,01	<0,01	<0,01	<0,01	0.28	<0,01	<0,01	<0,01	<0,01	1.73
	SW5	<0,01	0.05	<0,01	<0,01	<0,01	0.07	2	<0,01	0.35	21.27	0.03	0.03	0.32	0.03
	SW6	<0,01	0.03	<0,01	0.11	<0,01	<0,01	<0,01	<0,01	<0,01	8.24	<0,01	<0,01	<0,01	<0,01
	Surface water standards	5	5	-	-	1	0.05	0.05	-	0.05	-	-	1	-	-
	Aquatic environment	0.12	0.043	-	1	0.013	0.052	0.05	-	0.02	0.02	-	-	0.05	0.75
	irrigation	2		-	-	2	0.2	0.05	0.5	3	-		0.2		5
	Watering	25-50	0.05			1	1	0.2	1	0.1	50	0.5	0.05	0.05	5
Groundwater	UW1	<0,01	0.13	<0,01	0.05	<0,01	<0,01	1.76	<0,01	<0,01	<0,01	0.05	0.04	<0,01	<0,01
	UW2	<0,01	0.08	<0,01	0.05	<0,01	<0,01	5.91	<0,01	<0,01	<0,01	0.06	<0,01	<0,01	1.14
	UW3	<0,01	<0,01	<0,01	<0,01	<0,01	<0,01	0.99	<0,01	0.3	11.44	0.07	0.24	<0,01	<0,01
	UW4	<0,01	0.02	<0,01	<0,01	<0,01	<0,01	2.49	<0,01	0.03	0.25	<0,01	<0,01	<0,01	0.72
	UW5	<0,01	0.02	<0,01	<0,01	<0,01	<0,01	4.48	<0,01	0.01	0.36	<0,01	<0,01	<0,01	<0,01
	WHO standards	1	0.03		0.7	1	0.02	0.01	-	0.01	--	0.07	0.2	0.05	0.2

Table 32 : Heavy metal content in water at sampling points (ppm) - Rainy season (values in bold indicate threshold exceedances)

	Stations	Zn	Cd	Sr	Ba	Cu	Ni	As	Co	Pb	K	Mo	Mn	Cr	Al
Surface water	SW 1	< 0,01	< 0,01	< 0,01	< 0,01	0,08	< 0,01	0,87	< 0,01	1,29	2,37	0,25	0.00 u	0,12	1,24
	SW 2	< 0,01	< 0,01	< 0,01	< 0,01	0,19	< 0,01	0,99	< 0,01	1,38	2,33	0,5	< 0,01	0,12	1,27

Ground water	SW 3	< 0,01	< 0,01	< 0,01	< 0,01	0,13	< 0,01	0,79	< 0,01	1,53	2,36	0,32	< 0,01	0,04	< 0,01
	SW 4	< 0,01	< 0,01	< 0,01	< 0,01	0,02	< 0,01	< 0,01	< 0,01	1,32	2,64	0,56	< 0,01	0,12	< 0,01
	SW 5	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	0,7	1,28	0,18	< 0,01	0,03	0,42
	SW 6	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	0,57	0,65	0,18	< 0,01	0,02	0,61
	SW 7	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	0,51	0,68	0,16	< 0,01	0,04	0,35
	SW 8	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	0,45	0,74	0,19	< 0,01	0,03	1,36
	SW 9	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	0,26	0,8	0,09	< 0,01	0,02	0,89
	SW 10	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	0,15	1,36	0,27	< 0,01	0,1	0,85
	Surface water standards	5	5	-	-	1	0,05	0,05	-	0,05	-	-	1	-	-
	Aquatic environment standards	0,12	0,043	-	1	0,013	0,052	0,05	-	0,02	0,02	-	-	0,05	0,75
	Irrigation standards	2	-	-	-	2	0,2	0,05	0,5	3	-	-	0,2	-	5
	Drinking standards	25-50	0,05	-	-	1	1	0,2	1	0,1	50	0,5	0,05	0,05	5
	UW1	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	0,5	0,77	0,13	0,15	0,02	< 0,01
	UW2	< 0,01	< 0,01	< 0,01	< 0,01	0,14	< 0,01	0,25	< 0,01	1,86	6,06	0,61	0,15	0,4	0,87
	UW3	< 0,01	< 0,01	< 0,01	< 0,01	0,04	< 0,01	0,08	< 0,01	0,92	2,32	0,08	< 0,01	0,02	< 0,01
	WHO standards	1	0,03	-	0,7	1	0,02	0,01	-	0,01	--	0,07	0,2	0,05	0,2

Table 33. Microbiology of surface water and groundwater sampled in number of colonies after 24h incubation - Dry season

	Stations	Total coliforms	Faecal Coliforms	Salmonella Shigella	Faecal Streptococcus	Escherichia coli	Fungi	Compliance
Surface fresh water	SW1	176	5	0	23	0	46	Compliant
	SW2	120	7	0	25	0	42	Compliant
	SW3	1	1	0	8	0	15	Compliant
	SW4	20	14	0	0	0	14	Compliant
	SW5	2	0	0	0	1	100	Compliant
	SW6	14	0	0	0	1	43	Compliant

	Standards	5000	2000	0	1000	2000	-	
Groundwater	UW1	133	0	34	0	0	132	Non-Compliant
	UW2	3	3	0	0	0	5	Non Compliant
	UW3	80	0	0	104	2	152	Non-Compliant
	UW4	5	1	0	0	0	0	Non-Compliant
	UW5	3	6	0	0	0	12	Non-compliant
	WHO standards	0	0	0	0	0	0	

Table 34. Microbiology of surface water and groundwater sampled in number of colonies after 24 hours incubation - Rainy season

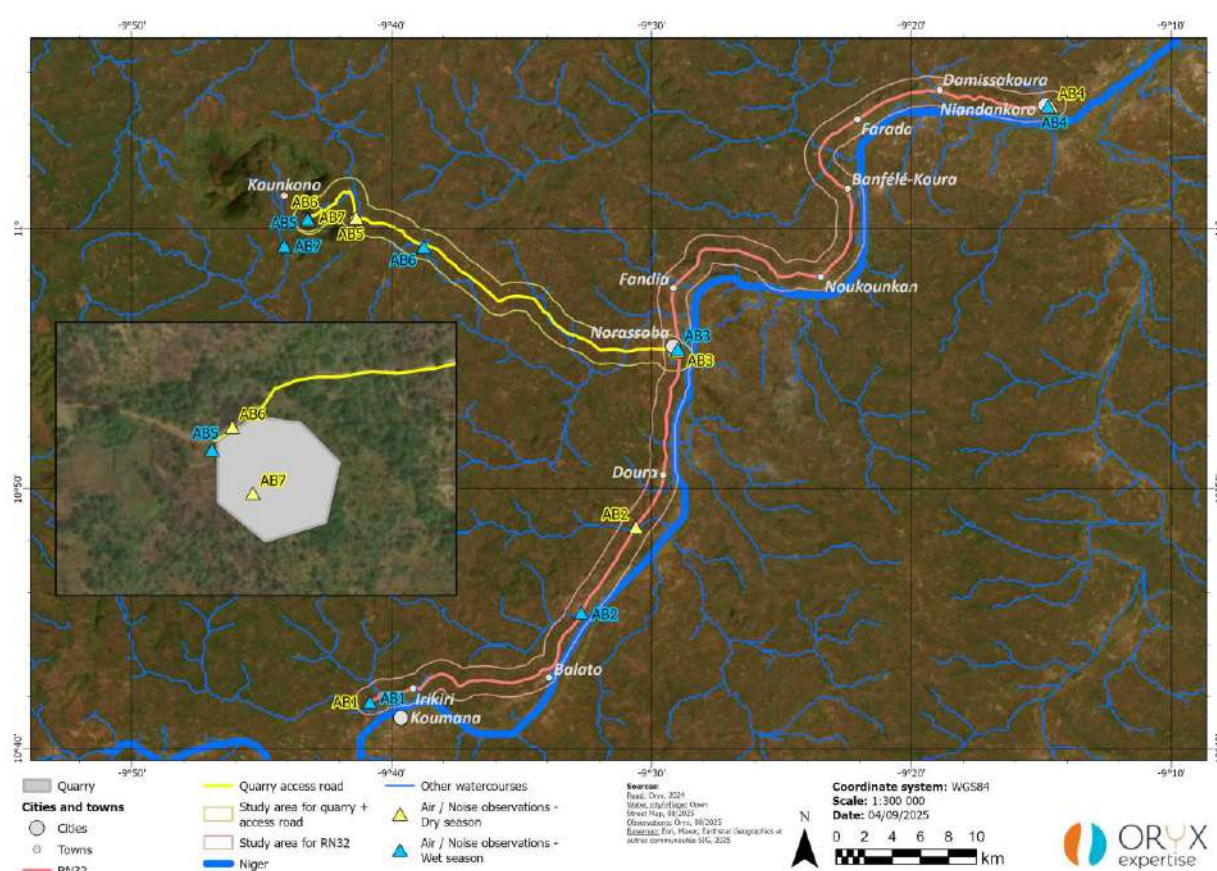
	Stations	Total coliforms	Faecal coliforms	Salmonella shigella	Faecal Streptococcus	Escherichia coli	Fungi	Compliance
Surface fresh water	SW1	176	51	13	22	0	2	Non Compliant
	SW2	96	49	7	17	0	13	Non Compliant
	SW3	11	44	0	9	0	4	Compliant
	SW4	240	228	1	10	0	4	Non Compliant
	SW5	63	63	4	10	0	8	Non Compliant
	SW6	70	416	3	7	0	9	Non Compliant
	SW7	320	496	0	0	0	7	Compliant
	SW8	120	116	13	25	0	131	Non Compliant
	SW9	256	152	0	2	0	6	Compliant
	SW10	160	302	0	4	0	3	Compliant
	Surface water standards	5000	2000	0	1000	2000	-	
Groundwater	UW1	63	628	22	20	0	19	Non-Compliant
	UW2	306	160	0	14	0	5	Non-Compliant
	UW3	37	23	7	3	0	8	Non compliant
	WHO standards	0	0	0	0	0	0	

6.1.4. Air quality

The locations of the air quality and noise environment measurement points are shown on the Map 25. Some of the measurement points at the quarry were shifted between the two field sessions due to their close proximity during the first session. All air quality measurements are spot measurements. The threshold values applied are those of the WHO for 1 hour of CO and NO₂ measurements, and for 24 hours of PM_{2.5}, PM₁₀ and SO₂ measurements.

The results of the air quality measurements are given in Table 35 and Table 36 and are commented on below:

- Nitrogen dioxide levels at all points on the RN 32 (AB1 to AB4) far exceed those measured in the quarry area, although they do not exceed the thresholds recommended by the WHO. This can be explained by the combustion of fuels at these points located not far from the main road, which may even be affected by the activities of some homes. On the other hand, points AB5 to AB7 are in an area where there is little human activity, apart from gold panning.
- Sulphur dioxide levels at all points comply with the WHO guide values (40 µg/m³), with the exception of point AB4 during the rainy season, where the threshold value is probably exceeded due to vehicle exhaust fumes at the Niandankoro market.
- Particulate matter PM_{2.5} and PM₁₀ meet WHO standards in the dry season. This can be explained by the sometimes rainy and humid weather (54% to 60% humidity) and the fairly wooded environment, which reduces particle levels. During the rainy season, the recommended threshold value for PM_{2.5} was exceeded at point AB3 (Norassoba), probably due to diesel exhaust fumes at the measurement point near the main road.
- Carbon monoxide levels at all points were within the WHO guide value. This would be due to the rainy weather in the areas and to the reduction in certain human activities and the low spread of smoke from rolling stock.



Map 25: Locations of air quality and noise environment measurement points

Table 35. Results of air quality analyses - Dry season (values in bold indicate threshold exceedances)

Stations	PM ₍₁₀₎ (µg/m ³)	PM _(2.5) (µg/m ³)	SO ₍₂₎ (µg/m ³)	NO ₍₂₎ (µg/m ³)	O ₍₃₎ (µg/m ³)	O ₍₂₎ (%)	CO (µg/m ³)	Humidity	Temperature (°C)
AB1	21,45	8,58	0	174,62	0	20,9	0	81,6	48,25
AB2	42,89	11,44	0	54,43	0	20,9	0	81,2	44
AB3	2,86	11,44	0	83,91	0	20,9	0	84,7	46,86
AB4	10,12	6,29	25	112	0	20,9	802	73,4	53,12
AB5	12,87	4,29	0	20,41	0	20,9	0	76,5	36,89
AB6	12,87	4,29	0	20,41	0	20,9	0	45,9	45,3
AB7	12,87	4,29	0	20,41	0	20,9	0	76	40,22
WHO standards	45	15	40	200	100	21	35 000	-	-

Table 36. Results of air quality analyses - Rainy season (values in bold indicate threshold exceedances)

Stations	PM ₍₁₀₎ (µg/m ³)	PM _(2.5) (µg/m ³)	SO ₍₂₎ (µg/m ³)	NO ₍₂₎ (µg/m ³)	O ₍₃₎ (µg/m ³)	O ₍₂₎ (%)	CO (µg/m ³)	Humidity	Temperature (°C)
AB1	12,87	1,43	31,55	97,52	0	20,9	3874,98	84	29
AB2	12,87	4,29	0	83,91	0	20,9	0	85	28
AB3	5,72	27,16	0	86,18	0	20,9	0	91	29 - 30
AB4	13,58	5	347,07	79,37	0	20,9	0	83	27
AB5	8,58	1,43	0	102,05	0	20,9	0	92	29
AB6	7,15	2,86	0	72,57	0	20,9	0	91	29
AB7	8,72	1,43	0	102,05	0	20,9	0	92	29
WHO standards	45	15	40	200	100	21	35 000	-	-

6.1.5. Noise environment

In accordance with IFC's general EHS guidelines (IFC, 2007b), WHO guidelines for ambient noise levels (Table 3, 2.2.2.1.1) will guide the design of the facilities. However, Guinean standards (Table 2, 2.2.2.1.1) will also apply, with a compromise to measure the project's compliance with the most stringent standard/guideline, if necessary. Noise impacts must not exceed the levels of the applicable standards and guidelines or result in a maximum increase in background levels of 3 dB at the receptors closest to the site.

The World Health Organisation (WHO) has issued guidelines that can be used to protect the health of communities living close to buildings. These guidelines, published in 2018, recommend that the constant noise level (LAeq) should not exceed 55dB during the day and 40dB at night in residential areas. In industrial and commercial zones, the guidelines recommend that LAeq levels of 70dB should not be exceeded during the day or at night. Given the locations of the various measurement points, the standards relating to residential areas will be applied to point AB3, and the standards relating to industrial areas for the other sampling points.

The average sound intensities measured (Table 37) are all below WHO standards. The various remarkable peaks in noise recorded (above WHO standards) are mainly due to the passage of lorries along the RN 32 in the study area and to heavy rain during the second field mission (see figures in Appendix 7).

Table 37. Noise levels measured in the study area. Values in bold indicate threshold exceedances.

Season	Measurement	AB1	AB2	AB3	AB4	AB5	AB6	AB7
Dryer	Max noise dB	81,6	81,2	84,7	73,4	76,5	45,9	76

Rainy	Average noise dB	48,25	44	46,86	53.12	36,89	45,3	40,22
	Noise max dB	74,1	84,7	69,6	68,3	81,6	72,1	45
	Average noise dB	45,8	29,5	40,9	33,7	27,2	32,7	58

6.1.1. Natural hazards

The following risk levels are taken mainly from the ThinkHazard! wSBSite of the Global Facility for Disaster Reduction and Recovery (GFDRR) and the World Bank Group (<http://thinkhazard.org/fr/>). Although fairly general, these estimates are useful for better targeting the aspects to be considered for measures in the ESMP.

It should be noted that Siguiri is at greater risk of urban flooding (greater flow, as it is downstream from the junction of certain rivers) and water shortages (warmer region with less rainfall).

Table 38 Natural hazards

Risk	Assessment for Kouroussa	Assessment for Siguiri
Flood	High	High
Urban flooding	Low	Moderate
Water shortage	Very low	Moderate
Extreme heat	Moderate	Moderate
Forest fire	High	High
Landslide	Very low	Very low
Earthquake	Very low	Very weak
Volcanic eruption	No data available	No data available
Cyclone	No data	No data
Dangerous animals ¹	Certain risks linked to the presence of species which, through their bite or sting, can pose a risk to people	Certain risks linked to the presence of species which, through their bite or sting, may pose a risk to people

¹Team estimate

6.2. Description of the initial state of the biological environment

6.2.1. International and national conservation status

Priority species for conservation are those considered threatened according to international conservation status and national legislation. These are species considered threatened on the IUCN red list (IUCN 2025) and those classified as protected under national legislation. The CITES convention is also considered here for information purposes. In addition, more specific criteria will target endemic and/or restricted-range species, as well as concentrations of migratory and/or gregarious species of global importance.

It should be borne in mind that assessments of the conservation status of species, both as regards the IUCN red list and national legislation, are subject to regular re-evaluation. The conservation status of species evolves according to population dynamics and the natural and anthropogenic pressures they face, which leads to regular revisions of these conservation statuses, for the IUCN more than for national legislation. Technological advances, particularly through the development of genetic analyses, are also making it possible to redefine the boundaries between species and to distinguish new species.

Finally, knowledge of the distribution area of animal and plant species in Guinea is more or less refined at present, with gaps in knowledge for most taxonomic groups. This should be seen in the light of the fact that the distribution of species is evolving at the same time as habitats are being modified by human activity.

Given these limitations, it is also possible to consider a species as a priority for conservation based on the expertise of the specialists carrying out studies on the different taxonomic groups.

6.2.1.1. Definition of IUCN status

The IUCN red list expresses the degree of threat of extinction of each species evaluated. The CR, EN and VU statuses constitute the category of threatened species. The statuses are defined as follows:

Critically Endangered (CR)

A taxon is said to be 'Critically Endangered' when the best available data indicate that it meets one of the criteria A to E corresponding to the category 'Critically Endangered' and, consequently, that it faces an extremely high risk of extinction in the wild.

Endangered (EN)

A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered and is therefore facing a very high risk of extinction in the wild.

Vulnerable (VU)

A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable, and it is therefore considered to be facing a high risk of extinction in the wild.

Near Threatened (NT)

A taxon is Near Threatened when it has been assessed against the criteria and does not meet the criteria for Critically Endangered, Endangered or Vulnerable, but is close to meeting the criteria for Threatened or is likely to do so in the near future.

Least Concern (LC)

A taxon is said to be of 'Least Concern' when it has been assessed against the criteria and does not meet the criteria for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.

Data Deficient (DD)

A taxon falls into the 'Data Deficient' category when there are insufficient data to directly or indirectly assess the risk of extinction based on its distribution and/or population status.

Not Evaluated (NE)

A taxon is said to be 'Not Evaluated' when it has not yet been tested against the criteria.

The abbreviation for each category, given in brackets, corresponds to the English name in all languages.

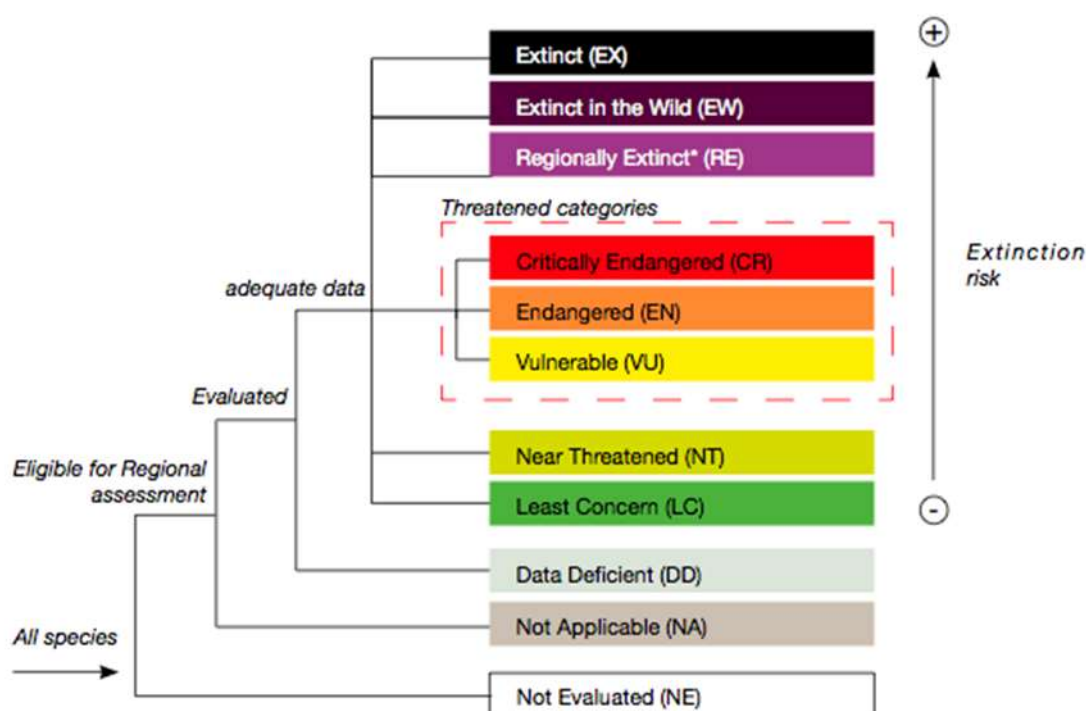


Figure 39. Structure of the IUCN extinction risk categories

Although IUCN information and assessments are critical in identifying species at conservation risk, they must be used with caution.

First of all, it should be borne in mind that the IUCN assessments do not cover all existing species. For some taxonomic groups, such as large and medium-sized mammals, most species have been assessed. On the other hand, the number of species assessed is limited for other groups, particularly plants. It is therefore necessary to ensure that species not evaluated by the IUCN but which are clearly important for conservation are taken into account.

In addition, some of the species assessed remain in the DD category, i.e. species that are potentially at stake but for which there is a lack of sufficient information to assign a status. The assessment of a taxon as belonging to the 'Insufficient Data' category does not rule out its consideration as a threatened species during the ESIA process and requires a case-by-case assessment, based on expert opinion.

6.2.1.2. National protection status in Guinea

Law L/2018/0049/AN defines the code for the protection of wildlife and the regulation of hunting.

The list of animal species fully protected throughout the national territory is defined in Chapter VIII but is not detailed therein. The list of partially protected animal species is defined in Chapter IX but is not detailed there either. Order A/2020/1591/MEEF/CAB/SGG of 19 May 2020 establishes measures for the protection of species of wild fauna and flora in Guinea, in accordance with the international commitments made by the country for the protection of biodiversity, as well as the national laws and regulations in force on this issue.

This decree proposes two types of national protection. On the one hand, the fully protected species (Annex I of the decree) are those listed in Annex 1 of CITES, species classified as CR or EN according to the IUCN Red Lists at the time the decree was drafted, species classified as endangered migratory species in Annex 1 of CMS and species in column A of Table 1 of the African-Eurasian Migratory Bird Agreement. For these species, the decree prohibits (for wildlife):

- The capture, keeping and killing of specimens;
- The transport, purchase, sale and export or re-export of live or dead specimens, even naturalised, as well as derived products;

- Any disturbance during the period of reproduction and dependence of these species;
- The destruction, collection and possession of eggs, even empty ones, and nests.

And for flora :

- picking, collecting, cutting, uprooting, destroying by fire or otherwise;
- the transport, purchase, sale and export or reshipment of these species in a fresh or dried state, including their by-products.

The partially protected species (Annex II of the Order) are those listed in Annex II of CITES, species classified as NT or VU according to the IUCN red lists at the time the Order was drafted, migratory species in an unfavourable situation classified in Annex II of the CMS and species in columns B and C of table 1 of the African-Eurasian Migratory Birds Agreement. For these species, the decree stipulates prior authorisation from the Minister for the Environment (for wildlife) for :

- The capture, keeping and killing of specimens;
- The transport, purchase, sale and export or re-export of live or dead specimens, even naturalised, or derived products;
- Any operation carried out for the purposes of scientific study and research.

For flora :

- picking, collecting, cutting, uprooting or any form of destruction;
- transport, purchase, sale and export or re-export in a fresh or dried state, including derived products;
- all operations carried out for the purposes of scientific study and research.

The taxonomic groups of fauna mentioned in the decree include reptiles, birds and mammals.

The Forestry Code (Law L/99/013/AN, 1999) establishes the framework for the management of forestry resources and deals in particular with the management, protection and exploitation of forests.

There is a National Monograph on Biodiversity in Guinea (1997). This document compiles information on the status of species in Guinea, valid at the time of publication. The lists in the monograph are no longer taxonomically up to date and the status of species has changed significantly in recent decades.

6.2.1.3. CITES Convention

CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) is an international agreement between governments adopted in 1973. Its main objective is to ensure that international trade in specimens of wild animals and plants does not threaten their survival.

CITES establishes rules for trade in species to prevent their excessive exploitation. It aims to preserve biodiversity while authorising sustainable trade.

Protected species are divided into three appendices according to their level of threat:

- Appendix I: Species threatened with extinction. Trade in these species is strictly prohibited, with some exceptions (for scientific reasons, for example).
- Appendix II: Species that are not necessarily threatened with extinction but could become so if their trade is not strictly controlled.
- Appendix III: Species protected in at least one country that has requested assistance from other Parties to control their trade.

Signatory States must implement national laws to apply the provisions of CITES.

6.2.1. Review of existing data on the biological environment

6.2.1.1. IBAT report

The IBAT report produced as part of this study mentions, on the basis of the international databases consulted and in particular that of the IUCN, the potential presence of numerous species belonging to different taxonomic groups ([Table 39](#)).

Table 39. Number of species assessed by the IUCN as potentially present in the study area, by status

Taxonomic group	Number of species assessed	CR	EN	VU	NT	LC	DD
Actinopterygians	123	0	1	1	1	119	1
Amphibians	33	0	0	0	0	32	1
Mammals	1121	1	2	5	8	103	2
Birds	389	3	3	6	8	369	0
Reptiles	73	1	0	2	2	68	0
Sarcopterygians	2	0	0	0	0	2	0
Bivalves	13	1	0	1	0	9	2
Gastropods	13	0	0	0	0	13	0
Malacostracans	7	0	0	0	0	6	1
Arachnida	4	0	0	0	0	4	0
Insects	160	0	0	0	0	157	3
Liliopsida	103	0	2	2	2	96	1
Lycopodiopsida	1	0	0	0	0	1	0
Magnoliopsida	105	1	7	5	3	84	5
Polypodiopsida	2	0	0	0	0	2	0
Agaricomycetes	5	0	0	0	0	5	0

The 22 species potentially present within 50 km of the study area and listed as CR or EN, and therefore likely to trigger the critical habitat according to IFC PS6, are as follows:

Table 40. List of CR and EN species likely to occur in or near the study area according to IUCN databases (IBAT report)

Kingdom	Phylum	Class	Scientific name	Common_name	Category
Animalia	Chordata	Actinopterygii	<i>Brachyalestes carolinae</i>		EN
Animalia	Chordata	Aves	<i>Gyps africanus</i>	White-backed Vulture	CR
Animalia	Chordata	Vultures	<i>Gyps rueppelli</i>	Rüppell's Vulture	CR
Animalia	Chordata	Aves	<i>Necrosyrtes monachus</i>	Hooded Vulture	CR
Animalia	Chordata	Aves	<i>Neophron percnopterus</i>	Egyptian Vulture	EN
Animalia	Chordata	Aves	<i>Polemaetus bellicosus</i>	Martial Eagle	EN
Animalia	Chordata	Aves	<i>Terathopius ecaudatus</i>	Bateleur	EN
Animalia	Chordata	Mammalia	<i>Phataginus tricuspis</i>	White-bellied Pangolin	EN
Animalia	Chordata	Mammalia	<i>Smutsia gigantea</i>	Giant Ground Pangolin	EN
Animalia	Chordata	Mammalia	<i>Pan troglodytes verus</i>	Western Chimpanzee	CR
Animalia	Chordata	Reptilia	<i>Mecistops cataphractus</i>	Slender-snouted Crocodile	CR
Animalia	Mollusca	Bivalvia	<i>Pleiodon ovatus</i>		CR
Plantae	Tracheophyta	Liliopsida	<i>Cyanotis scaberula</i>		EN
Plantae	Tracheophyta	Liliopsida	<i>Schizachyrium radicosum</i>		EN
Plantae	Tracheophyta	Magnoliopsida	<i>Aspilia chevalieri</i>		EN
Plantae	Tracheophyta	Magnoliopsida	<i>Diospyros feliciana</i>		EN
Plantae	Tracheophyta	Magnoliopsida	<i>Indigofera pobeguini</i>		CR
Plantae	Tracheophyta	Magnoliopsida	<i>Indigofera scariesii</i>		EN
Plantae	Tracheophyta	Magnoliopsida	<i>Bacopa lisowskiana</i>		EN
Plantae	Tracheophyta	Magnoliopsida	<i>Lepidagathis epacridea</i>		EN
Plantae	Tracheophyta	Magnoliopsida	<i>Microstachys faradianensis</i>		EN
Plantae	Tracheophyta	Magnoliopsida	<i>Cyphostemma pobeguinianum</i>		EN

It should be noted that *Pleiodon ovatus* (bivalve), *Brachylestes carolinae* (actinopterygian) and *Hylarana fonensis* (amphibian) are species with a restricted distribution. There are potentially others.

6.2.1.2. Available publications/studies

This section details, for each taxonomic group studied, the literature available at local, regional or biogeographical level. It should be noted that data certainly exists for work related to local ESIs, including that for the Kouroussa gold mine, but the reports do not appear to be publicly available.

No studies on the **flora** of the study area have been identified.

As far as **birdlife** is concerned, Guinea remains a country that has historically been little explored by ornithologists. At national level, publications on avifauna are rare, and the majority of available references date back at least ten years. One of the least documented regions is Upper Guinea, whose remoteness from Conakry is one of the main obstacles to research. Information on the distribution of bird species comes mainly from the reference work by Borrow and Demey (2015) on the avifauna of West Africa. In addition, the only ornithological study carried out in the vicinity of the study area is that by Nikolaus (2000), devoted to the birds of the Haut Niger National Park.

According to Avibase 2025, the Kouroussa prefecture is home to 403 bird species, while the Siguiri prefecture has 374. The combined lists bring the total to 436 species present in the territory of these two prefectures.

For **herpetology**, no publications are available in the study area, but nearby, the work of Doumbia et al (2020, unpublished) in the prefectures of Kouroussa, Dinguiraye and Siguiri reported an inventory of 18 amphibian species, Doumbia et al (2022, unpublished) inventoried 14 species of amphibians and 8 species

of reptiles, and the work of Greenbaum and Carr (2005) reported 22 species of amphibians and 34 species of reptiles.

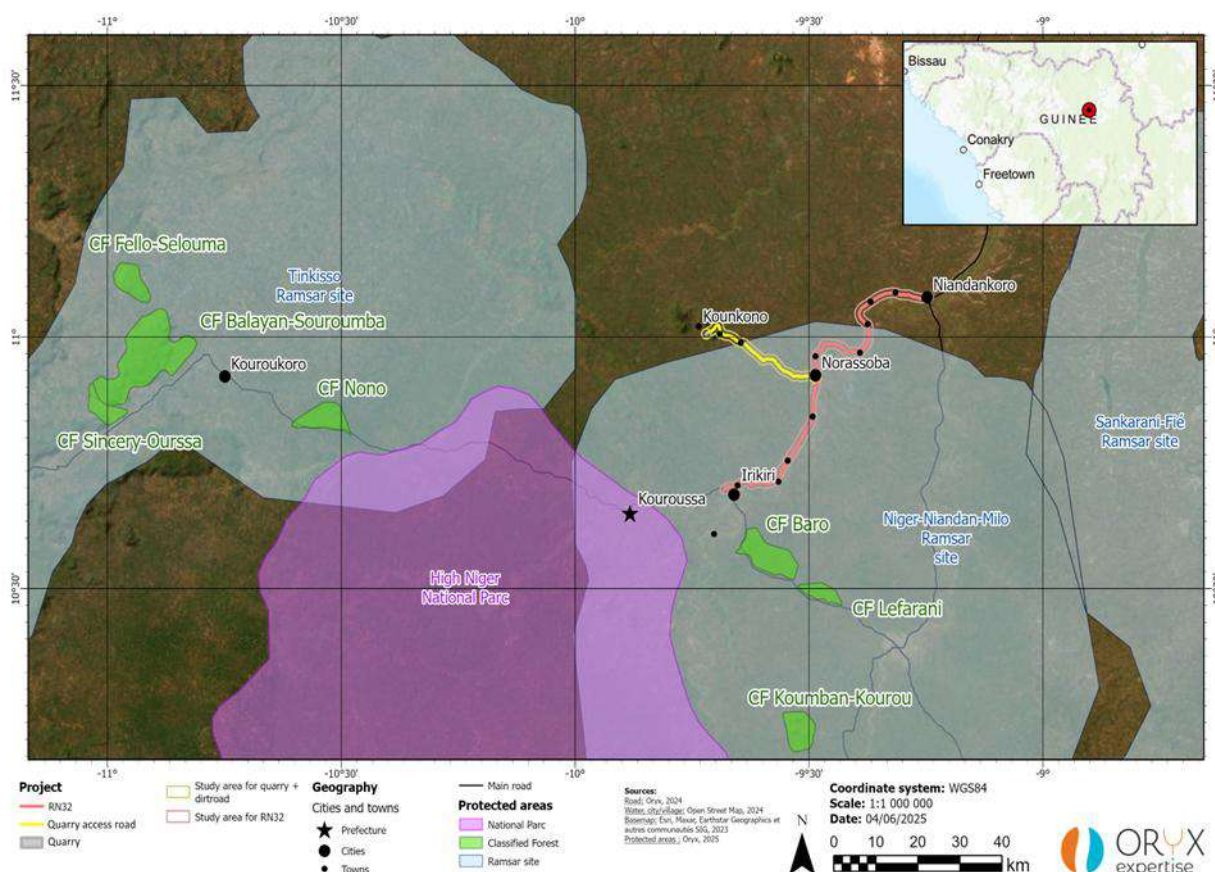
For **mammals**, surveys carried out in the PNHN in 1996/1997 revealed an average mammalian richness (89 species including 16 carnivores, 19 chiropterans and 23 rodents) with both savannah and forest species (Camara et al., 2005). In 2005, Brugière et al. reported on an inventory of the Mafou forest that included 18 species of large and medium-sized mammals.

For **ichthyology**, the work of Crespi (1998) in the Haut Niger park reports 63 species. In the community ponds of Upper Guinea (including the study area), Keita et al (2021) reported the presence of 65 species of fish. Finally, a study conducted over a smaller area than the present project in the Kouroussa zone reported an inventory of 28 fish species in 2021.

6.2.2. Protected areas

Guinea has put in place a wilderness management policy that modulates the protection afforded to these areas. The creation and development of these areas is part of the Guinean government's desire to protect the environment, particularly the forest cover, which is in sharp decline, and certain rare or endangered animal species.

There are several types of protected area in the vicinity of the study area (Map 26 : Map of protected areas): the Haut Niger National Park is also a Key Biodiversity Area (KBA) and a UNESCO Biosphere Reserve, classified forests and Ramsar sites, wetlands of international importance.



Map 26 : Map of protected areas

6.2.2.1. Haut-Niger National Park

The Haut Niger National Park (PNHN), classified in 1997, covers an area of 12,470 km² spread over the prefectures of Kouroussa, Faranah, Dabola and Kankan. It includes the historic classified forests of Mafou and Lamarana (in the centre of the NNHP) and Kouya (in the south-east of the NNHP). It is crossed by the

River Niger and features a mosaic of forest and savannah habitats. Its low level of human occupation (on the scale of Guinea) makes it a refuge for wildlife. The park was listed as a biosphere reserve in 2002 and is managed by the MEDD. Park management is based in Sirakoro, and the park is also home to the Chimpanzee Conservation Centre (CCC). The perimeter of the Mafou classified forest is also listed as an IBA (Important Bird and Biodiversity Area).

The minimum distance between the edge of the park and the study area is 13km, at the RN 32-RN2 junction at Irikiri.

6.2.2.2. Classified forests

Two classified forests, regulated by the forestry code, are located to the south-west of the study area (within a radius of 50km): the Baro forest (35 442 ha), located at least 8.5km from the study area, and the Lefarani forest (2 674 ha), which is an extension of the Baro forest and at least 23km from the study area.

6.2.2.3. Ramsar sites

Ramsar sites are recognised for their importance as wetlands and for their importance for bird conservation due to the presence of local and migratory species linked to wetlands. The criteria used for designation as a Ramsar site include the aspects of "irreplaceable site" and the vulnerability of species and habitats. Many of these sites are of global biodiversity value, and therefore receive a high level of local, national and international attention. These sites are mentioned in several standards of financial institutions, including the International Finance Corporation (IFC - performance standard 6).

Responsibility for managing Ramsar sites is placed at national level and assigned to the administrative authority. In the case of Guinea, a signatory to the Convention, the Ramsar zones are recognised as wetlands of conservation importance but **are not currently incorporated into Guinean legislation. All socio-economic activities are therefore permitted, in accordance with the regulations, with priority given to those aimed at conservation.**

The study area is partly located within the Niger-Niandan-Milo Ramsar site. Covering an area of 13,990 km² of plains, this area is dotted with a rich hydrographic network intersecting the watersheds of three major rivers: the Milo, the Niandan and the Niger. The importance of this area for biodiversity is reflected primarily in its rich fish and bird life, and it provides a refuge for species of conservation concern such as *Arius gigas* (NT and endemic to the Niger basin), the golden-breasted jacana, the cattle egret, the widowed whistling duck, the little egret and the Gambian goose. It is also an area of international importance for grassy savannah, wooded savannah and gallery forest habitats and for plant species, notably the presence of the *Khaya senegalensis* tree (VU). Certain parts of the area are also of folkloric importance, such as the Baro pond (FDR of the site, 2017). Given the area covered by the Ramsar site, it should be noted that the site's protection issues are limited to aquatic environments: rivers and streams, major riverbeds, permanent and temporary ponds, floodplains, gallery forests and sandbanks.

Other Ramsar sites are located close to the study area:

- The Tinkisso Ramsar site. This site of over 12,000 km² covers the Tinkisso watershed, which flows from the eastern Fouta-Djalon massif, passing through Dabola and joining the Niger at Tiguibiri to the south of the town of Siguiri. It is an important site for fish and waterbirds with its dense network of permanent and temporary rivers and ponds (Site FDR, 2017). The minimum distance between the edge of the site and the study area is 29km, at the Kounkono quarry.
- The Sankarani-fié Ramsar site: covering more than 16,000 km², this Ramsar zone covers the catchment area of the Sankarani, which flows into eastern Upper Guinea from the north of the forest region and empties into the Niger 80 km upstream of Bamako, as well as the Fié river. Influenced by the impoundment of the Sélingué dam in Mali, it is an area of major halieutic importance for the region, particularly for its well-preserved spawning grounds (Site FDR, 2017). The minimum distance between the edge of the site and the study area is 27 km, at Niandankoro.

6.2.3. Description of the landscape in the study area

The study area is located in Haute-Guinée, an administrative and natural region characterised by a landscape of savannahs and open semi-deciduous forests, on the boundary between the Sudanese and Guinean bioclimatic zones. Fire is a major element in the structure of these landscapes, as both a natural and man-made disturbance. The stands are therefore mainly made up of species that are resistant or tolerant to bush fires, with the exception of gallery forests which form barriers along watercourses.

The Niger is a structuring element in the landscapes of the study area, with its broad valley bordered by hilly areas 50 to 100m above sea level. The relief of the region is relatively flat, with the exception of the forest massif to the north of Kounkono, which rises to an altitude of 850m.

The land use map of Guinea (ZAEG, 2022) gives an idea of the distribution of the main vegetation types in the study area (

Figure 40). The majority of the study area is occupied by savannah (light green) with rare isolated blocks of light or dense forest (darker green). Along the Niger, there are areas of freshwater plains and lowlands (greyish green) and rainfed crops and fallow land (yellow). Urban fabric and infrastructure are spread along the Niger (red).

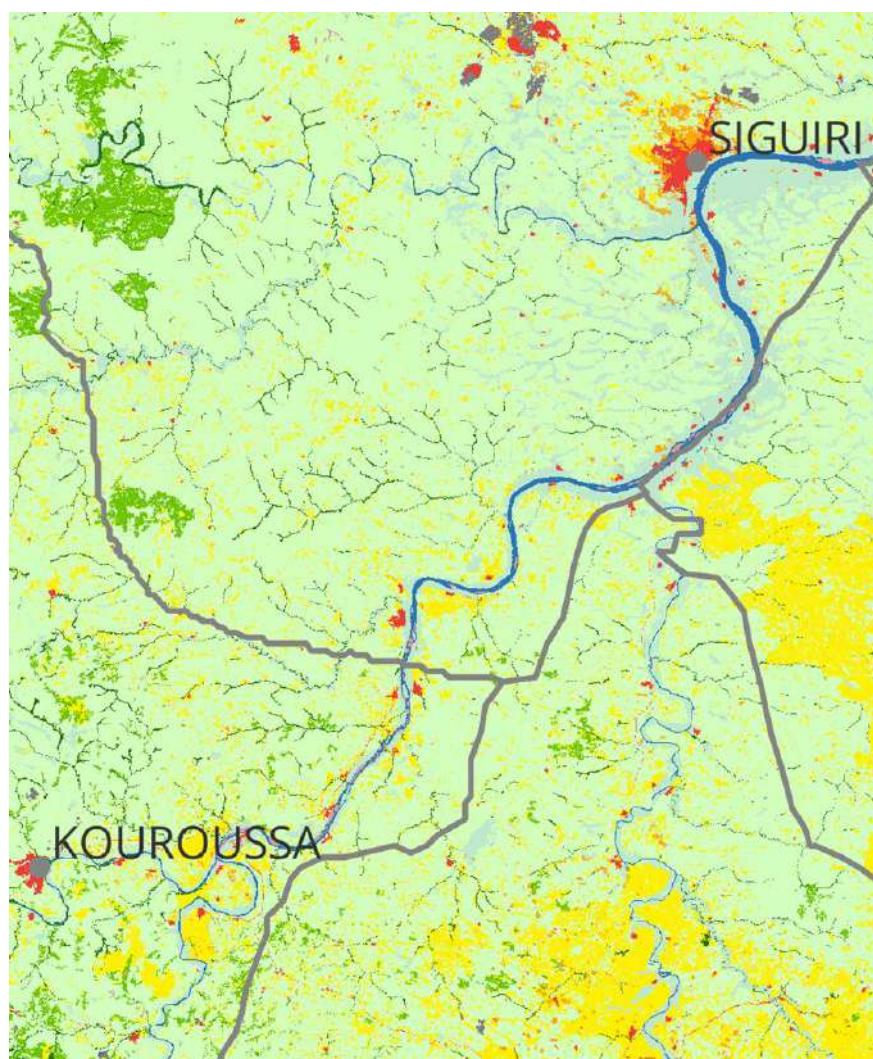


Figure 40 : Land use map of Guinea Pivot 2020 - extract from Upper Guinea (ZAEG, 2022)



Photograph 12. Seasonal change in the landscape along the RN 32 between the rainy season (July, left) and the dry season (March, right)

The landscape changes greatly over the course of the year between the rainy season and the dry season, particularly with the period of flooding of the flood expansion zones along the Niger. In January-February, the Harmattan blows in from the north, causing dust storms.

The state of degradation of habitats is significant throughout the study area, particularly along the RN 32, as a result of human activities. Artisanal gold panning is regularly distributed along the roads and inland. Slash-and-burn cultivation is widespread, and areas of secondary thicket are scattered across the landscape.

6.2.1. Flora and Habitats

6.2.1.1. Habitat mapping

Following the first field mission and the identification of the different types of habitat encountered, a sample of habitats was used to train a Random Forest model for modelling habitats and land use in the study area (Table 41) using orthophotographs with a resolution of 2.5m acquired on 20/01/2025 by the Chinese ZY-1 satellite (natural colours and multispectral bands to differentiate vegetation types). A Sentinel-1 SAR orthophotograph acquired on 30/08/2024 was also used to delineate rain-fed crops flooded during the rainy season. The habitat classes mapped as a result of the modelling are presented in Appendix 8 and can be found on the Table 41.

Table 41. Habitats identified during Mission 1 and used as a basis for the cartographic modelling and the corresponding modelled habitat classes

Habitat	Number of sites	Class modelled
Bamboo grove	1	Not shown
Dense forest grove	3	Forest gallery
Bowal	22	Bowal
Watercourse	4	Watercourse
Open forest	67	Wooded savannah - Open forest
Dense forest	1	Forest gallery
Dense dry forest	3	Forest gallery
Gallery forest	24	Forest gallery

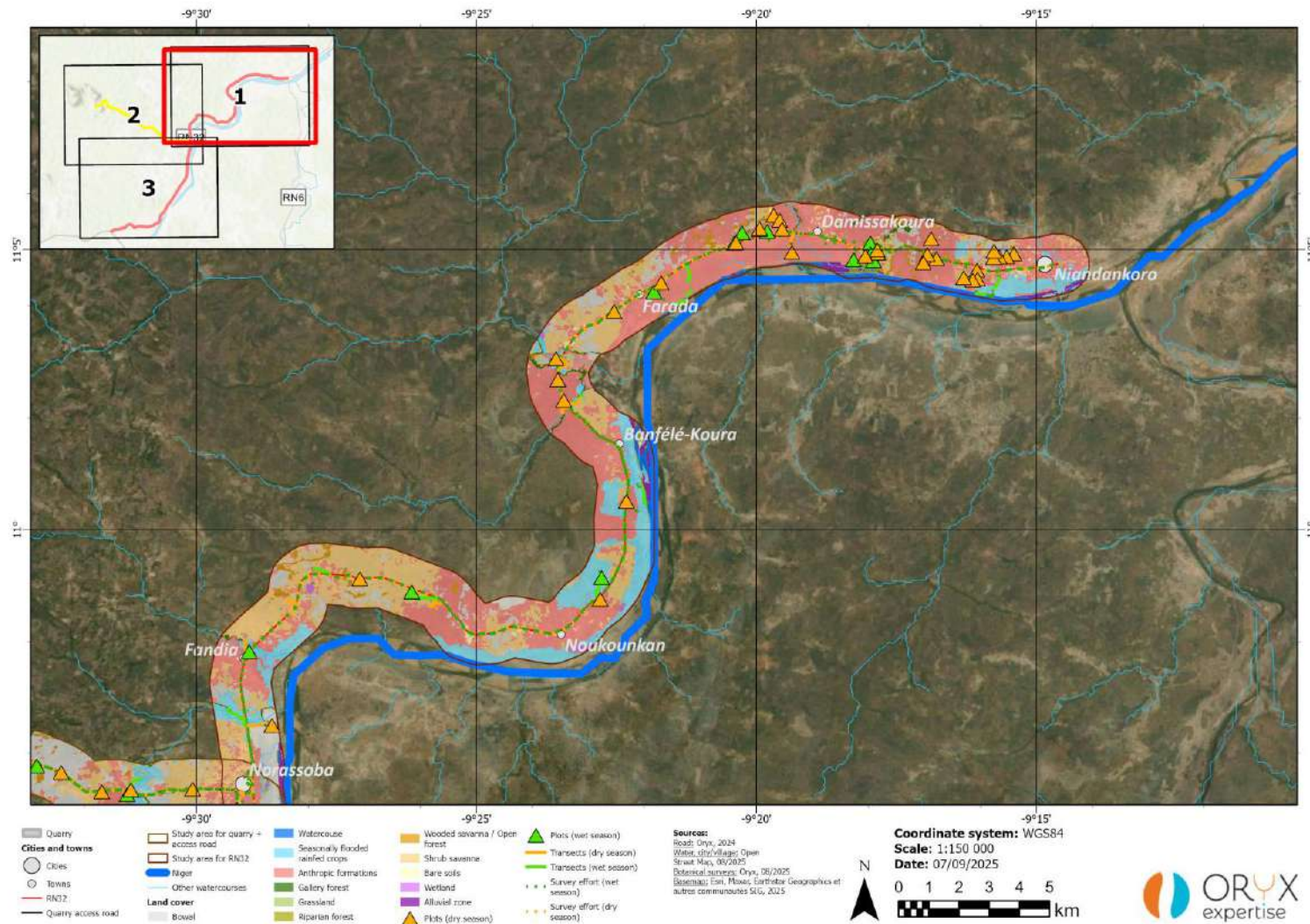
Anthropogenic formation	135	Anthropogenic formation - Roads - Tracks
Anthropogenic formation	135	Anthropogenic formation - Buildings
Anthropogenic formation	135	Anthropogenic formation - Plantations Tree crops
Anthropogenic formation	135	Anthropogenic formation - Hedges/ fences
Anthropogenic formation	135	Anthropogenic formation - Crops
Anthropogenic formation	135	Anthropogenic formation - Closed cultivation
Wooded grassland formation	64	Wooded savannah - Open forest
Forest gallery	59	Forest gallery
Pond	4	Wetland
Pond and Meadow	2	Wetland and shrubby savannah
Aquatic environment	2	Watercourse
Meadow	7	Shrubby savannah
Ripisylve	15	Ripisylve
Wooded savannah	40	Wooded savannah - Open forest
Shrubby savannah	38	Shrubby savannah
Grassy savannah	1	Shrubby savannah
Flood zone	5	Seasonally flooded rainfed crops
Wetland	2	Wetland
Not listed	-	Alluvial zone
Not listed	-	Bare ground

Certain classes have been combined (for example, the "Gallery forest" class corresponds to the following habitats: gallery forest, forest gallery, dense forest, dry dense forest, dense forest grove) or separated (for example, "Anthropogenic formation" has been distinguished between Roads and tracks, Built-up areas, Plantations of tree crops, Hedges and fences, Crops and Closed crops). Wooded savannah and open forest are combined with wooded grassland, because of the near-synonymy of the names and the difficulty of distinguishing these habitats from the same plant succession using satellite imagery. The class of bare soils has been added and largely corresponds to gold panning areas, as well as the class of alluvial areas, which mainly corresponds to the sandbanks that line the Niger's minor riverbed.

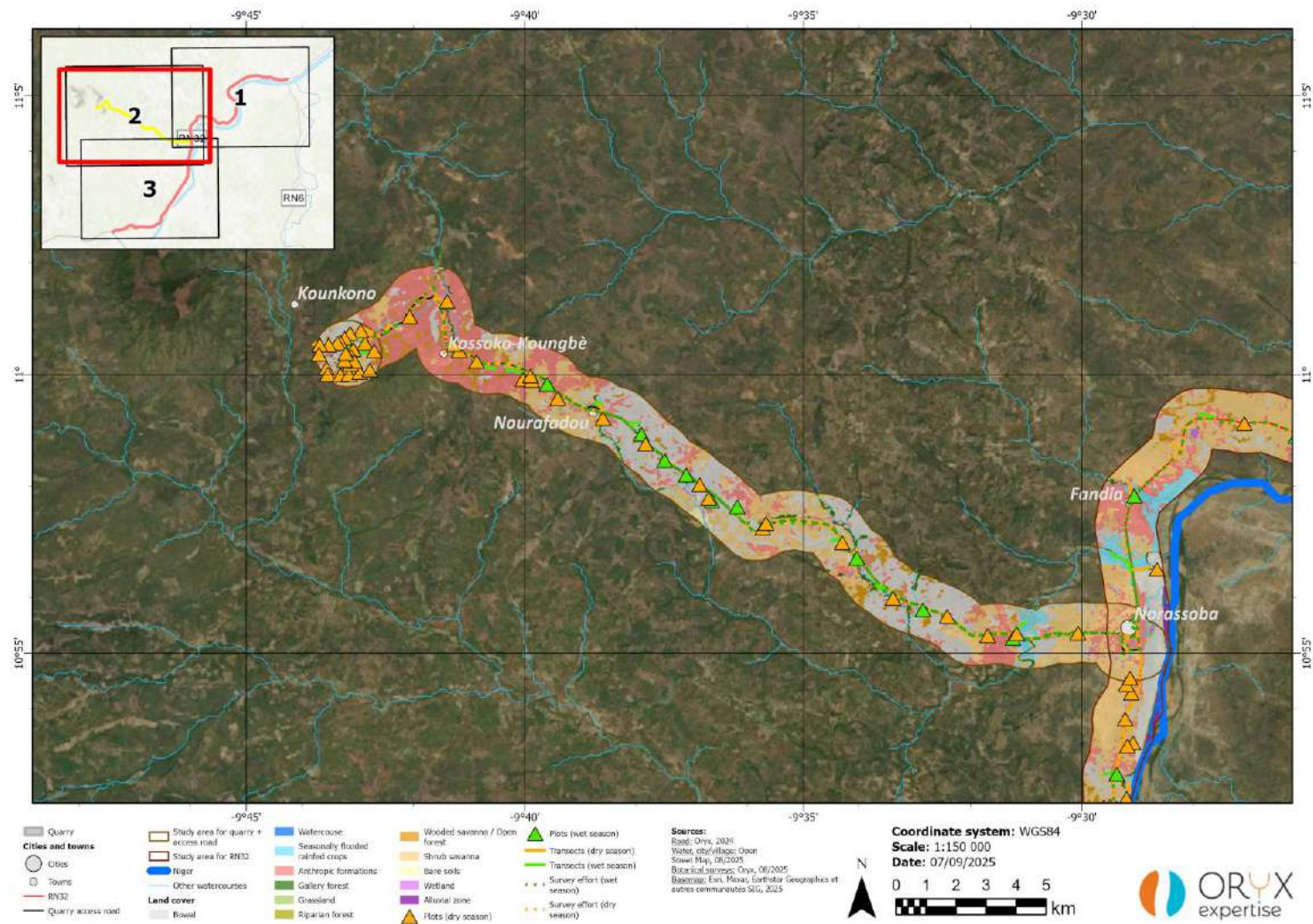
6.2.1.2. *Prospecting effort*

The botanical inventory was carried out between 18 and 27 March 2025 for the dry season and from 12 to 20 July for the rainy season (Map 27, Map 28, Map 29). Along the RN 32, the botanical team carried out 28 quadrats, 36 transects and 86 opportunistic observation points. The Kounkono quarry area and the track leading to it from Norassoba were covered by 11 plots, 15 transects and 43 opportunistic observation points.

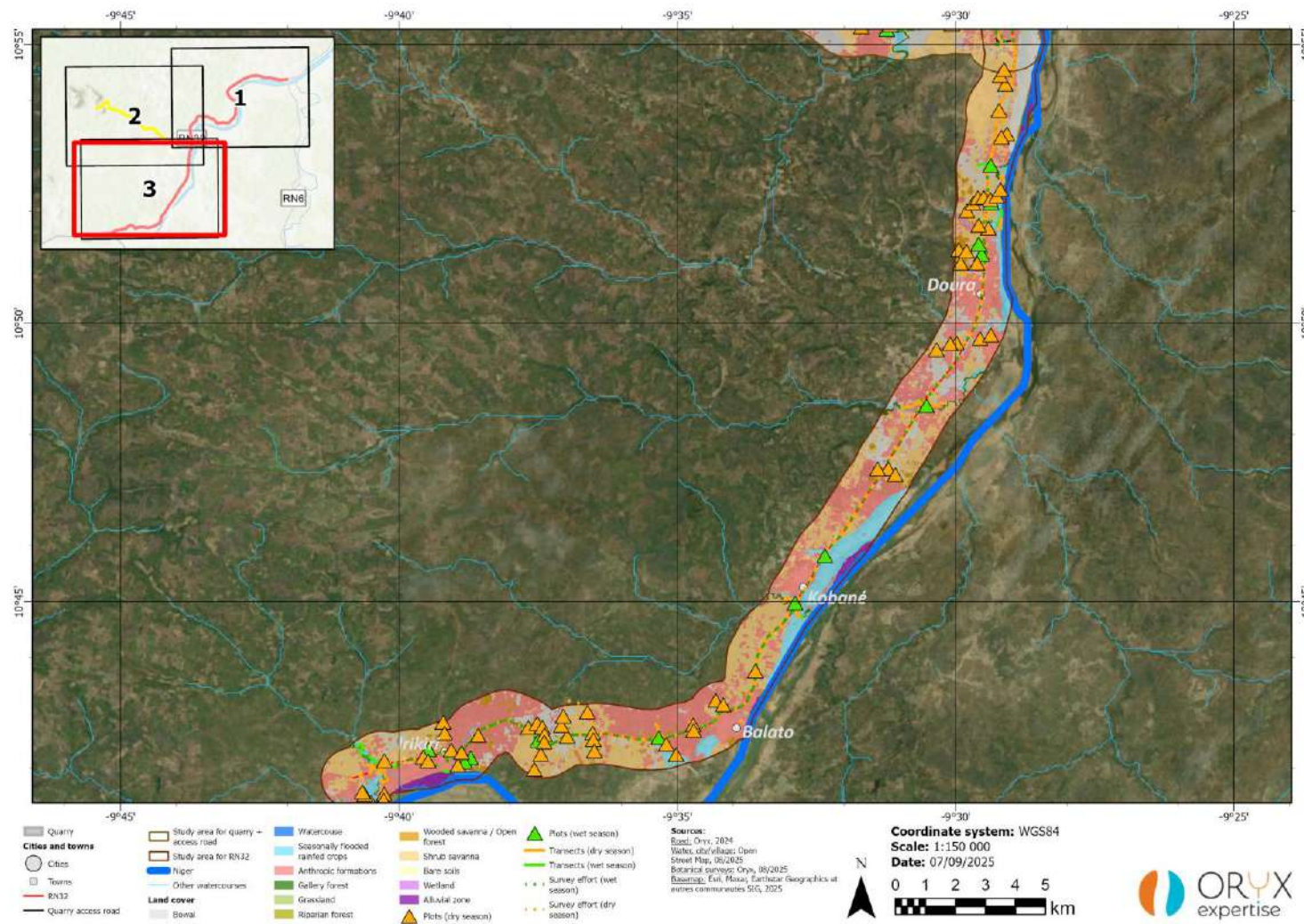
All habitats hosting terrestrial plant communities were surveyed, focusing on the most natural and best-preserved habitats. Some areas of minor interest or which were too far from the base camps for the field mission (Balato, Norassoba and Damissakoura) were not surveyed.



Map 27 : Location of botanical inventories carried out 1/3



Map 28 : Location of botanical inventories carried out 2/3



Map 29 : Location of botanical inventories carried out 3/3

6.2.1.3. Inventory of plant formations and assessment of their quality

During this botanical inventory, seven habitats were identified along the RN 32: dense forests (forest gallery, groves of dense dry forest), open forests, anthropogenic formations (mango groves, cashew plantations, rice or maize fields, fallow land), wooded grassland formations (also known as savannahs), riparian thickets, grassland formations on bowal and freshwater aquatic plant formations. For the quarry and access track, six habitats were inventoried: dense forests (forest gallery, groves of dense dry forest), open forests, anthropogenic formations (cashew plantations, fallow land) and grassy formations on bowal and freshwater aquatic plant formations. Table 42 summarises the number of surveys carried out in each habitat during the study.

Table 42. Number of quadrats, transects and opportunistic observation points by habitat type surveyed in the study area

Site	Method	DF	CF	FA	FHB	F	FH	FVAED	Total
RN 32	Quadrat 25 m x 25 m	7	9	1	3	0	0	0	20
	Quadrat 2 m x 2 m	0	0	0	0	0	3	5	8
	Transect of 100 m or more	21	3	7	1	1	2	1	36
	Opportunistic observation	12	3	41	25	1	3	1	86
Quarry + track	Quadrat 25 m x 25 m	4	3	0	0	-	0	0	7
	Quadrat 2 m x 2 m	0	0	0	0	-	4	0	4
	Transect of 100 m or more	7	1	0	4	-	3	0	15
	Opportunistic observation	6	3	14	18	-	1	1	43

(DF: dense forests, CF: open forests, FA: anthropogenic formations, FHB: wooded grassland formations, F: thickets, FH: grassland formations on bowal, FVAED: freshwater aquatic plant formations)

6.2.1.3.1. Dense forest

The dense forests identified in the RN 32 study area, as well as in the quarry and the track leading to it, are represented by forest galleries and groves of dense dry forest. They have emergent canopies with a canopy cover of between 60 and 80% at heights of 15 to 30 metres. These emergent canopies are dominated by *Pterocarpus santalinoides*, *Erythrophleum suaveolens*, *Isobertinia doka*, *Pterocarpus erinaceus*, *Khaya senegalensis*, *Vitex doniana*, *Anthonotha macrophylla*, *Syzygium guineense*, *Dialium guineense*, *Anthostema senegalense*, *Carapa procera* and *Uapaca heudelotii*. The shrub layer is dominated by *Hymenocardia heudelotii*, *Alchornea cordifolia*, *Nauclea latifolia*, *Soreindea juglandifolia*, *Millettia sp* and *Uvaria chamea*. The undergrowth is mainly composed of woody regrowths of emergent canopy species. There are a few windfalls.

It should be noted that the dense forests identified in the study area are evergreen and semi-evergreen (equivalent term: semi-deciduous) in places. They are therefore threatened habitats according to the book of Tropical Areas of Importance for Threatened Plants and Habitats of Guinea (Couch, C., Cheek, M., Haba, P., Molmou, D. et al. 2019).



Photograph 13 ; Quadrat of 25m x 25m in a dense dry saxicolous forest (top left), forest gallery (top right) and dry forest surveyed during the rainy season (bottom).

6.2.1.3.1. Open forest

The open forests identified in the project study area are mixed woody and grassy formations with a dominant height of between 15 and 25 metres and a woody cover of between 50% and 70%. The emergent canopy is dominated by *Pterocarpus erinaceus*, *Pericopsis laxiflora*, *Lannea acida*, *Anthonotha crassifolia*, *Khaya senegalensis*, *Azizelia africana*, *Uapaca togoensis*, *Parkia biglobosa*, *Bombax costatum*, *Vitellaria paradoxa*, *Monotes kerstingii* and *Isobertinia doka*. The shrub layer consists mainly of *Combretum glutinosum*, *Detarium microcarpum*, *Terminalia albida*, *Entada africana*, *Nauclea latifolia*, *Gardenia erubescens*, *Landolphia heudelotii* and *Hymenocardia acida*. As for the undergrowth, it is composed of

grasses (*Panicum.sp*, *Hyparrhenia rufa*, *Hyparrhenia sp*, *Pennisetum sp*) and woody regrowths of emergent canopy species.



Photograph 14 : 25m x 25m quadrat in open forest on the left and open forest surveyed during the rainy season on the right.

These open forests encompass a range of vegetation profiles, from almost totally closed forest with a thin grass cover to wooded grassland (commonly known as savannah), which, as a result of the ancestral practice of bush fires, have been floristically reduced to a restricted set of species with varying degrees of fire resistance. Despite the various stages of degradation observed, the plant community is homogeneous and modestly diverse.

6.2.1.3.1. Anthropogenic formations

Anthropogenic formations are the type of plant formation most often encountered in the study area. They are used for a variety of purposes and practices: fallow land, cashew groves, mango groves and agricultural plains (rice cultivation in flood-prone areas along the Niger, maize fields).

The characteristic species of the anthropogenic formations identified include: *Piliostigma tonningii*, *Parkia biglobosa*, *Combretum glutinosum*, *Oryza sativa*, *Zea mays*, *Psidium guajava*, *Cassia sieberiana*, *Isobertlinia doka*, *Nauclea latifolia*, *Anthonotha crassifolia*, *Anacardium occidentale*, *Hymenocardia acida*, *Annona senegalensis*, *Vitellaria paradoxa*, *Mangifera indica*, *Hyparrhenia rufa* and *Gardenia erubescens*.



Photograph 15. Mango grove



Photograph 16. Quadrat of 25m x 25m in a young fallow less than one year old



Photograph 17. Maize fields in the rainy season



Photograph 18. Cashew tree plantation

Today, shifting cultivation practices have resulted in a net reduction in the area occupied by natural vegetation in favour of agricultural fields, plantations and fallow land, which is gaining massive ground. The fallow land contains stump sprouts and a few woody plants spared during felling operations.

6.2.1.3.1. Wooded grassland formations

Wooded grassland formations are also common in the study area. They have open canopies and are located at a height of between 10 and 20 metres. The tree layer is mainly composed of *Pterocarpus erinaceus*, *Daniellia oliveri*, *Piliostigma thonningii*, *Parkia biglobosa*, *Terminalia macroptera*, *Bombax costatum*, *Khaya senegalensis*, *Combretum glutinosum*, *Anthonotha macrophylla*, *Pericopsis laxiflora*, *Cassia sieberiana*, *Detarium microcarpum*, *Vitellaria paradoxa*, *Entada africana*, *Isobertlinia doka*, *Monotes kerstingii*, *Terminalia glaucescens* and *Lannea velutina*. The herbaceous stratum is composed of *Hyparrhenia* sp, *Hibiscus* sp, *Andropogon* sp, *Hyparrhenia rufa*, *Andropogon gayanus*, *Imperata cylindrica* and *Ctenium elegans*. Woody regrowth of the species that make up the emerging canopy is also found here.

It should be noted that good natural regeneration allows for a gradual transition from the wooded grassland stage (commonly known as savannah) to that of a light forest. These formations also constitute the harvesting area for timber (*Pterocarpus erinaceus*, *Daniellia oliveri*, *Isobertlinia doka*, *Khaya senegalensis*, *Azalia africana*), energy (*Terminalia macroptera*, *Anthonotha macrophylla*, *Albizia zygia*, *Harungana madagascariensis*, *Terminalia glaucescens*) and medicinal plants (*Annona senegalensis*, *Nauclea latifolia*, *Gardenia erubescens*, *Cassia sieberiana*, *Dichrostachys cinerea*, *Combretum micranthum*). Grassland woodlands are also used for transhumance of livestock.



Photograph 19 : Quadrat of 25m x 25m in a wooded grassland formation



Photograph 20 Wooded grassland during the rainy season

6.2.1.3.1. Thickets

Thickets, identified only along the RN32, are closed stands of bushes between 3 and 5 m high. They are mainly shrub formations with closed cover, usually impenetrable, fragmented, consisting of evergreen or deciduous species. There is no herbaceous layer. They are represented on the RN32 site by riparian thickets and fallow thickets and constitute secondary formations.

Characteristic species include: *Combretum sp*, *Combretum micranthum*, *Syzygium sp*, *Ochna sp*, *Nauclea latifolia*, *Millettia lucens*.



Photograph 21 : Riparian thicket on the left and fallow thicket on the right

6.2.1.3.2. Grassland formations on bowal

The grassy bowal formations identified in the study area are located on cuirasses covered with thin layers of earth (bowé), scattered between the wooded grassy formations. They correspond to land covered with grasses or other herbs, either devoid of woody plants or with a woody plant cover of no more than 10%. This makes the bowal a climax formation characterised by a herbaceous layer. It may have trees, shrubs or no trees at all.



Photograph 22 ; Grass formation on bowal in the dry season (left) and rainy season (right) and Photograph 23 : Freshwater aquatic plant formation dominated by *Nymphaea* sp. (left) and 2 m x 2 m quadrat in a freshwater aquatic plant formation (right).

The main characteristic species are *Afrotrilepis pilosa*, *Hyparrhenia rufa*, *Hyparrhenia* sp, *Panicum* sp and *Ctenium elegans*.

These formations are used for grazing and for cutting straw to cover the huts in the riverside villages. They are also transhumance areas for livestock.

6.2.1.3.1. Freshwater aquatic plant formations

These are aquatic and marshy freshwater herbaceous vegetations, which have only been recorded during the rainy season. They are mainly composed of Herbaceae (*Amaranthus* sp, *Borreria verticillata*, *Panicum* sp, *Paspalum* sp, *Acmella uliginosa*, *Croton hirtus*, *Nymphaea* sp, *Urena lobata*, *Sida urens*, *Cyperus rotundus*, *Corchorus* sp.).

6.2.1.3.1. State of degradation of habitats in the study area

None of the habitats inventoried in the study area were intact or almost intact. The vast majority of the habitats surveyed were in an intermediate "degraded" state, and half of the wooded grassland formations were in a "very degraded" state.

The causes identified vary according to habitat and habitat type, the most common being logging, bush fires and shifting cultivation (Table 43)

Table 43. Summary of habitat degradation in the study area

Habitats	State of degradation	Causes identified	RN 32	Quarry + runway
Dense forest	Slightly degraded, locally degraded to severely degraded	Logging; shifting cultivation; artisanal gold mining; brick-making in forest galleries	X	X
Open forest	Slightly degraded, locally degraded to severely degraded	Logging; shifting agriculture; bush fires	X	X
Wooded grassland	Degraded to severely degraded in places	Logging; shifting cultivation; bush fires; artisanal gold mining; overgrazing	X	X
Anthropogenic formation	Degraded to severely degraded in places	Shifting cultivation; logging; artisanal gold mining; overgrazing; carbonisation	X	X
Thicket	Degraded to severely degraded at edges	Logging; shifting cultivation	X	
Grassland formation on bowal	Degraded to severely degraded in places	Bush fires; carbonisation; overgrazing	X	X
Freshwater aquatic plant formation	Degraded to severely degraded in places	Shifting cultivation; overgrazing, urbanisation	X	X

6.2.1.4. Floristic diversity

The floristic inventory carried out led to the collection of 2,465 data (1,725 data along the RN 32 and 740 in the area of the quarry and its access track). Field determinations led to the identification of a total of 265 taxa in the entire study area (240 along the RN 32 and 168 in the area of the quarry and its runway). 143 taxa, or 54% of all taxa, were shared between the two study areas. 123 taxa were recorded during the two survey sessions, 96 taxa were recorded only in the rainy season and 46 only in the dry season (Appendix 9). Not all taxa could be determined at the specific level: 76 taxa were determined at the genus level.

The determinations revealed 189 plant species identified in the study area, including 175 along the RN 32 and 126 in the study area of the quarry and its access track. The species identified on the RN 32 site are divided into 47 families and 146 genera. As for those at the quarry + runway site, they were distributed between 40 families and 108 genera. Of all the species inventoried, the Fabaceae family is the most represented with 39 species, followed by the Rubiaceae (13 species), the Malvaceae (11 species) and the Poaceae (10 species, but 20 taxa in all, this family being particularly difficult to determine).

The spectrum of morphological types is dominated by trees (100 taxa, or 38% of all taxa inventoried), followed by herbs (78 taxa, or 29% of taxa), shrubs (64 taxa, or 24%) and lianas (19 taxa, or 7%). The morphological types in the minority are palms and bamboos.

17 plant samples were collected during the rainy season (10 herbaceous species, 5 shrubs, 1 liana and 1 tree). The herbarium samples collected were identified using botanical works (Guinea flora, Letouzey's manual of forest botany of Tropical Africa, etc.) and by comparison with reference samples kept at the National Herbarium of Guinea. These samples are included in the collections of the National Herbarium of Guinea.

The list of species inventoried during the two seasons is presented in Appendix 9.

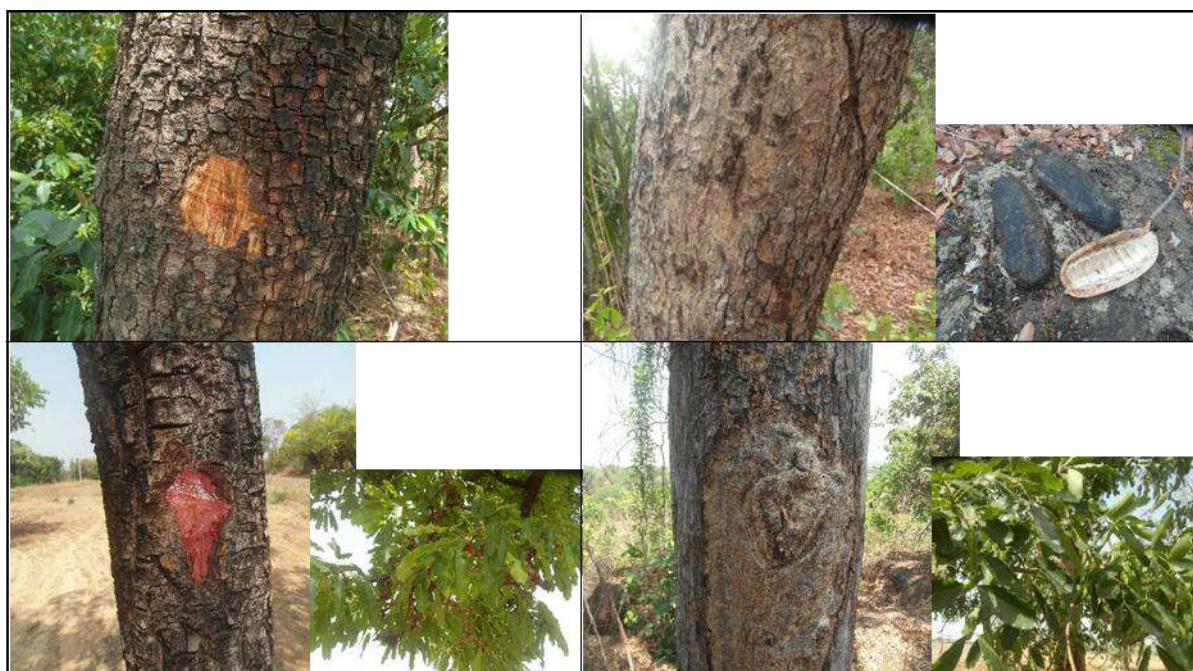
6.2.1.5. Species at conservation risk

6.2.1.5.1. Threatened species according to IUCN criteria

According to IUCN criteria, four threatened plant species are present in the study area Table 44. These are *Pterocarpus erinaceus* (EN), *Azelia africana* (VU), *Khaya senegalensis* (VU) and *Vitellaria paradoxa* (VU), which are present both along the RN 32 and in the area of the quarry and its access track. While *Tectona grandis* is considered endangered (EN) in its native range, in South-East Asia, in Guinea, this species is planted and is even invasive. It is therefore not presented in this report as a species of conservation concern and is shown in brackets in Table 44.

Table 44 : IUCN status of inventoried plant species

IUCN status	CR	EN	VU	NT	LC	DD	NE
Number of species	0	1 (1)	3	2	109	2	72



Photograph 24 : Threatened plant species present in the study area (from top to bottom and left to right: *Pterocarpus erinaceus* (EN), *Azelia africana* (VU), *Vitellaria paradoxa* (VU) and *Khaya senegalensis* (VU))

- ***Pterocarpus erinaceus* - EN**

Pterocarpus erinaceus is a tree native to West and Central Africa. Its range covers a vast area estimated at over 2 million km². This species grows in wooded savannahs and dry forests, as well as in humid coastal savannahs. *Pterocarpus erinaceus* is crucial to these ecosystems thanks to its ability to fix nitrogen, thereby improving soil fertility. It is resistant to drought and fire, and plays a pioneering role on fallow land. This species grows in wooded savannahs and dry forests, as well as in the humid coastal savannahs of countries such as Togo and Nigeria. It is also a favourite nesting tree for chimpanzees.

The species faces many threats, mainly deforestation due to demographic pressure and agriculture. The growing demand for wood, particularly for international trade, has intensified illegal logging, leading to a

significant decline in chimpanzee populations. In addition, natural regeneration is compromised by overexploitation, overgrazing and climate change, which further degrade its habitat (criterion A3d, Barstow, 2018). It is also listed in Appendix II of CITES in order to regulate its international trade. Despite the efforts made, large volumes of timber are still traded illegally. Although this tree is very common throughout the study area, its wood is prized by local people for its sale and use in joinery.

71 areas of presence were recorded for this species along the RN 32 and 44 in the area of the quarry and its runway, in all types of woodland habitat.

- ***Khaya senegalensis* - VU**

This tree, which is widely distributed in West Africa, measures 30 to 35 metres in height at maturity and is found mainly in gallery forests. The species is legally protected in several countries because of its timber and the medicinal properties of its bark. This species is found in large numbers in the study area.

60 areas of presence have been recorded for this species along the RN 32 and 15 in the area of the quarry and its runway, in all the habitat types encountered.

- ***Azelia africana* - VU**

Azelia africana is a tree species widely distributed throughout Africa. This species is known for its many uses, including wood, charcoal, fodder and medicinal applications. This tree can grow up to 40 m tall and 150 to 200 cm in diameter. It is found in a variety of forest habitats, including the transition zone between wooded savannah and dry forest, as well as in the more humid semi-deciduous forests. It can also be found in wooded grasslands and seems to regenerate easily in old fields.

Azelia africana faces significant threats, mainly due to intensive and unsustainable logging for timber, with high international demand. This exploitation has led to a population reduction of at least 30% over the last three generations (150 years). General habitat loss due to forest clearance for agriculture is also a threat in some parts of its range. The species is assessed as Vulnerable due to these ongoing threats (criterion A2cd, Hills et al. 2020).

The scientific community recommends monitoring populations of this species across its range and introducing and implementing sustainable harvesting measures. It is also recommended that firebreak networks be set up to protect small individuals and facilitate recruitment (Amahowe et al. 2018).

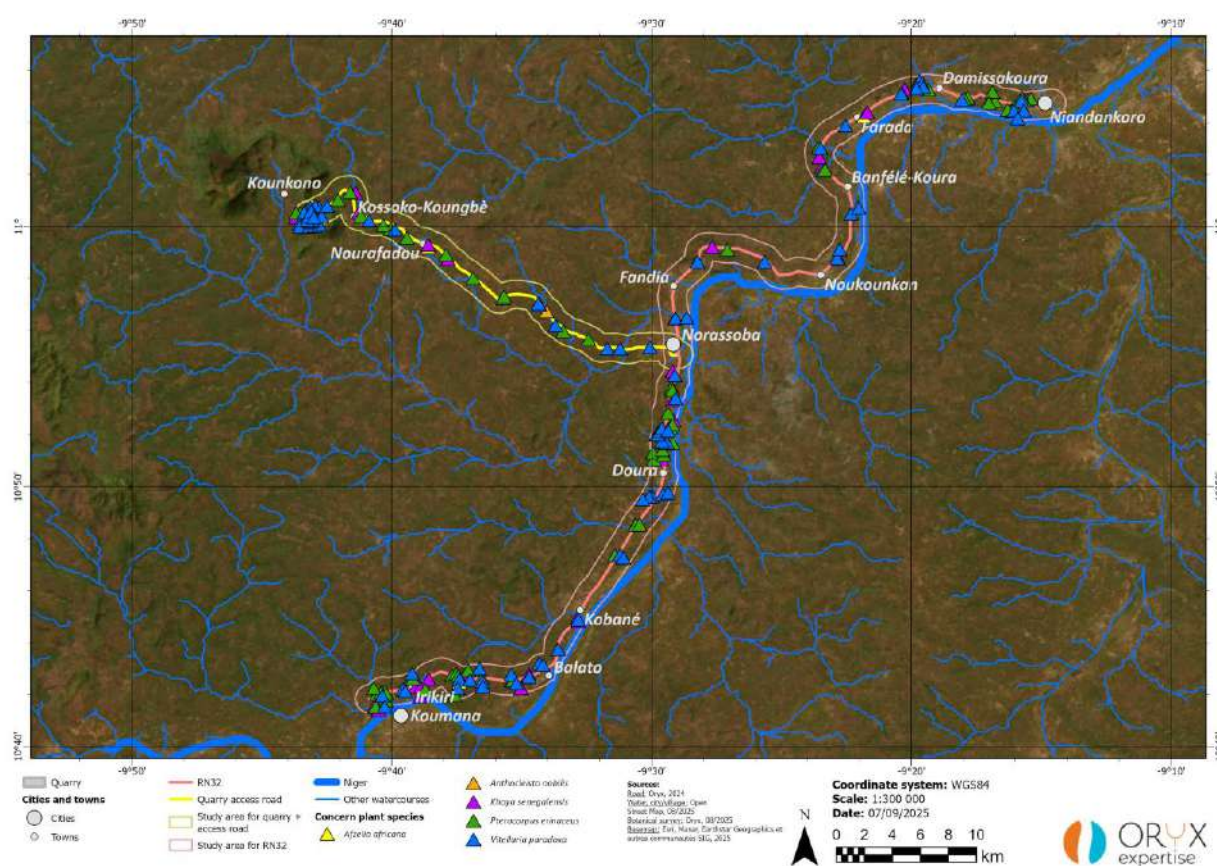
24 areas of presence have been recorded concerning this species along the RN 32 and 4 in the area of the quarry and its runway, in woodland habitats and anthropogenic formations.

- ***Vitellaria paradoxa* - VU**

Shea tree is a widely distributed species. It is spared by the local population during agricultural work because of its socio-economic importance (the shea nut is used in cosmetics and locally in cooking).

The species is present in high densities throughout the diversity of woodland habitats in the study area, with 56 areas of presence recorded along the RN 32 and 30 in the area of the quarry and its runway.

The Map 30 shows the locations where one or more plant species of conservation concern (threatened species according to IUCN criteria and species fully protected by Guinean legislation) were inventoried during the field sessions.



Map 30 : Localisation of sightings of plant species of conservation concern

6.2.1.5.1. Nationally threatened species

Of the 172 partially protected plant species listed in Order A/2020/1591/MEEF/CAB/SGG on the protection of species of wild fauna and flora in the Republic of Guinea, 30 have been inventoried along the RN 32 and 24 in the study area of the quarry and its runway (see Appendix 9). Any action on these species is subject to prior authorisation from the Minister responsible for wild fauna and flora.

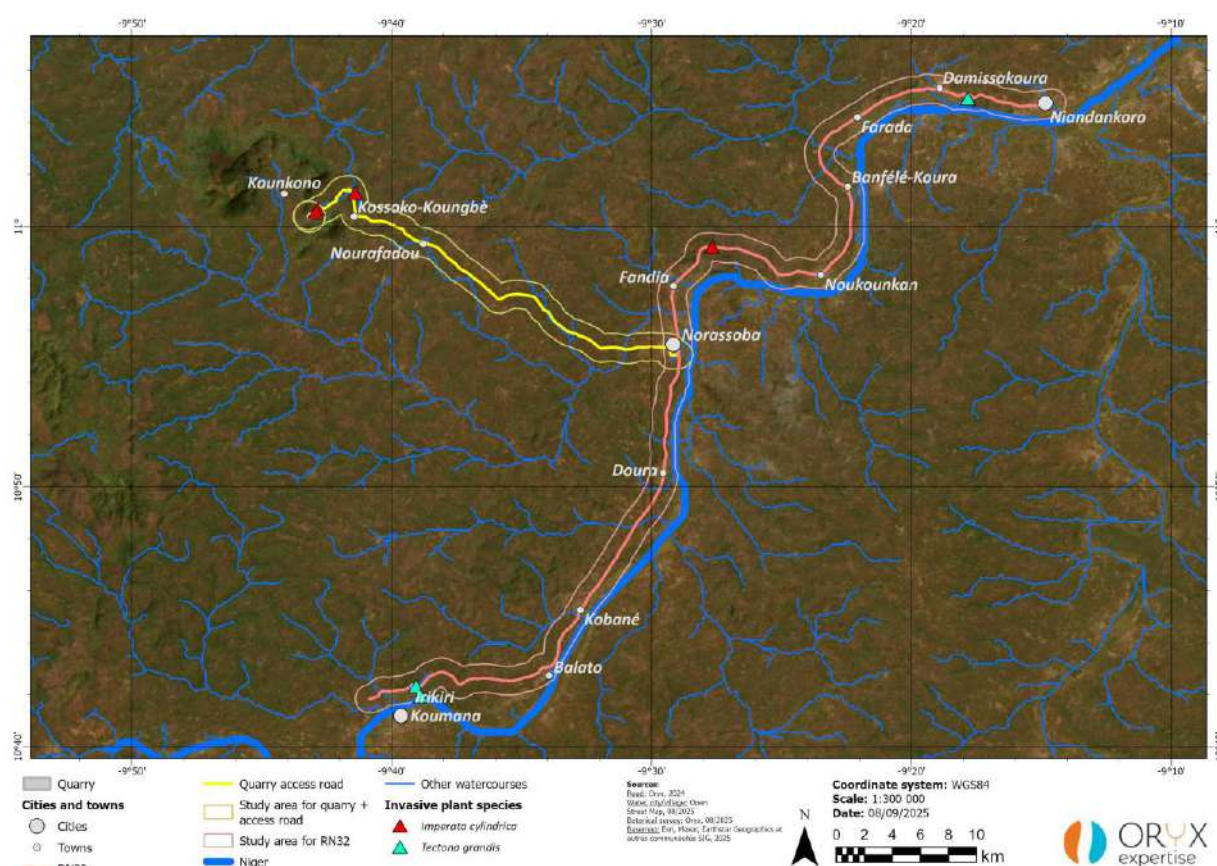
One plant species that is fully protected under the same decree is present in the study area: *Anthocleista nobilis*. 12 locations of presence have been observed along the RN 32 and 3 along the track leading to the quarry. It is therefore forbidden to pick it, collect it, cut it, uproot it or destroy it by fire or any other means. It is also forbidden to transport, buy, sell, export or re-export it in a fresh or dried state, including its by-products. The individuals observed were not in the area designated for the construction work zone. Nevertheless, their presence cannot be ruled out.

6.2.1.5.2. Endemic or restricted-range species

Analysis of all the data collected in the field did not reveal the presence of any endemic or restricted-range species.

6.2.1.5.3. Invasive species

Two invasive species have been identified in the study area: the *Imperata cylindrica* grass and the *Tectona grandis* tree.



Map 31: Maps of invasive plant species identified in the study area

Teak, *Tectona grandis*, is a fast-growing tree with large deciduous leaves, whose wood is highly prized. Native to South-East Asia (India, Malaysia, Laos and Thailand), its over-exploitation has decimated its populations and it is now threatened. The success of this species in industrial forestry explains its presence throughout the tropics. In particular, it is used by local environmental services to reforest habitats that have been degraded because of its rapid growth, without taking into account its invasive nature. In fact, its large number of seeds and good germination capacity give it an advantage in colonising territories beyond the sites where it has been planted. Today, its invasive nature is having a dangerous impact on the biodiversity of native plant formations. Teak has been observed on three occasions along the RN 32.

Imperata cylindrica was observed on 4 occasions in the quarry area, in a heavily degraded wooded grassland formation, a degraded open forest and an anthropogenic formation, as well as in a low-lying area near the RN 32 to the north of Fandia. Native to Asia, it has spread widely throughout the world's hot tropical zones and is now considered to be one of the 10 worst invasive herbaceous plants. Its extensive root system (most of its biomass is found underground), its ability to grow on poor soils, its tolerance to drought and fire and its genetic plasticity make this plant a particularly invasive species. This species has a major impact on invaded ecosystems, displacing native species and changing the fire regime.

6.2.1.6. Discussion

During this study, seven types of habitat were identified along the RN 32 and six types of habitat in the area of the quarry and its runway: dense forests, open forests, wooded grassy formations, grassy formations on bowal, thickets (RN 32 only), freshwater aquatic plant formations and anthropogenic formations.

The floristic inventories identified 189 species, including 1 endangered species and 3 vulnerable species according to IUCN criteria. Among these plant species, *Pterocarpus erinaceus* (EN), *Khaya senegalensis* (VU) and *Vitellaria paradoxa* (VU) are very common throughout the study area. A species that is fully protected under Guinean law has also been identified: *Anthocleista nobilis* (IUCN category LC).

Floristic diversity and specific richness along the RN 32 are influenced by shifting agriculture, artisanal gold mining, bush fires, wood cutting, overgrazing, carbonisation and the making of mud bricks in the forest

galleries. Tree species are removed in places to make way for fields, and plantations and woody regrowths are dependent on weeding by the farmer.



Photograph 25 ; Current threats to vegetation in the study area (from top to bottom and left to right): brickyard in a gallery forest, wood cutting, gold panning, overgrazing, slash-and-burn farming, etc

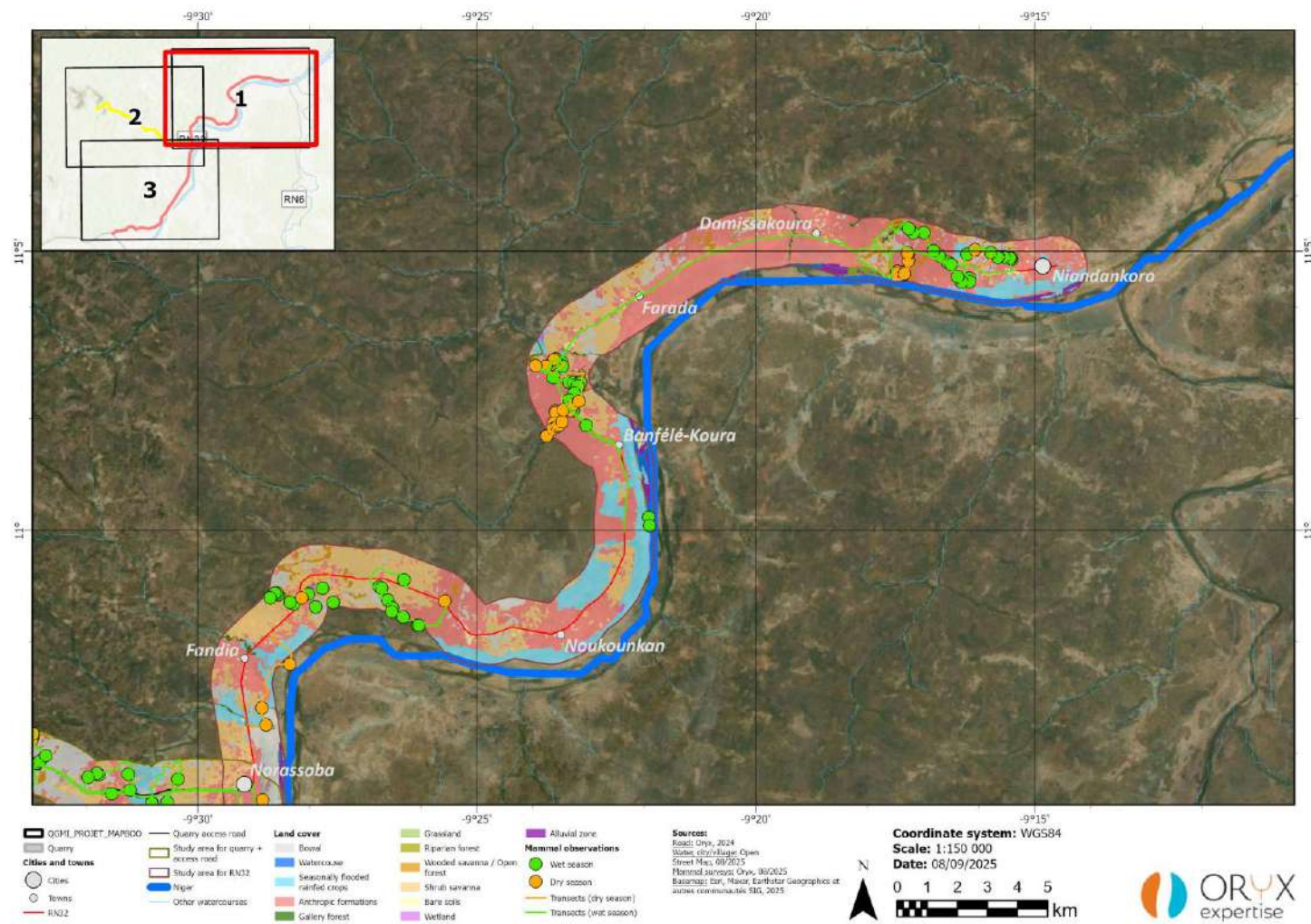
6.2.1.6.1. Reliability and limitations of the study

The duration and periods of fieldwork were particularly reasonable. It was well suited to the recognition of plant specimens, particularly given the fertility of most plants in the dry season. It was possible to complete the dry-season inventory during the rainy season, which was favourable for inventorying annual species.

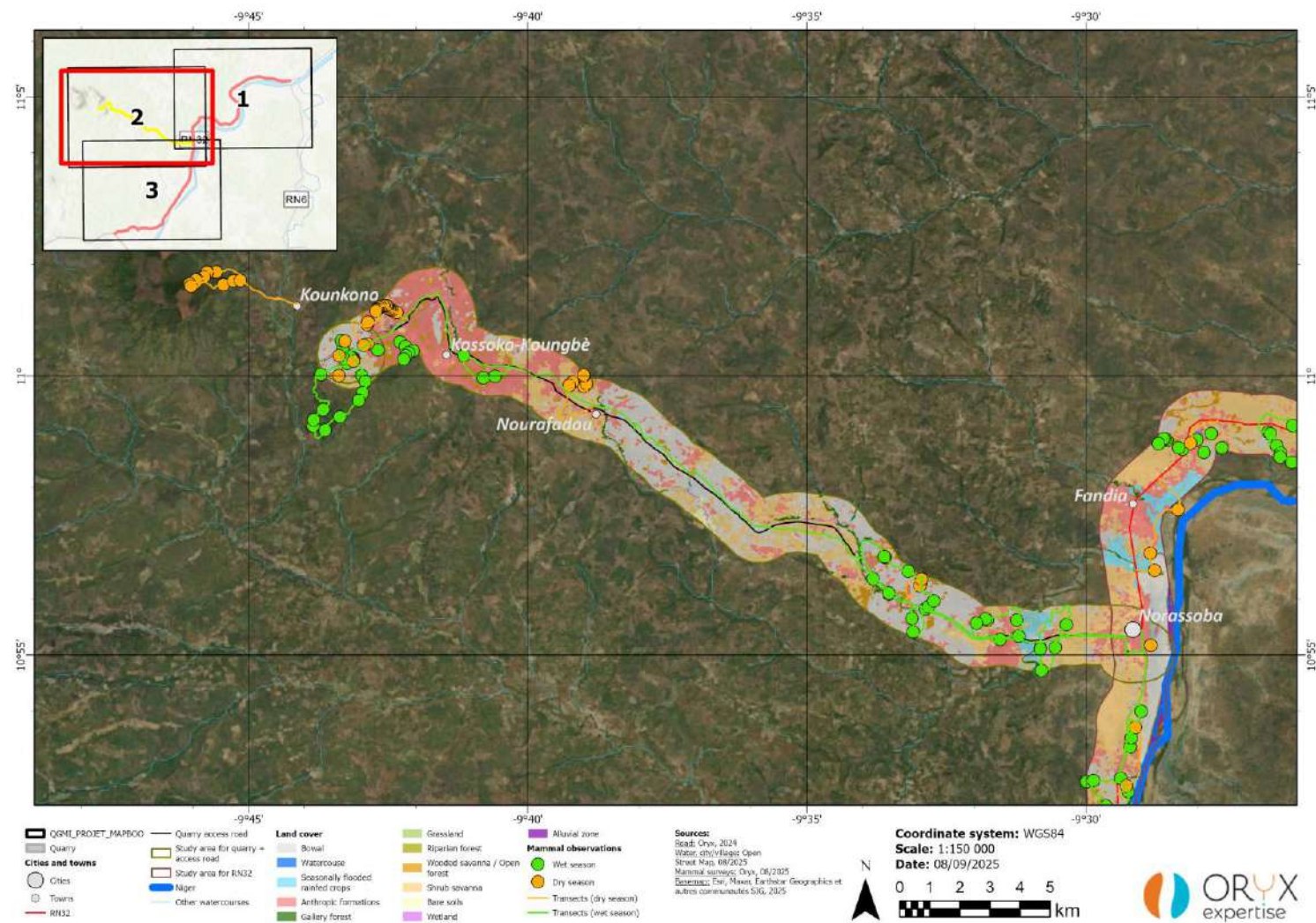
6.2.2. Large and medium-sized mammals

6.2.2.1. Survey effort

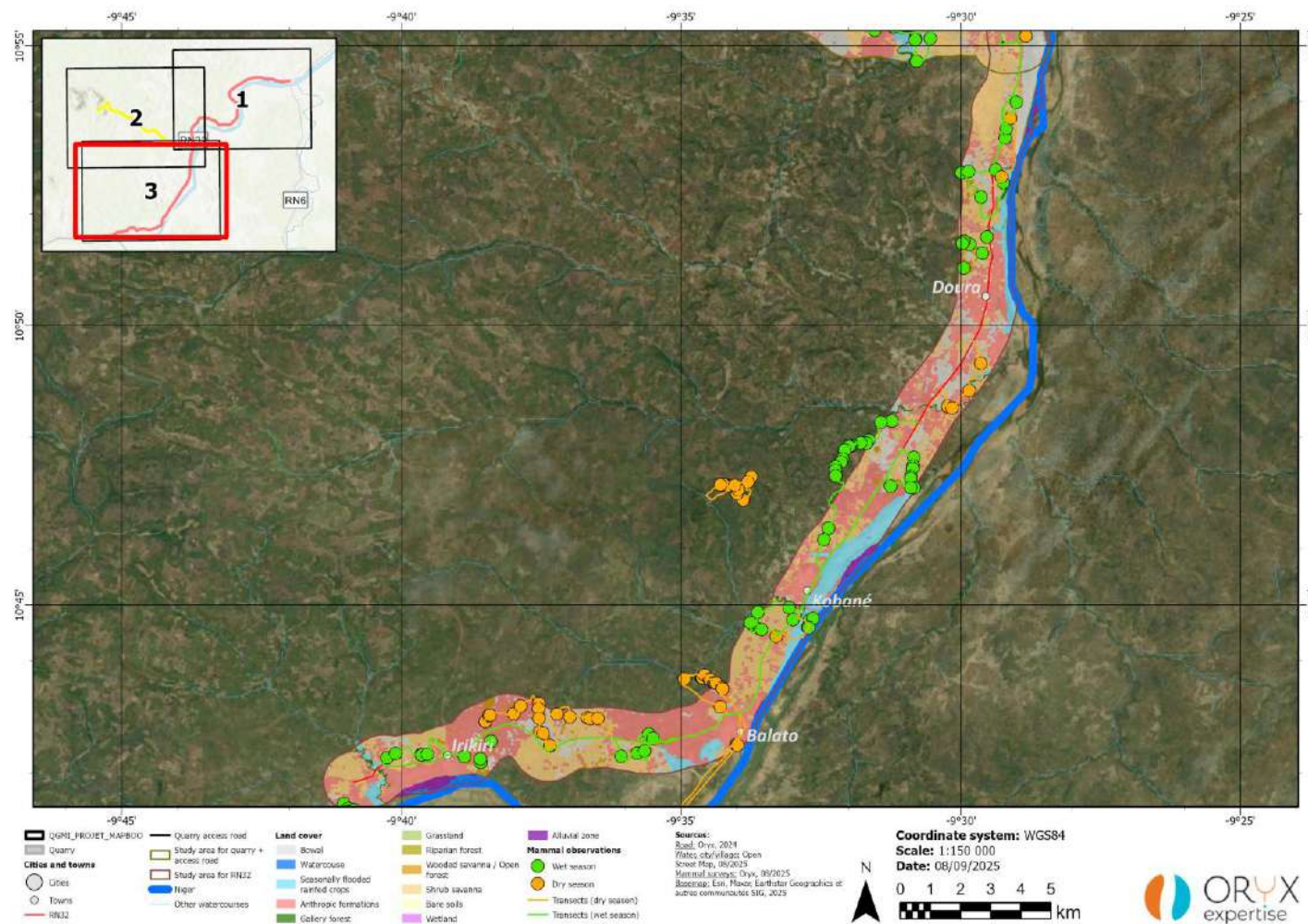
Data on large and medium-sized mammals were collected from 27 to 29 July 2024 during the baseline survey in the rainy season, then during the initial assessment from 18 to 27 March 2025 in the dry season and from 12 to 20 July 2025 in the rainy season. During this initial assessment, 33 people were surveyed and 17 reconnaissance walks were carried out across the entire study area during the dry season (13 along the RN32 and 4 in the quarry area and its access road). During the rainy season, 18 reconnaissance walks were carried out (including 6 in the quarry area and its access track). The reconnaissance walks focused on the least anthropised areas most conducive to the presence of mammals, particularly great apes, explaining the presence of unexplored areas and prospecting outside the study area. (Map 32, Map 33, Map 34).



Map 32 : Map of mammal surveys 1/3



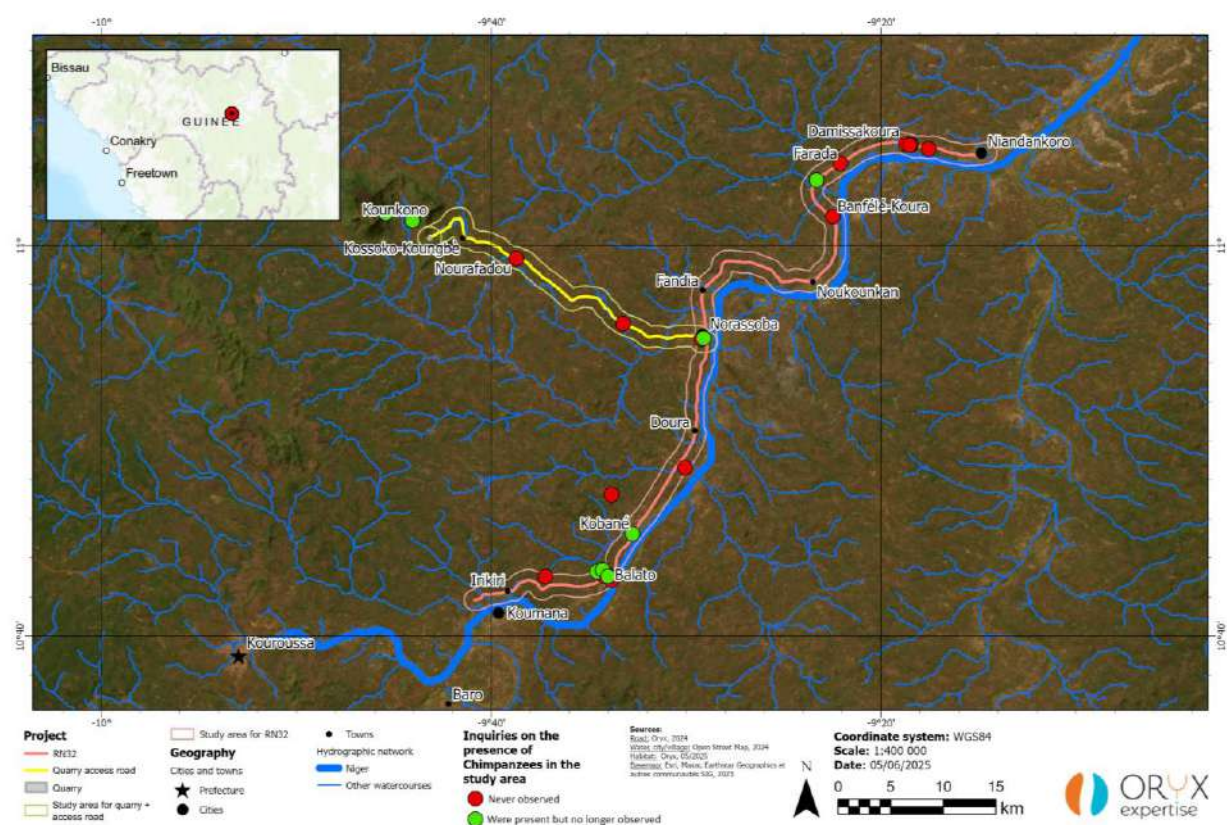
Map 33 : Surveys and observations of mammal indices 2/3



Map 34: Surveys and observations of mammal indices 3/3

6.2.2.2. Chimpanzee surveys

Of the 33 people surveyed, 24 (73%) were hunters, with detailed knowledge of their locality and the species that live there. Seven (21%) are farmers (who also hunt regularly), one is a livestock farmer and one is an elder from the village of Kobané. The Map 35 below shows the distribution of the people surveyed in the study area and the results of the surveys concerning the presence of chimpanzees in the area.



Map 35. Map of chimpanzee surveys

Twenty people say they have never seen chimpanzees in the area. Twelve people have seen chimpanzees in the area, but most report that they have not been seen there for many years. Only one farmer from Balato says he saw them 'three months ago', All the other people who have observed them say that it was several years ago, between 3 and 15 years ago, and that they were only present for part of the year. This recent mention is probably an error, either in the perception of time or in the identification of the species, the second option being more likely. The 12 people are unanimous that they do not approach villages and agricultural areas, that there is no human-chimpanzee conflict over non-timber forest products, and that the inhabitants fear chimpanzees.

The people interviewed reported that the disappearance of chimpanzees in the area is primarily attributable to population growth, which leads to deforestation, poaching and difficulties in accessing food and water.

6.2.2.3. *Mammal diversity*

A total of 23 species divided into 5 orders and 13 families were inventoried in the study area (*Table 45*), based on 641 signs of presence, mainly indirect (droppings, footprints, food remains, etc.), and visual observations. 490 signs were collected along the RN 32 and 151 in the area of the quarry and its runway. One or more species of mongoose, genet and galagos are present on the basis of the evidence found (digs, droppings, footprints, nests) but identification of the specific rank requires more precise evidence (droppings or footprints for mongooses, photographs for genets and galagos).

The majority of the evidence found is primate food remains (24% of evidence found, mostly in the rainy season). According to the other primate evidence found, these are probably the food remains of Patas

Monkey and Green Monkeys (*Chlorocebus sabaeus*). In terms of relative abundance, the Common Warthog came next (13.7% of finds), followed by the Striped Ground Squirrel (9.6% of finds).

Some species were only observed along the RN32 study area (Hippopotamus, Swamp Mongoose, Patas, African Atherid). With the exception of the Hippopotamus, which remains native to Niger in the study area, it cannot be ruled out that they are also present in the area of the quarry and its track, but that the limited survey time in this area did not allow their presence to be detected. The Yellow-backed Duiker was only identified during the framing in the quarry area. This species is probably present sporadically and benefits from more favourable conditions in this less anthropised area of the massif.

Table 45. Inventory of large and medium-sized mammals on the study site, with status and number of associated clues

Family	French name	Species	IUCN	Prot nat	Quarry + runway			RN 32	
					Cad.	SP	SS	SP	SS
Artiodactyla									
Bovidae	Yellow-backed Duiker	<i>Cephalophus silvicultor</i>	NT	IP	1				
Bovidae	Red-flanked Duiker	<i>Cephalophus rufilatus</i>	LC	IP/PP			2		5
Bovidae	Maxwell's Duiker	<i>Philantomba maxwellii</i>	LC	PP			1	7	4
Bovidae	Duiker sp		NA	NA			2		3
Bovidae	Bushbuck	<i>Tragelaphus scriptus</i>	LC	IP		4	2	11	4
Hippopotamidae	Hippopotamus	<i>Hippopotamus amphibius</i>	VU	IP				13	
Suidae	Common Warthog	<i>Phacochoerus africanus</i>	LC	PP	1	28	19	31	9
Suidae	Red River Hog	<i>Potamochoerus porcus</i>	LC	IP			3	1	
Carnivora									
Canidae	Side-striped Jackal	<i>Lupulella adustus</i>	LC	PP			2		3
Felidae	feline sp		NA	NA					5
Felidae	Serval	<i>Leptailurus serval</i>	LC	IP					3
Herpestidae	Marsh Mongoose	<i>Atilax paludinosus</i>	LC	NA				1	
Herpestidae	Common Slender Mongoose	<i>Herpestes sanguineus</i>	LC	PP		1		3	
Herpestidae	Mongoose sp		NA	NA					2
Viverridae	African Civet	<i>Civettictis civetta</i>	LC	PP			4	4	2
Viverridae	Genetta sp		NA	NA				3	
Lagomorpha									
Leporidae	Savannah hare	<i>Lepus victoriae</i>	LC	PP		4	10	16	27
Primates									
Cercopithecidae	Patas monkey	<i>Erythrocebus patas</i>	NT	PP				12	2
Cercopithecidae	Monkey sp		NA	NA	4	2	2	148	
Cercopithecidae	Green Monkey	<i>Chlorocebus sabaeus</i>	LC	PP			6	1	4
Galagidae	Galago sp		NA	PP		2		1	
Rodentia									
Hystricidae	African Brush-tailed Porcupine	<i>Atherurus africanus</i>	LC	PP				1	
Hystricidae	Crested Porcupine	<i>Hystrix cristata</i>	LC	PP		2	1	3	2
Nesomyidae	Northern Giant Pouched Rat	<i>Cricetomys gambianus</i>	LC	NE		6	2	25	5
Sciuridae	Striped Ground Squirrel	<i>Xerus erythropus</i>	LC	NE	1	16	1	32	12
Sciuridae	Squirrel sp		NA	NA					5
Sciuridae	Fire-footed Rope Squirrel	<i>Funisciurus pyrropus</i>	LC	NE		2		8	5
Sciuridae	Red-legged Sun Squirrel	<i>Heliosciurus rufobrachium</i>	LC	NE		1		6	
Sciuridae	Gambian Sun Squirrel	<i>Heliosciurus gambianus</i>	LC	NE		6		44	10

Family	French name	Species	IUCN	Prot nat	Quarry + runway			RN 32	
					Cad.	SP	SS	SP	SS
Thryonomyidae	greater Cane Rat	<i>Thryonomys swinderianus</i>	LC	NE		12	1	7	

Legend: Cad. Frame, SP rainy season, SS dry season. IUCN status: LC: Least Concern, NT: Near Threatened, NE: Not Evaluated, NA: Not Applicable, National Protection: IP: Fully Protected, PP: Partly Protected.



Photograph 26 Traces of amphibious hippopotamus (top), marsh mongoose (bottom left) and galago nest (bottom right)



Photograph 27 : Visual observations of Striped Ground Squirrel (top left) and Greater Cane Rat (bottom), Common Warthog droppings (top right) in the study area.

6.2.2.4. Species at conservation risk

6.2.2.4.1. Threatened species according to IUCN criteria

Among the mammal species inventoried during this study, one is threatened according to IUCN criteria (Table 46): the Hippopotamus. Two species are near-threatened: the Patas monkey and the Yellow-backed Duiker, whose populations are under pressure from hunting, the destruction of forest habitats and agriculture.

Table 46. IUCN status of mammal species inventoried

IUCN status	CR	EN	VU	NT	LC	DD	NE
Number of species	0	0	1	2	20	0	0

• Hippopotamus (*Hippopotamus amphibius*) - VU

This emblematic large mammal is adapted to rivers and wetlands because of its physiology, and in particular its skin, which is very sensitive to desiccation. Individuals spend their days in the water and come out onto the banks at night to graze, sometimes several kilometres away from their daytime habitat. It is a gregarious species that lives in groups of varying size, from around ten to a hundred individuals. The main threats to the species are habitat loss and poaching.

In West Africa, Hippopotamus populations are sparse and highly fragmented, concentrated around major rivers such as the Niger. These populations are the most threatened due to fragmentation and human-wildlife conflicts. In the region, the highest densities are found in Cameroon and Burkina Faso (Lewison & Pluháček, 2017). In Guinea, the Hippopotamus population could be of the order of 500 individuals, with the PNHN being home to approximately 1/5th of them (Brugière et al., 2006).

The species has been mentioned by local people as being present in Niger along the RN 32 during the rainy season, particularly in August. During the rainy season, the hippos come out onto the banks at night to graze. They stay close to the river and do not seem to cross the RN 32 according to surveys of guides and villages crossed. Their inter-seasonal movements are not well known and in the dry season these hippos take refuge either where there is more water, downstream, or in the Upper Niger Park, upstream.

6.2.2.4.2. Nationally threatened species

Of the terrestrial mammal species inventoried during this initial biodiversity survey, 6 are fully protected by Guinean legislation under decree A/2020/1591/MEEF/CAB/SGG of 19 May 2020: the Red-flanked Duiker, the Yellow-backed Duiker, the Bushbuck, the Hippopotamus, the Red River Hog and the Serval.

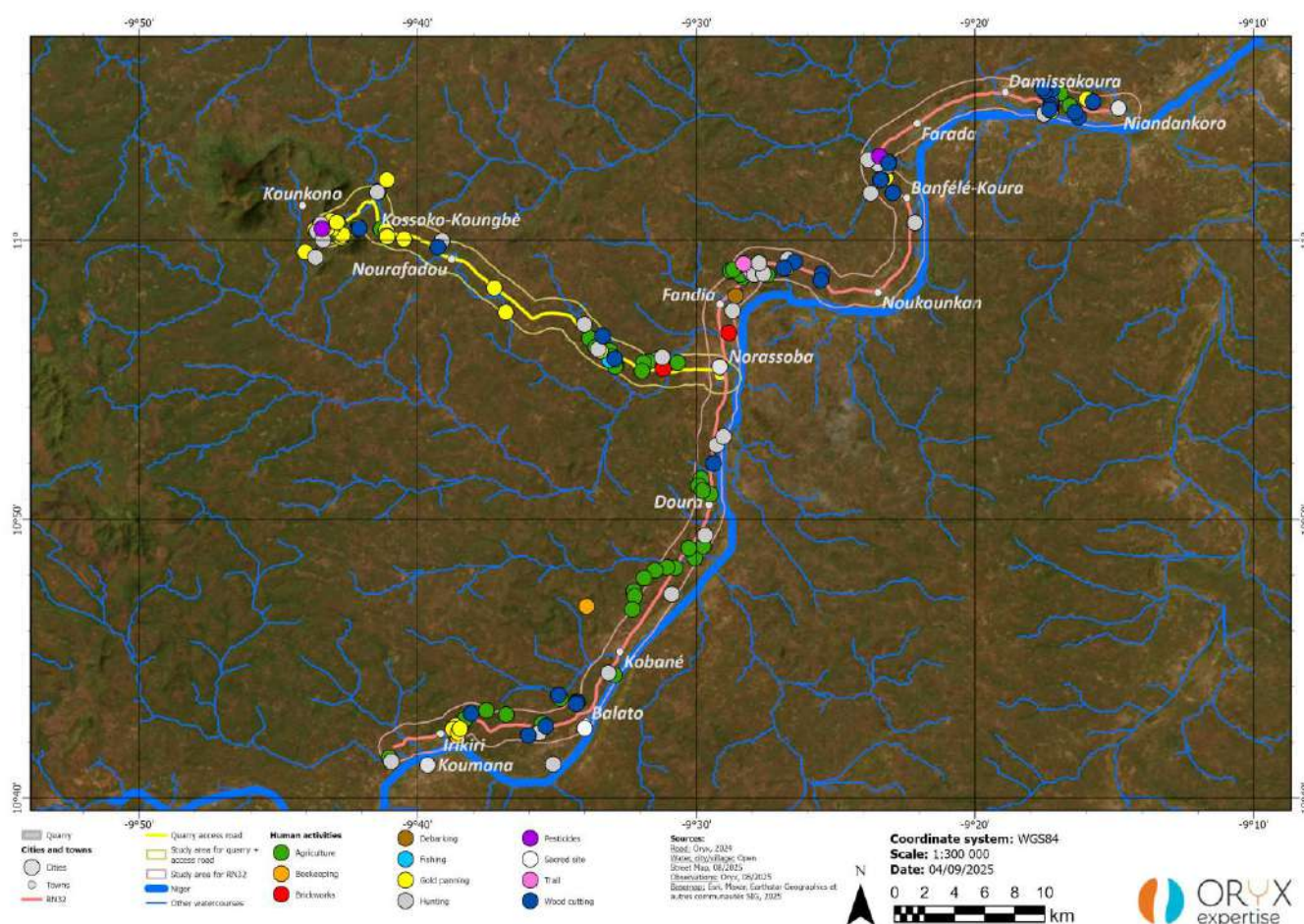
The following species are partially protected under the same decree: the Green Monkey, the Patas Monkey, the Maxwell's Duiker, the Common Warthog, the Side-striped Jackal, the African Civet, the Galago, the African Brush-tailed Porcupine, the Savannah Hare, the Crested Porcupine and the Common Slender Mongoose.

6.2.2.4.3. Endemic or restricted-range species

No endemic or restricted-range species according to IFC criteria were inventoried during the study.

6.2.2.5. Current threats in the study area

During field surveys, various human activities were recorded by the mammalogy team and are reported on Map 36. Due to the omnipresence of agriculture in the study area (accompanied by the use of pesticides), not all occurrences of this activity were recorded. The most frequently encountered activities are therefore agriculture, followed by hunting (empty cartridges), wood cutting, and gold panning. These activities together account for more than 90% of all human activities reported in the study area.



Map 36 : Human activities collected during field missions by the mammal's team

6.2.2.6. Discussion

The specific richness of mammals in the study area is at least 25 species. The mammal community appears to be depleted along the RN32, probably due to various significant anthropogenic pressures. In the quarry area and its access road, the minimal human influence seems to favour greater mammal diversity, even taking into account the limited survey time due to the need to survey the entire study area.

Several species that are likely to be present were not encountered during the field study. These include the Cape hyrax (*Procavia capensis*, LC), which could also be present in the quarry area, where its rocky habitat is well established.

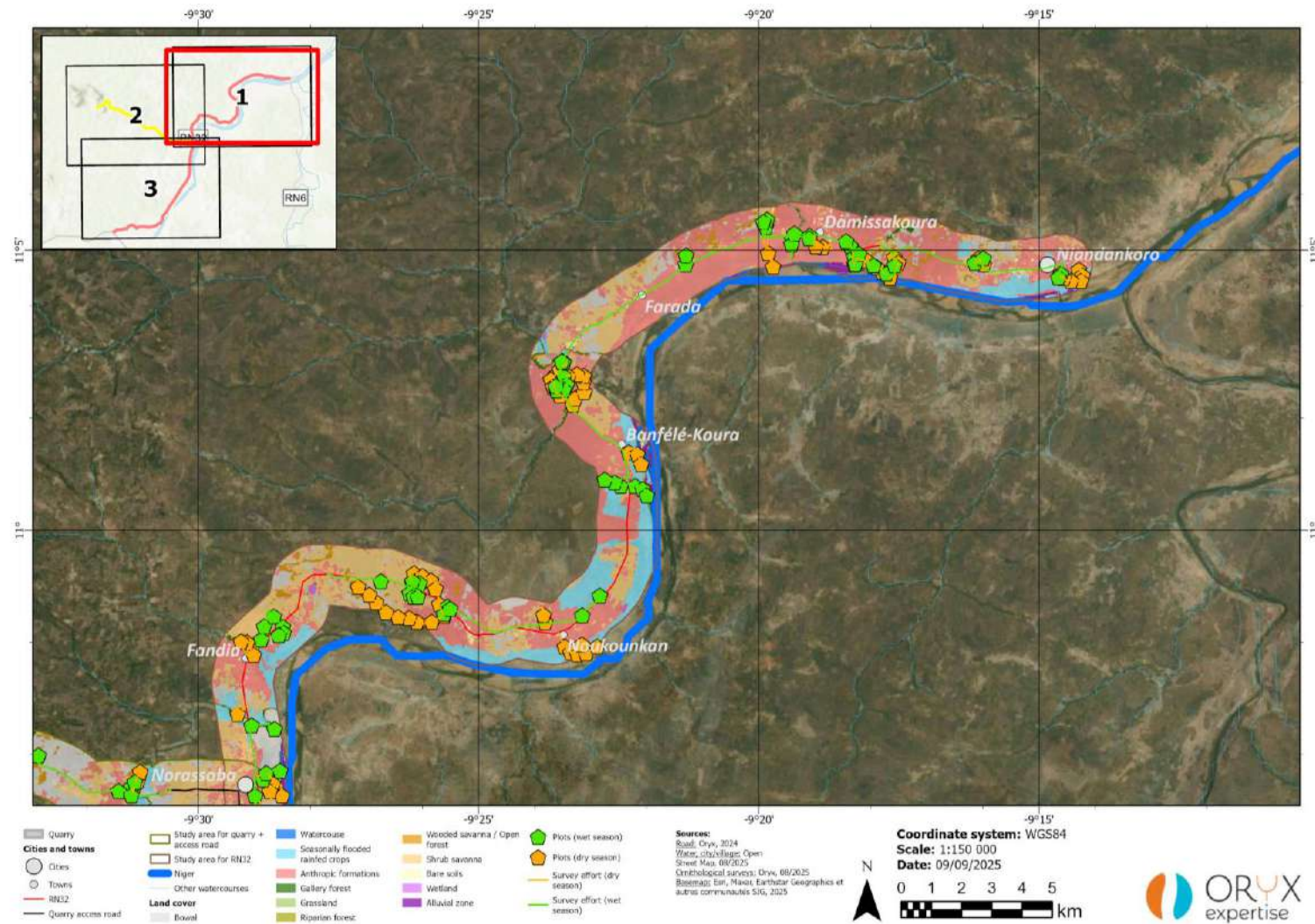
Surveys combined with reconnaissance walks are an effective method of combining local knowledge with field expertise. The areas most favourable to the presence of great apes, as indicated by hunters, were surveyed but no evidence of chimpanzees was found. The most recent mention of chimpanzees, dating back three months, is of a dubious nature and is probably attributable to misidentification of the species. All other reports mention the absence of chimpanzees. This combination of the two methods used allows us to conclude that there are no long-term chimpanzee groups living in the study area.

6.2.3. Avifauna

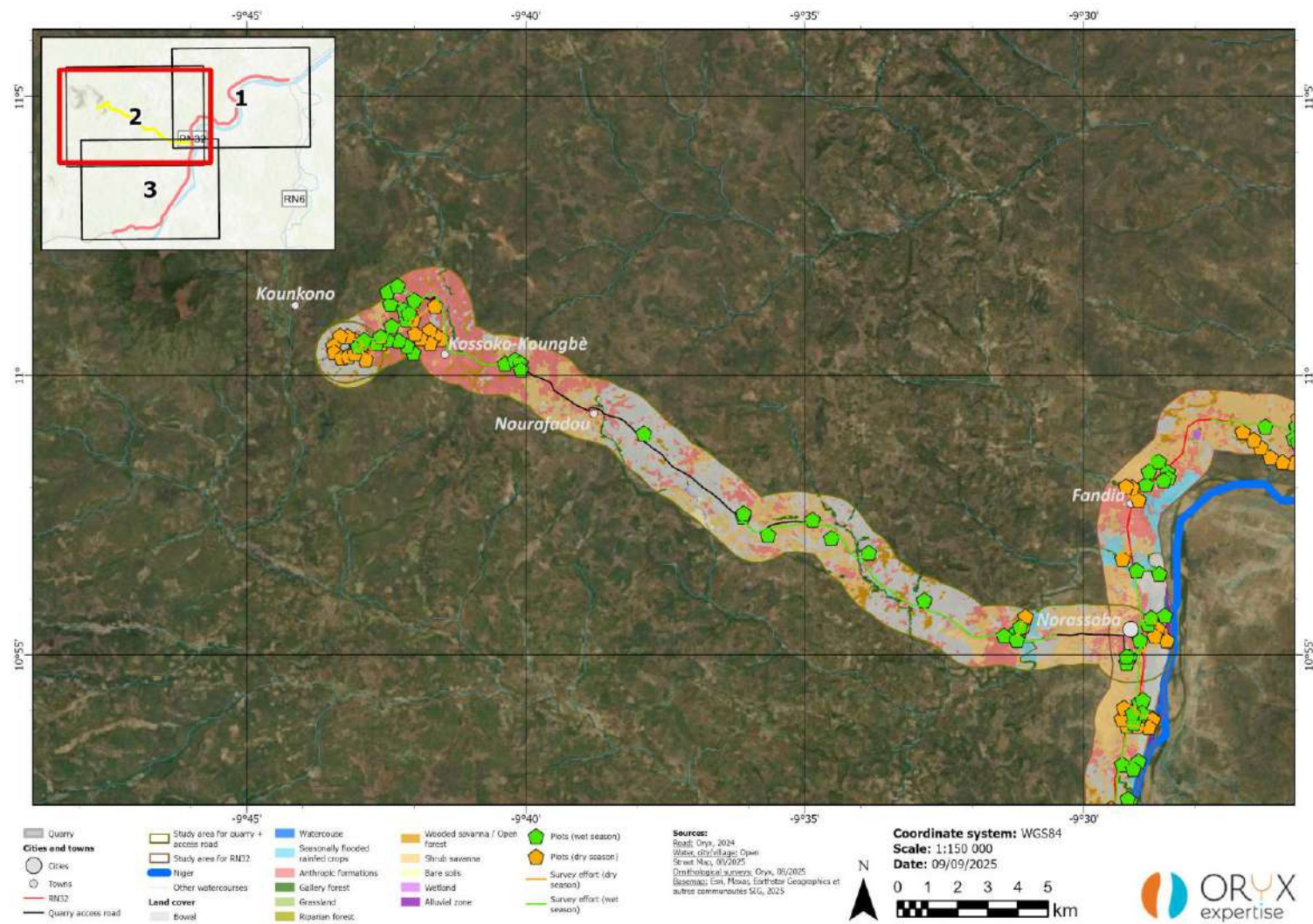
6.2.3.1. Survey effort

Data on avifauna was collected from 18 to 26 March 2025 at the end of the dry season, when Palaearctic migrants are still in Guinea. During the rainy season, data was collected from 12 to 20 July 2025.

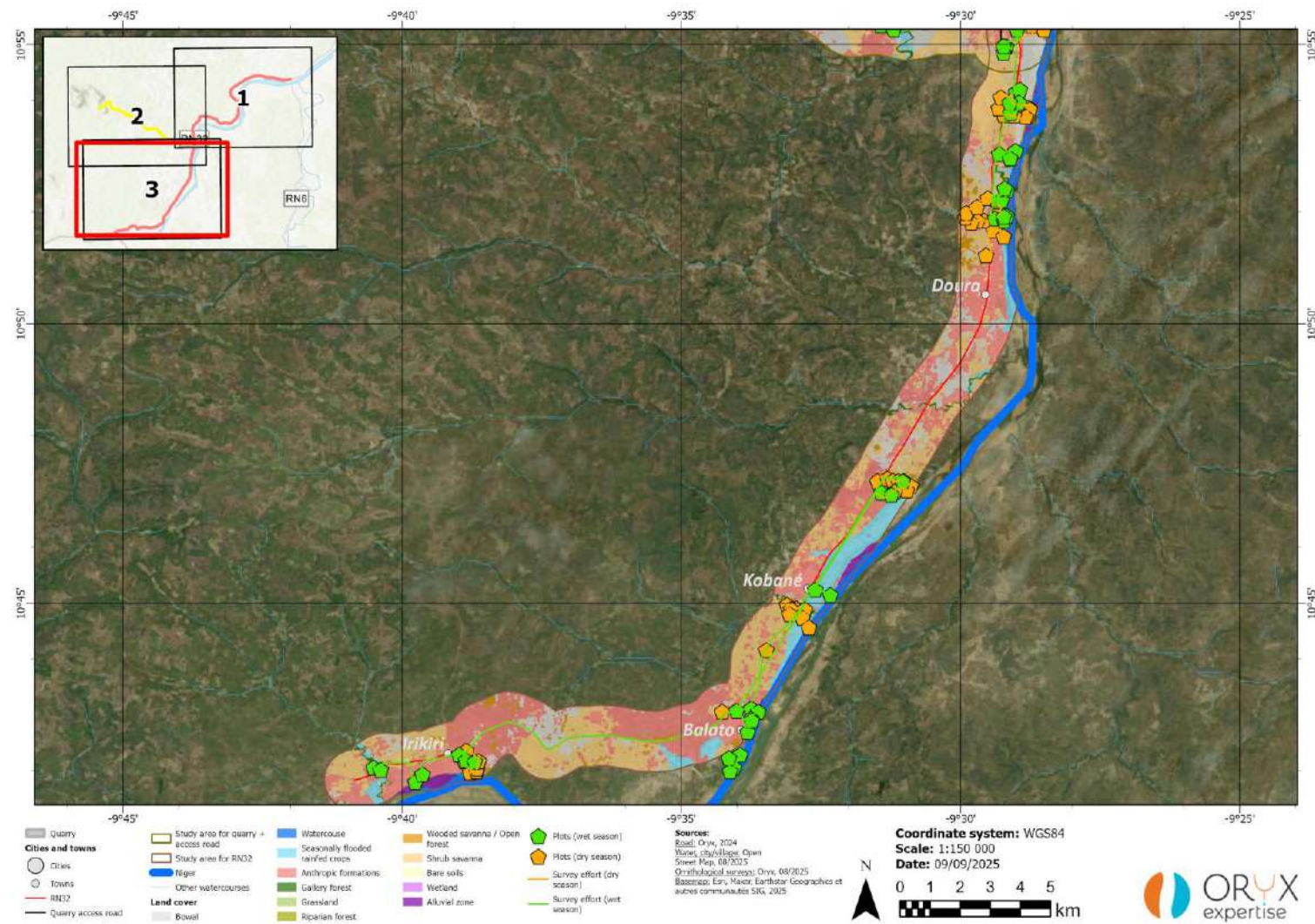
Map 37, Map 38 and Map 39 illustrates the locations of the ornithological surveys and the routes taken to carry out this inventory.



Map 37 : Maps showing the locations of bird surveys 1/3



Map 38 : Maps showing the locations of bird surveys 2/3



Map 39 : Maps showing the locations of bird surveys 3/3

6.2.3.2. Bird diversity

A total of 178 species belonging to 63 families and 18 orders were recorded in the study area, including the national road and quarry. 1,260 data sets were collected in the dry season, representing 4,439 individuals. In the rainy season, 829 data were collected, representing 2,234 individuals.

In the RN 32 study area in the dry season, 125 species belonging to 56 families were identified. 1,018 data sets were recorded, representing 3,799 individuals. In the quarry and access track zone, 71 species in 39 families were identified, with 241 data records, representing a total of 640 individuals.

During the rainy season, in the RN 32 study area, 127 species belonging to 52 families were identified. 652 data were recorded, representing 1,810 individuals. In the quarry and runway area, 64 species belonging to 35 families were observed, with 177 records, representing a total of 424 individuals.

Details of the species inventoried and their status are given in appendix 10; illustrations are presented in appendix 11.

The species recorded can be grouped into different groups according to the ecosystems in which they are found:

- Forests and woodlands: open forest, gallery forest, riparian forests, etc. ;
- Wetlands: flood meadows, watercourses, wetlands, etc. ;
- Man-made formations: crops, fallow land, plantations, gold panning areas, etc;
- Grassy savannahs: meadows.

The forest and woodland assemblage includes 99 species observed in the dry season and 91 in the rainy season, despite the fragmentation of these ecosystems. The most common species include the Common Bulbul (*Pycnonotus barbatus*), the African Grey Hornbill (*Lophoceros nasutus*), the Grey-backed Camaroptera (*Camaroptera brevicaudata*), the Yellow-billed Shrike (*Lanius corvinus*), the Brown Babbler (*Turdoides plebejus*) and the Double-spurred Spurfowl (*Pternistis bicalcaratus*), Yellow-crowned Gonolek (*Laniarius barbarus*), African Golden Oriole (*Oriolus auratus*), African Thrush (*Turdus pelios*), Brown-throated Wattle-eye (*Platysteira cyanea*), African Paradise Flycatcher (*Terpsiphone viridis*), the Western Plantain-eater (*Crinifer piscator*), the Violet Turaco (*Musophaga violacea*), the Black-billed Wood Dove (*Turtur abyssinicus*) and the Vinaceous Dove (*Streptopelia vinacea*).

The range of species found in the grassy savannah, i.e. the meadows, is relatively undiversified. It comprises 27 species (13 in the rainy season), including the Spur-winged Lapwing (*Vanellus spinosus*), the African Wattled Lapwing (*Vanellus senegallus*) and the Sun Lark (*Galerida modesta*), Quailfinch (*Ortygospiza atricollis*), Western Cattle Egret (*Ardea ibis*), yellow-fronted Canary (*Crithagra mozambica*) and Laughing Dove (*Spilopelia senegalensis*).

The wetland assemblage, comprising the diversity of aquatic habitats (streams, ponds, etc.) totals 24 species in the dry season and 43 species in the rainy season. These include species that depend on wetlands, such as the Egyptian Plover (*Pluvianus aegyptius*), the Little Egret (*Egretta garzetta*) and the Common Sandpiper (*Actitis hypoleucos*), the Common Greenshank (*Tringa nebularia*), the White-faced Whistling Duck (*Dendrocygna viduata*), the Great Painted-snipe (*Rostratula benghalensis*) and the Lesser Moorhen (*Gallinula angulata*). Among the species most frequently observed in these habitats are the African Wattled Lapwing (*Vanellus senegallus*), the African Jacana (*Actophilornis africanus*), the Striated Heron (*Butorides striata*) and the Squacco Heron (*Ardeola ralloides*).



Photograph 28 : Squacco Heron (left) and Great Painted-snipe (right), birds associated with wetlands.

The assemblage of anthropogenic formations, comprising only modified habitats in the sense of NP6 of the SFI⁸, includes agricultural habitats and built-up areas. These habitats dominate the landscape of the study area. This group includes 79 species in the dry season and 103 species in the rainy season, and is diverse in terms of avifauna, dominated by the same species as in the previous groups: Common Bulbul (*Pycnonotus barbatus*), African Grey Hornbill (*Lophoceros nasutus*), Western Cattle Egret (*Ardea ibis*), Red-billed Firefinch (*Lagonosticta senegala*), Greater Blue-eared Starling (*Lamprolornis chalybaeus*), Yellow-billed Shrike (*Lanius corvinus*), Brown Babbler (*Turdoides plebejus*), Vinaceous Dove (*Streptopelia vinacea*) and Laughing Dove (*Spilopelia senegalensis*).

6.2.3.3. Priority species for conservation

6.2.3.3.1. Endangered species according to the IUCN

According to IUCN criteria, three of the species observed are considered threatened: the Hooded Vulture (*Necrosyrtes monachus*) and the White-backed Vulture (*Gyps africanus*) are both classified as critically endangered (CR) and the Bateleur (*Terathopius ecaudatus*) as endangered (EN).

Table 47. IUCN status of bird species surveyed

UICN status	CR	EN	VU	NT	LC	DD	NE
Number of species	2	1	0	1	172	0	1

Most of the bird species inventoried are classified as "Least Concern" (LC) on the IUCN red list. They are all common.

• Hooded Vulture (*Necrosyrtes monachus*) - CR

The Hooded Vulture is the smallest of the vultures present in Guinea and one of the most common, particularly due to its proximity to human habitations. This species is widely distributed across sub-Saharan Africa and frequents a wide variety of habitats, from open savannahs to peri-urban areas.

⁸ Modified habitats are areas that may harbour a large proportion of alien plant and/or animal species, and/or where human activity has significantly altered the primary ecological functions and species composition. They may include areas developed for agriculture, forest plantations, coastal areas reclaimed from the sea and areas reclaimed from wetlands.

In West Africa, the species remains relatively common and is often seen near villages and towns, both in the bush and in urban areas. However, the population is declining at an alarming rate, leading the IUCN to revise its status from Endangered to Critically Endangered in 2015 (Thiollay, 2006; Ogada et al., 2015).

The main threats to the species include indirect poisoning, often linked to carcasses processed to eliminate large carnivores (Roxburgh & McDougall, 2012; Otieno et al., 2010; Woodford et al., 2008); trade for traditional medicine and mystical practices (Buij et al., 2015); hunting, electrocution on power lines, and habitat degradation.

According to BirdLife International (2022), the global population is estimated at around 131,000 mature individuals, for an approximate total of 197,000 individuals. Although no precise estimate is available for Guinea, severe declines have been observed elsewhere in the region. In Dakar, for example, the population fell by more than 85% between 1969 and 2016 (Mulli   et al., 2017). In contrast, the species is still considered common in Guinea-Bissau (Henriques et al., 2017).

During the dry season, 21 scavenging vultures were recorded. 5 individuals were observed in flight in the localities of Iri-Kiri, Balato and Koban  ; 9 individuals were counted between Norassouba and Soukouran  , including 6 in flight and 3 posed (including 1 juvenile), 6 individuals were observed in flight in Damisa Koro and Niandankoro. Finally, 1 individual was observed in flight at the quarry site.

During the wet season, 19 individuals of carrion vultures were recorded. 11 individuals were observed in the locality of Norassoba, including 3 posed and 8 in flight; 1 individual was observed posed in the locality of Banfele Koura; 1 individual was observed in flight between Nounkounkan and Banfele Koura, 2 individuals were observed in flight near Soukouran  ; 2 individuals were observed in flight in Koban   and 2 individuals were observed in flight near Balato. No Hooded Vultures were observed either at the quarry site or on the track leading to it.



Photograph 29;. Hooded Vulture in flight



Photograph 30 : Group of Hooded Vultures perched.

- **White-backed Vulture (*Gyps africanus*) - CR**

The African vulture population is experiencing an alarming decline overall, which has led to the accelerated revision of its status by the IUCN: in 2008, it was reclassified from 'Least Concern' to 'Near Threatened', then in 2012 to "Endangered" and finally to 'Critically Endangered' in 2015.

The main threats to the African vulture are essentially the same as those to the Egyptian vulture.

Firstly, the loss of habitat for foraging and breeding (Bamford et al. 2008): disturbance by human activities, fires, destruction of trees used for nesting, and poaching.

Other factors such as heavy metal contamination, with concentrations in the liver and kidneys becoming lethal to vultures, collisions with power lines or wind turbines, and indirect poisoning from consuming animal carcasses that have been destroyed by humans to protect their livestock, all pose threats to the African vulture (Ogada et al., 2016).

In total, during the rainy season studies, seven African vultures were recorded. One individual was observed in flight near the town of Banfele Koura; two individuals were observed in flight near Nounkounkan; one individual was observed perched between Nounkounkan and Banfele Koura; two individuals were observed in flight near Soukourané and one individual was observed in flight between Norassoba and Doura. No African vultures were observed either at the quarry site or on the track leading to it, but the species is certainly present there.



Photograph 31 ; White-backed Vultures observed in the study area

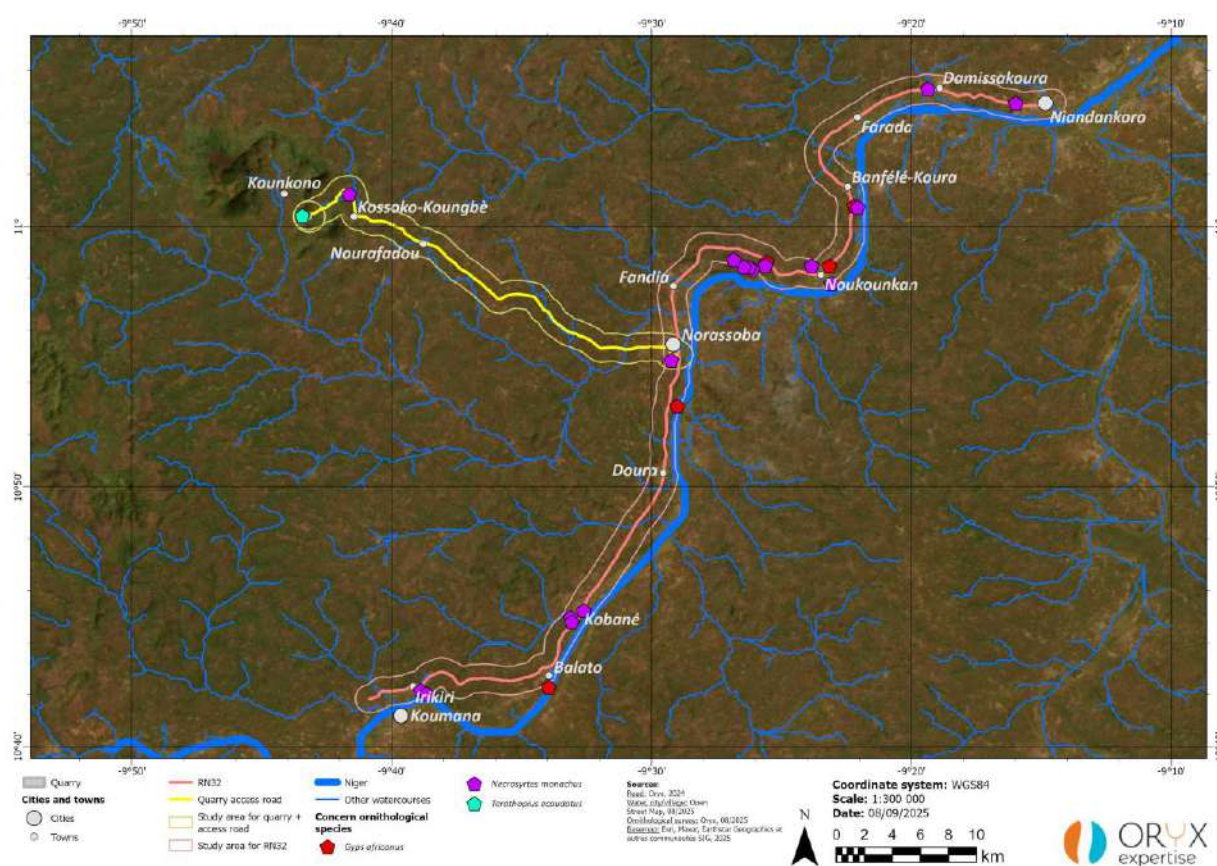
- **Bateleur (*Terathopius ecaudatus*) - EN**

The Bateleur is an emblematic African diurnal bird of prey, easily recognisable by its distinctive silhouette in flight, with its long wings and very short tail. The Bateleur occupies a wide range across sub-Saharan Africa, where it mainly frequents wooded savannahs, open areas and open forests. It hunts over vast distances in search of prey (small mammals, birds, reptiles) or carrion (Thiollay, 2007).

Despite its wide distribution, its populations have declined sharply, particularly in West Africa, due to a number of threats such as: poisoning, often unintentional, linked to the use of chemicals in carcasses to eliminate predators; illegal hunting, sometimes for traditional medicine; collisions with human infrastructure, such as power lines; and above all, the degradation and fragmentation of its natural habitat, due to extensive farming, urbanisation and logging (Ogada et al., 2016).

The Bateleur has been classified as Endangered by the IUCN, due to its rapid decline. Although it is still observed in Guinea, it has become rare and localised, particularly in the large savannahs of the north and in protected areas.

A single individual of the species was observed in flight at the quarry site.



Map 40: Sightings of birds of conservation concern

6.2.3.3.2. Species protected at national level

Decree A/2020/1591/MEEF/CAB/SGG of 19 May 2020 on the protection of species of wild fauna and flora in Guinea sets out measures for the protection of birds, dividing them into two categories:

- Fully protected species (32 species listed in the decree), including nine species observed in the study area during the mission carried out in the rainy season. These are detailed in Table 48.

Table 48. Bird species fully protected under national legislation and contacted on the study site

English name	Scientific name
Wahlberg's eagle	<i>Hieraaetus wahlbergi</i>
Dark Chanting Goshawk	<i>Melierax metabates</i>
Bateleur	<i>Terathopius ecaudatus</i>
European Honey Buzzard	<i>Pernis apivorus</i>
Western Marsh Harrier	<i>Circus aeruginosus</i>
Grasshopper Buzzard	<i>Butastur rufipennis</i>
Black-winged Kite	<i>Elanus caeruleus</i>
Lanner Falcon	<i>Falco biarmicus</i>
Western Cattle Egret	<i>Bubulcus ibis (Ardea ibis)</i>



Photograph 32 ; The Dark Chanting Goshawk and the Black-winged Kite, fully protected birds

- b) Partially protected species (178 species listed in the decree), including some of the species observed in the study area during the rainy season. They are detailed in Table 49.

Table 49. Bird species partially protected under national legislation and observed on the study site

English name	Scientific name
Osprey	<i>Pandion haliaetus</i>
African Harrier-Hawk	<i>Polyboroides typus</i>
Yellow-billed Kite	<i>Milvus aegyptius</i>
Red-necked Buzzard	<i>Buteo auguralis</i>
Hooded Vulture	<i>Necrosyrtes monachus</i>
White-backed Vulture	<i>Gyps africanus</i>
Gabar Goshawk	<i>Micronisus gabar</i>
Lizard Buzzard	<i>Kaupifalco monogrammicus</i>
Shikra	<i>Accipiter badius</i> (<i>Tachyspiza badia</i>)
Grey Kestrel	<i>Falco ardosiaceus</i>
Common Kestrel	<i>Falco tinnunculus</i>
African Hobby	<i>Falco cuvierii</i>
African Scops Owl	<i>Otus senegalensis</i>
Pearl-spotted Owlet	<i>Glaucidium perlatus</i>
Senegal Parrot	<i>Poicephalus senegalus</i>



Photograph 33 : Lizard Buzzard and African Hobby, partially protected birds

According to the national monograph by Bah *et al.* (1997), whose species lists serve as a national inventory for biodiversity conservation strategies under the 1992 International Convention on Biological Diversity, of all the species listed as being at risk, only 6 were observed in the study area during the survey: the Senegal Parrot (*Poicephalus senegalus*), the Lizard Buzzard (*Kaupifalco monogrammicus*), the White-backed Vulture (*Gyps africanus*), the Red-billed Firefinch (*Lagonosticta senegala*) and three species of Turacos (*Tauraco* spp.), at densities that do not suggest any need to change their status. This monograph has no legal value in terms of conservation and protection, but it does serve as a basis for setting up national biodiversity strategies.

6.2.3.3.1. Endemic or restricted-range species

No endemic species have been identified in the study area and none are expected. No restricted-range species have been observed.

6.2.3.3.2. Species restricted to biomes

The study area is located in the Sudano-Guinean savannah biome. Elements of the Guinean-Congolian forest biome may be present in the gallery forests. Groups of species whose range is restricted to these biomes (Fishpool & Evans 2001) are present in the study area. Of the 173 species of the Sudano-Guinean savannah biome known from Guinea, 16 were recorded on the study site in the dry season and 19 in the rainy season (Table 50). Of the 37 species of the congo-guinean forest biome known from Guinea, one was inventoried on the study site in the dry season and 5 in the rainy season.

Table 50. List of bird species restricted to the Sudano-Guinean savannah (SG) and the Congo-Guinean forest (GC) biomes

English name	Scientific name	Biome CG	SG biome
Leaf-love	<i>Phyllastrephus scandens</i>	X	
Olive-green Camaroptera	<i>Camaroptera chloronota</i>	X	
Sharpe's Drongo	<i>Dicrurus sharpei</i>	X	
Red-bellied Paradise Flycatcher	<i>Terpsiphone rufiventer</i>	X	
Guinea Touraco	<i>Tauraco persa</i>	X	
Violet Turaco	<i>Musophaga violacea</i>		X
Blue-bellied Roller	<i>Coracias cyanogaster</i>		X
Red-throated Bee-eater	<i>Merops bullocki</i>		X
Bearded Barbet	<i>Pogonornis dubius</i>		X
Senegal Parrot	<i>Poicephalus senegalus</i>		X
Yellow-billed Shrike	<i>Lanius corvinus</i>		X
Piapiac	<i>Ptilostomus afer</i>		X

English name	Scientific name	Biome CG	SG biome
Sun Lark	<i>Galerida modesta</i>		X
Senegal Eremomela	<i>Eremomela pusilla</i>		X
Blackcap Babbler	<i>Turdoides reinwardtii</i>		X
Purple Starling	<i>Lamprotornis purpureus</i>		X
Yellow Penduline Tit	<i>Anthoscopus parvulus</i>		X
Sahel Bush Sparrow	<i>Gymnoris dentata</i>		X
Yellow-winged Pytilia	<i>Pytilia hypogrammica</i>		X
White-crowned Robin-Chat	<i>Cossypha albicapillus</i>		X
Splendid Sunbird	<i>Cinnyris coccinigastrus</i>		X
Lavender Waxbill	<i>Glaucestrilda caerulescens</i>		X
Black-rumped Waxbill	<i>Estrilda troglodytes</i>		X
Bar-breasted Firefinch	<i>Lagonosticta rufopicta</i>		X
Black-faced Firefinch	<i>Lagonosticta larvata</i>		X



Photograph 34. Red-throated Bee-eater, representative of species from the SudanoGuinean savannah.



Photograph 35 : YellowPenduline Tit and Sun Lark, representatives of Sudano-Guinean savannah species

The avifauna in the project area is not very typical of Sudano-Guinean savannah habitats. This reflects a landscape of ecosystems that have been trivialised by human activity, with few natural habitats. The natural habitats have been largely degraded or replaced by modified habitats, which has a direct influence on the

specific composition of the species present. The species composition of the Guinean-Congolian forests is very low, as the study area lies outside this biome. However, the presence of gallery forests means that some species from this biome are present in the study area.

However, the inventory carried out during the rainy season enabled several additional species typical of biome-restricted assemblages to be observed in addition to those already observed during the dry season.

6.2.3.3.1. Migratory or gregarious species

Thirteen intra-African migratory species were contacted, as well as nine trans-Saharan migratory species, or palearctic migrants. Five palearctic or local migratory species were also inventoried, i.e. species with breeding populations on both continents. [Table 51](#) summarises the migratory species contacted and their status.

Table 51. Migratory species present in the study area during the dry season (MA: intra-African migrant; P: palearctic; P/L: palearctic or local)

English name	Scientific name	Status
Little Egret	<i>Egretta garzetta</i>	P/L
Osprey	<i>Pandion haliaetus</i>	P/L
Squacco Heron	<i>Ardeola ralloides</i>	P/L
Common Kestrel	<i>Falco tinnunculus</i>	P/L
Collared Pratincole	<i>Glareola pratincola</i>	P/L
Western Yellow Wagtail	<i>Motacilla flava</i>	P
European Honey Buzzard	<i>Pernis apivorus</i>	P
Western Marsh Harrier	<i>Circus aeruginosus</i>	P
Common Greenshank	<i>Tringa nebularia</i>	P
Common Sandpiper	<i>Actitis hypoleucos</i>	P
European Pied Flycatcher	<i>Ficedula hypoleuca</i>	P
Melodius Warbler	<i>Hippolais polyglotta</i>	P
Woodchat Shrike	<i>Lanius senator</i>	P
Willow Warbler	<i>Phylloscopus trochilus</i>	P
Wahlberg's Eagle	<i>Hieraaetus wahlbergi</i>	MA
Grasshopper Buzzard	<i>Butastur rufipennis</i>	MA
African Grey Hornbill	<i>Lophoceros nasutus</i>	MA
African Cuckoo	<i>Cuculus gularis</i>	MA
Black Cuckoo	<i>Cuculus clamosus</i>	MY
Diederik Cuckoo	<i>Chrysococcyx caprius</i>	MA
Klaas's Cuckoo	<i>Chrysococcyx klaas</i>	MA
African Golden Oriole	<i>Oriolus auratus</i>	MA
Grey-headed Kingfisher	<i>Halcyon leucocephala</i>	MA
Woodland Kingfisher	<i>Halcyon senegalensis</i>	MA
African Crane	<i>Creccopsis egreria</i>	MA
Broad-billed Roller	<i>Eurystomus glaucurus</i>	MA
Violet-backed Starling	<i>Cinnyricinclus leucogaster</i>	MA



Photograph 36 : Melodius Warbler (left), trans-Saharan migrant wintering in Guinea. Right Juvenile African Golden Oriole, intra-African migrant

The study area is used by several migratory species as a stopover or wintering site. The study area is almost entirely located within a RAMSAR site, site no. 1164 Niger-Niandan-Milo. This RAMSAR site plays a major hydrological role and is recognised in terms of biodiversity for its fish fauna, but also for its role as a feeding, nesting and refuge area for birds. No information is provided by the site's Ramsar file on the diversity of migratory species present or on the concentrations of birds present.

During the dry season study, no significant concentrations of birds were observed, but given the vast area covered by the study zone, the long linear stretch of river and the regular presence of sites favourable to the presence of larids and waders, it is not possible to judge the site's capacity to accommodate these birds. The lack of bibliographic data makes it impossible to complete this analysis. As the fieldwork took place at a time when most Palearctic migrants are absent, it is not possible to give an opinion on the actual frequency of visits to the site.



Photograph 37 : Waterfowl on the River Niger, Common Greenshank and African Wattled Lapwing



Photograph 38 : The widowed tree duck, a common water bird in the study area

6.2.3.4. Discussion

Overall, 178 species belonging to 58 families were identified in the study area. This diversity, although significant, remains moderate. Guinea has 683 bird species according to the iGoTerra site (iGoTerra 2025), so the species richness of the study area represents 26% of the national total. This diversity can be explained by the significant anthropisation of the area, which has seen natural habitats disappear in favour of a landscape dominated mainly by agricultural activities.

Four main species assemblages have been identified, in relation to the ecosystems that make up the landscape of the study area: the forest and woodland assemblages, the wetland assemblages, the anthropogenic formations assemblages and the grassy savannah assemblages. The avifauna present in the study area is not very typical, i.e. the number of species restricted to the Sudano-Guinean biome is limited (20 species). This is a marker of the state of conservation of the study area landscape.

Three species are considered threatened on the IUCN red list: the Hooded Vulture (*Necrosyrtes monachus*), classified as Critically Endangered (CR), the White-backed Vulture (*Gyps africanus*), also Critically Endangered (CR), and the Bateleur (*Terathopius ecaudatus*), classified as Endangered (EN). The first two were seen on several occasions in the study area, while the third was observed once during the dry season.

No significant concentrations of migratory or gregarious species exceeding the threshold of 1% of the world population were observed. The diversity of waders and larids observed can be described as relatively low at the time of the study, as can the concentrations of waterbirds observed. However, the study area straddles a RAMSAR site recognised as important for the conservation of wetland birds and migratory birds. The time of year at which the study was carried out, as well as the short duration of the study, do not allow an objective judgement to be made on the diversity and numbers of waterbirds present on the river and the wetlands present. If necessary, a dedicated visit planned for the heart of the wintering period for Palaearctic migrants would make it possible to address this issue.

6.2.4. Herpetofauna

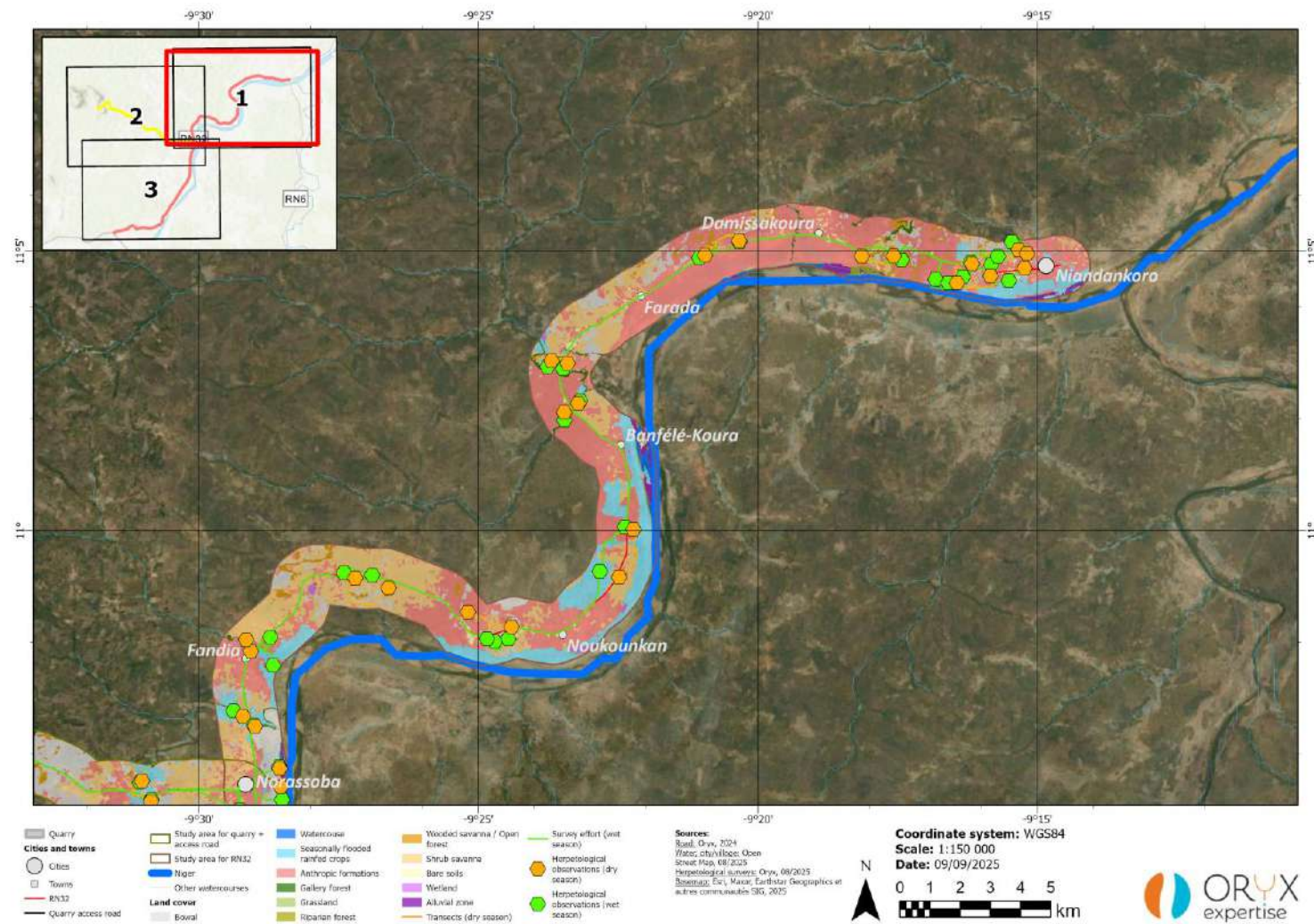
6.2.4.1. Survey effort

The fieldwork for the herpetofauna inventory took place from 18 to 27 March 2025 during the dry season and from 12 to 20 July during the rainy season. During these periods, the herpetological team carried out investigations in 40 sites distributed as follows:

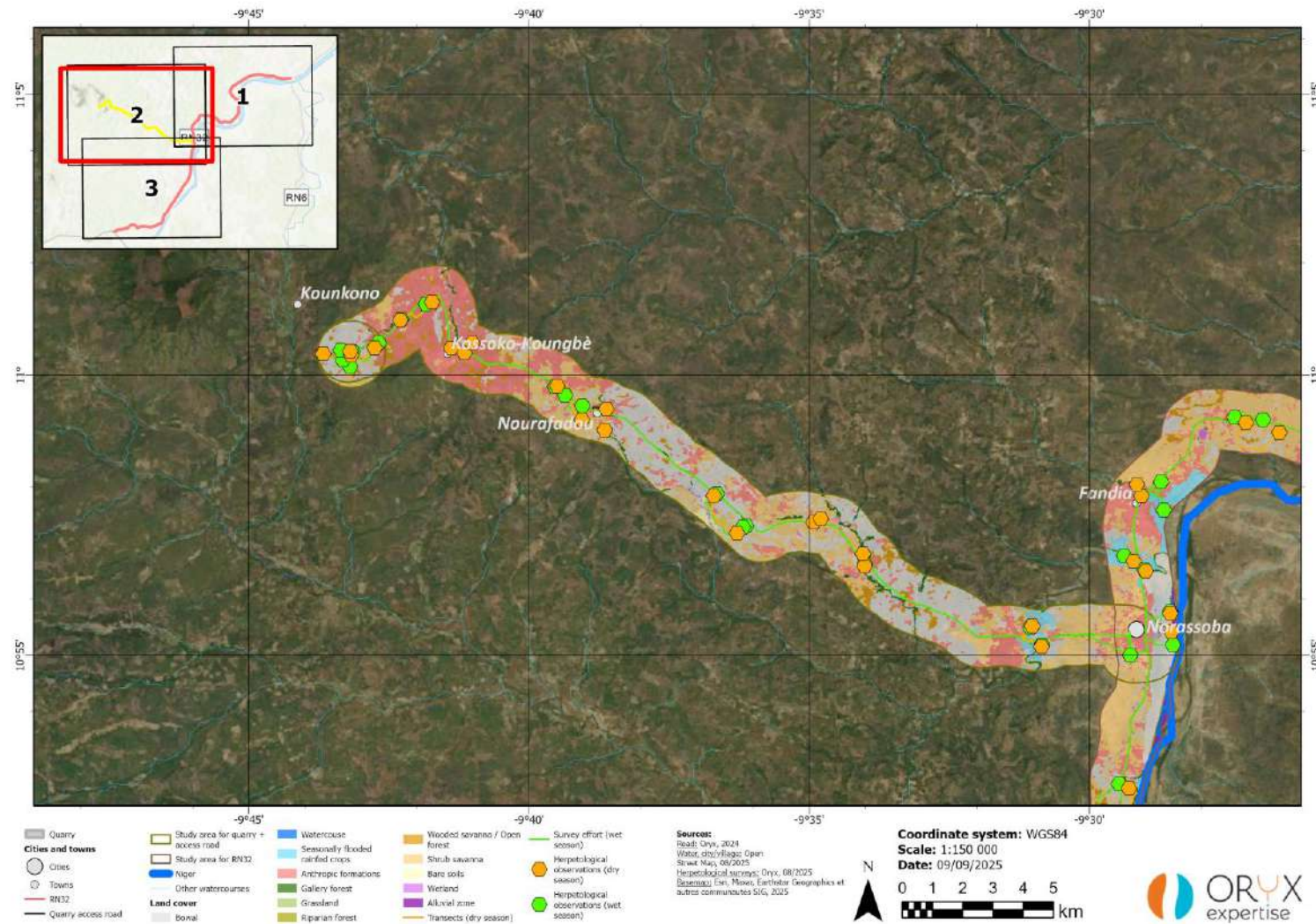
- along the RN 32, 30 sites in the dry season and 27 sites in the wet season;
- from the quarry area to the intersection with the RN 32, 10 sites in the dry season and 9 sites in the rainy season.

The survey sites and locations of the sampling points are shown on Map 41, Map 42, Map 43.

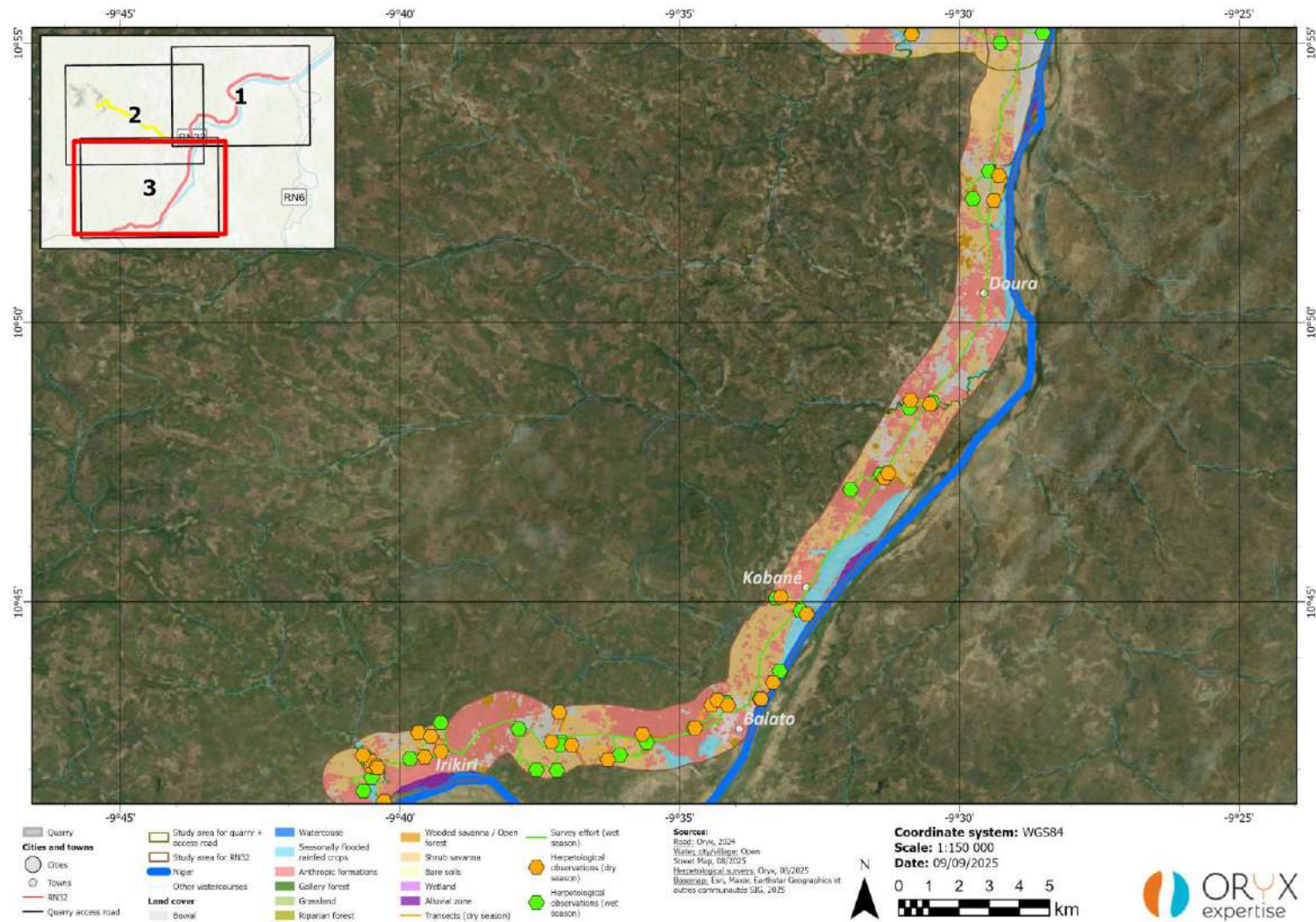




Map 41 : Map of herpetological surveys 1/3



Map 42 : Map of herpetological surveys 2/3



Map 43 : Map of herpetological surveys 3/3

6.2.4.2. Amphibian diversity

For the entire study area, which takes into account the RN 32 and the quarry site, including the quarry itself and the track that joins the RN 32, 2,214 individuals of amphibians consisting solely of anurans were counted. All of these individuals are divided into 8 families, 11 genera and 23 species (Table 52). The most represented family is the Ptychadenidae with 7 species, including : *Hildebrandtia ornata*, *Ptychadena pumilio*, *Ptychadena retropunctata*, *Ptychadena bibroni*, *Ptychadena tellinii*, *Ptychadena tournieri* and *Ptychadena trinodis*. The Dicroglossidae (*Hoplobatrachus occipitalis*) and Microhylidae (*Phrynomantis microps*) are the least represented, with just one species each.

Several individuals observed on the Maimanen River (bridge 1) were attributed to the species *Hylarana fonensis*. The identification, which was uncertain at the end of the dry season due to the small size of the individuals, was confirmed during the rainy season with the observation of individuals of 'normal' size. The small individuals were probably immature.

For the specific surveys of the RN 32, 1,595 amphibian individuals were counted. All of these individuals are divided into 22 species, 7 families and 10 genera. The species *Phrynomantis microps* of the Microhylidae family was not observed on the RN 32.

Table 52. Number of individuals per amphibian species inventoried and IUCN status (LC: Least Concern, DD: Data Deficient)

Family	Scientific name	IUCN	National protection	Rainy season		Dry season	
				Quarry + Track	Road	Quarry + Track	Road
Arthroleptidae	<i>Arthroleptis poecilnotus</i>	LC				8	1
Arthroleptidae	<i>Leptopelis bufonides</i>	LC			36		
Arthroleptidae	<i>Leptopelis viridis</i>	LC		12	105		
Bufonidae	<i>Sclerophrys maculata</i>	LC		8	84	10	21
Bufonidae	<i>Sclerophrys regularis</i>	LC		2	51	10	10
Dicroglossidae	<i>Hoplobatrachus occipitalis</i>	LC		43	23	51	341
Hyperoliidae	<i>Afraxalus vittiger</i>	LC			9		
Hyperoliidae	<i>Hyperolius spatzi</i>	LC		18	23	1	
Hyperoliidae	<i>Kassina fusca</i>	LC		9	9		
Microhylidae	<i>Phrynomantis microps</i>	LC		1			
Phrynobatrachidae	<i>Phrynobatrachus calcaratus</i>	LC				33	15
Phrynobatrachidae	<i>Phrynobatrachus francisci</i>	LC		1	6	102	228
Phrynobatrachidae	<i>Phrynobatrachus latifrons</i>	LC			2	40	139
Phrynobatrachidae	<i>Phrynobatrachus natalensis</i>	LC			1		22
Ptychadenidae	<i>Hildebrandtia ornata</i>	LC			3		
Ptychadenidae	<i>Ptychadena bibroni</i>	LC		15	39	107	70
Ptychadenidae	<i>Ptychadena pumilio</i>	LC		12	2	67	118
Ptychadenidae	<i>Ptychadena retropunctata</i>	LC		21	2	26	3
Ptychadenidae	<i>Ptychadena tellinii</i>	LC				12	27
Ptychadenidae	<i>Ptychadena tournieri</i>	LC			8	64	
Ptychadenidae	<i>Ptychadena trinodis</i>	LC			2	1	
Ranidae	<i>Hylarana cf. fonensis</i>	DD	IP		3		164
Ranidae	<i>Hylarana galamensis</i>	LC		5	52	10	30

For the surveys carried out at the quarry and runway, 626 amphibian individuals were counted. All of these individuals are divided into 18 species belonging to 8 families and 10 genera. The species *Hylarana cf. fonensis*, *Hildebrandtia ornata*, *Leptopelis bufonides*, *Afraxalus vittiger* and *Phrynobatrachus natalensis* were not observed at the quarry or runway.

The species *Sclerophrys maculata*, *Hoplobatrachus occipitalis*, *Ptychadena tellinii*, *P. bibroni*, *P. pumilio* and *P. retropunctata* live in both cleared and anthropised areas (i.e. large clearings, forest tracks and roads) and savannas/bowals. However, *Hyperolius spatzi*, *Phrynobatrachus francisci* and *Hylarana galamensis* prefer savannas and bowls. In addition, individuals of the *Arthroleptis poecilonotus* species complex prefer forest habitats, as does *Hylarana cf. fonensis*.

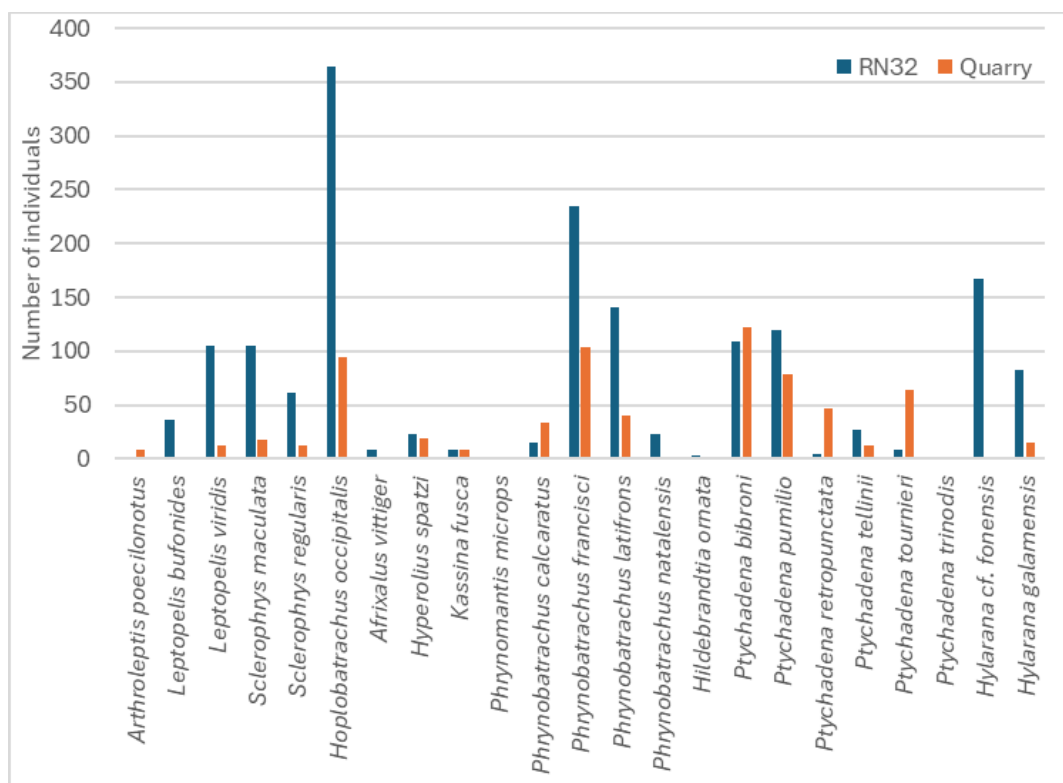


Figure 41: Diversity and abundance of amphibian species inventoried in the study area



Photograph 39 : Some amphibians in the study area (A = *Arthroleptis poecilonotus*, B = *Phrynobatrachus francisci*, C = *Phrynobatrachus latifrons*, D = *Ptychadena bibroni*, E = *Ptychadena tellinii*, F = *Ptychadena tournieri*, G = *Ptychadena retropunctata*, H = *Hoplobatra occipitalis*, I = *Hylarana galamensis*, J = *Hildebrandtia ornata*, K = *Leptopelis bufonides*, L = *Hyperolius spatzi*, M = *Afrixalus vittiger*, N = *Phrynomantis microps*, O = *Kassina fusca*)

6.2.4.3. Reptile diversity

Throughout the study area, 163 reptile individuals were observed. These individuals were divided into 22 species, 11 families and 17 genera (Table 53). The most represented family is the Scincidae, with five species: *Chalcides pulchellus*, *Panaspis togoensis*, *Trachylepis affinis*, *Trachylepis quinquetaeniata* and *Trachylepis perrotetii*. The Chamaeleonidae (*Chamaeleo gracilis*), Pythonidae (*Python sebae*), Psammophiidae (*Rhamphiophis oxyrhynchus*) and Varanidae (*Varanus niloticus*) are represented by a single species each. The diversity and abundance of reptile species inventoried can be seen on Figure 42. Some of the reptiles collected at the various observation sites are illustrated in Table 53.

Table 53. Number of individuals per reptile species inventoried and IUCN status (LC: Least Concern, NT: Near Threatened, NE: Not Evaluated) and national protection status (IP: Fully Protected, PP: Partly Protected)

Family	Scientific name	IUCN	Rainy season	Dry season

			National protection	Quarry + Track	RN 32	Quarry + Track	RN 32
Agamidae	<i>Agama agama</i>	LC		3	3	5	25
Agamidae	<i>Agama weidholzi</i>	LC			2		2
Chamaeleonidae	<i>Chamaeleo gracilis</i>	LC	PP	1			1
Colubridae	<i>Crotaphopeltis hotamboeia</i>	LC					1
Colubridae	<i>Philothamnus semivariegatus</i>	LC		1			
Elapidae	<i>Dendroaspis polylepis</i>	LC					1
Elapidae	<i>Naja katiensis</i>	LC			1		
Elapidae	<i>Naja nigricollis</i>	LC	IP	1			
Elapidae	<i>Naja savannula</i>	LC					2
Gekkonidae	<i>Hemidactylus angulatus</i>	LC		1	1		15
Gekkonidae	<i>Lygodactylus gutturalis</i>	LC					3
Pelomedusidae	<i>Pelomedusa olivacea</i>	NE		4	2		
Psammophiidae	<i>Rhamphiophis oxyrhynchus</i>	LC					1
Pythonidae	<i>Python regius</i>	NT	IP		1		
Scincidae	<i>Chalcides pulchellus</i>	LC	PP		1		
Scincidae	<i>Panaspis togoensis</i>	LC				5	
Scincidae	<i>Trachylepis affinis</i>	LC			10	20	23
Scincidae	<i>Trachylepis perrotetii</i>	LC		2	6		2
Scincidae	<i>Trachylepis quinquetaeniata</i>	LC		3		5	
Varanidae	<i>Varanus niloticus</i>	LC	IP	2	2		3
Viperidae	<i>Bitis arietans</i>	LC	PP				1
Viperidae	<i>Causus maculatus</i>	LC					1

For the specific surveys of the RN 32, 110 reptile individuals were counted. These individuals were divided between 19 species, 11 families and 15 genera. The most represented families (Elapidae and Scincidae) have four and three species respectively. Of the 22 species recorded at all the sites, half (11) were only observed along the RN 32.

For the surveys carried out at the quarry and access track, 53 reptile individuals were counted. All of these individuals were divided into 11 species, 8 families and 9 genera. The Scincidae family is the most represented. Of the 22 reptile species recorded at all the sites, *Philothamnus semivariegatus*, *Naja nigricollis*, *Panaspis togoensis* and *Trachylepis quinquetaeniata* were only observed in the quarry + runway area.

In terms of species habitat, according to the IUCN (2025), *Dendroaspis polylepis*, *Rhamphiophis oxyrhynchus*, *Agama agama*, *Lygodactylus gutturalis*, *Panaspis togoensis*, *Bitis arietans* and *Causus maculatus* are known from areas of forest, savannah, shrubland, grassland and rocky areas. *Agama weidholzi*, *Hemidactylus angulatus* and *Trachylepis perrotetii* are known from the savannah, while *Naja savannula* is known from the forest and wetlands. *Crotaphopeltis hotamboeia*, *Trachylepis affinis* and *Varanus niloticus* are known from savannah and wetlands, and *Trachylepis quinquetaeniata* is known from savannah and rocky habitats. This information corroborates our work, as the species were recorded in the habitats corresponding to their preferences according to the bibliography.

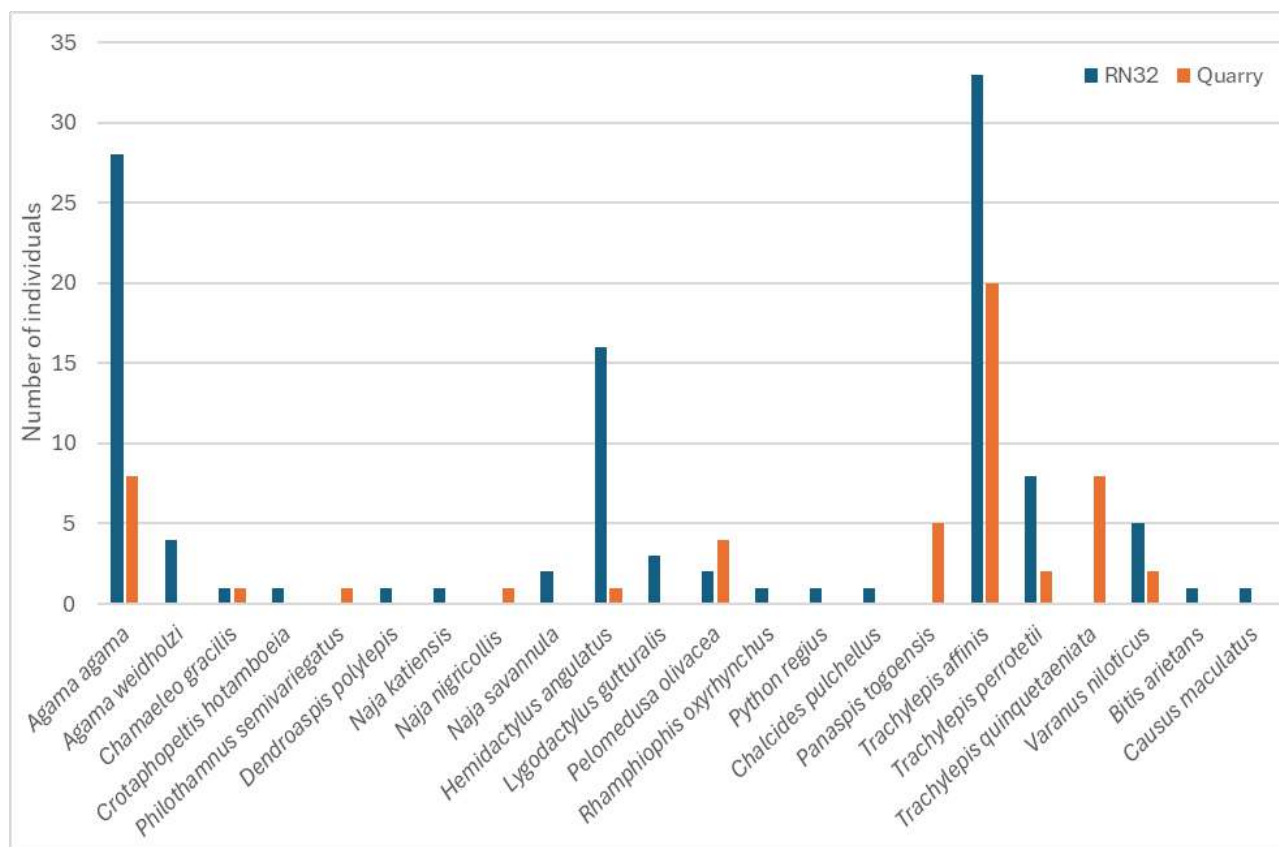


Figure 42 : Diversity and abundance of reptile species inventoried in the study area



Photograph 40. Some reptiles in the study area (A = *Agama weidholzi*, B = *Trachylepis affinis*, C = *Trachylepis quinquetaeniata*, D = *Hemidactylus angulatus*, E = *Lygodactylus gutturalis*, F = *Causus maculatus*, G = *Crotaphopeltis hotamboeia*, H = *Bitis arietans*, I = *Rhamphophis oxyrhynchus* J = *Naja katiensis*, K = *Chalcides pulchellus*, L = *Chamaeleo gracilis*, M = *Python regius*)

6.2.4.4. Species at conservation risk

6.2.4.4.1. Endangered species according to the IUCN

Of the 45 herpetofauna species recorded, 42 are classified as being of Least Concern (LC) according to IUCN criteria (Table 54). One species, *Hylarana cf. fonensis*, lacks the data to assess its status (see section 6.2.4.4.3), one species is near-threatened (*Python regius*) and one is not assessed: the aquatic turtle *Pelomedusa olivacea*. None of these species is threatened according to IUCN criteria.

Table 54: IUCN status of amphibian and reptile species inventoried

IUCN status	CR	EN	VU	NT	LC	DD	NE
Number of amphibian species	0	0	0	0	22	1	0
Number of reptile species	0	0	0	1	20	0	1

6.2.4.4.2. Species protected at national level

Order A/2020/1591/MEEF/CAB/SGG of the MEEF (2020) on the protection of species of wild fauna and flora in the Republic of Guinea stipulates that the reptile species *Chamaeleo gracilis*, *Chalcides pulchellus* and *Bitis arietans* are partially protected (PP) and the Nile monitor (*Varanus niloticus*), *Python regius* and *Naja nigricollis* are fully protected (IP). The destruction, purchase, sale or export of all or part of the individuals of these species, whatever their stage of development, is subject to ministerial authorisation for the former and prohibited for the latter.

6.2.4.4.3. Endemic or restricted-range species

Taking into account information from the IUCN (2025) and Frost et al. (2024), one species endemic to Guinea was identified during this study: *Hylarana cf. fonensis*.


Photograph 41 : Different stages of development of the species *Hylarana cf. fonensis*

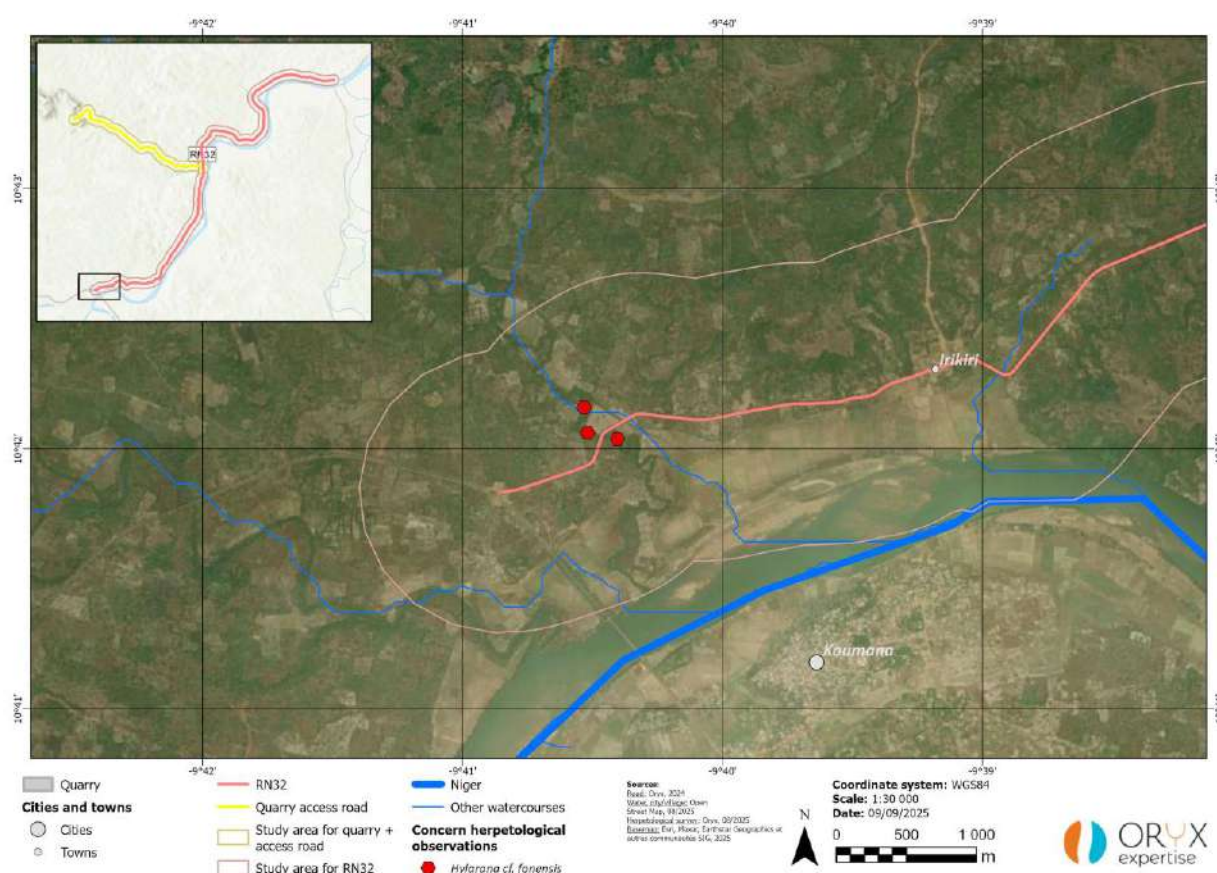
The species (Photograph 41) was discovered by Rödel and Bangoura (2004) during a rapid assessment of biodiversity in the Pic de Fon classified forest in south-east Guinea in 2002. The holotype and one of the paratypes come from gallery forests in the localities of Moribadou and Traoréla in Simandou, Beyla. The other paratypes come from the work of Greenbaum & Carr (2005) in the Haut-Niger National Park (specimens found near the road leading to the park headquarters). The distribution map of the species on the IUCN Website also suggests its presence 20km north of Kouroussa (Tiyeko near Traoréla).

According to the IUCN (2020),

"the species is found near rivers in gallery forests at the type locality. There is no information on the habitat of the Tiyeko site, but it probably lives in the forest habitats of the [Upper Niger] park. At Mount Nimba, it has been found in primary forest along the river (L. Sandberger, pers. comm., June 2012). It is not thought to tolerate habitat degradation and is likely to be a larval species, like other members of the genus.

In the Simandou Range, the remaining habitat is fragmented into small patches, and logging to clear land for agriculture and commercial purposes and bushfires are major threats. The typical locality is highly threatened by open-cast mining".

Map 44 shows the locations where this species was observed, all within a small area along the Maimanen tributary of the Niger River near Bridge 1.

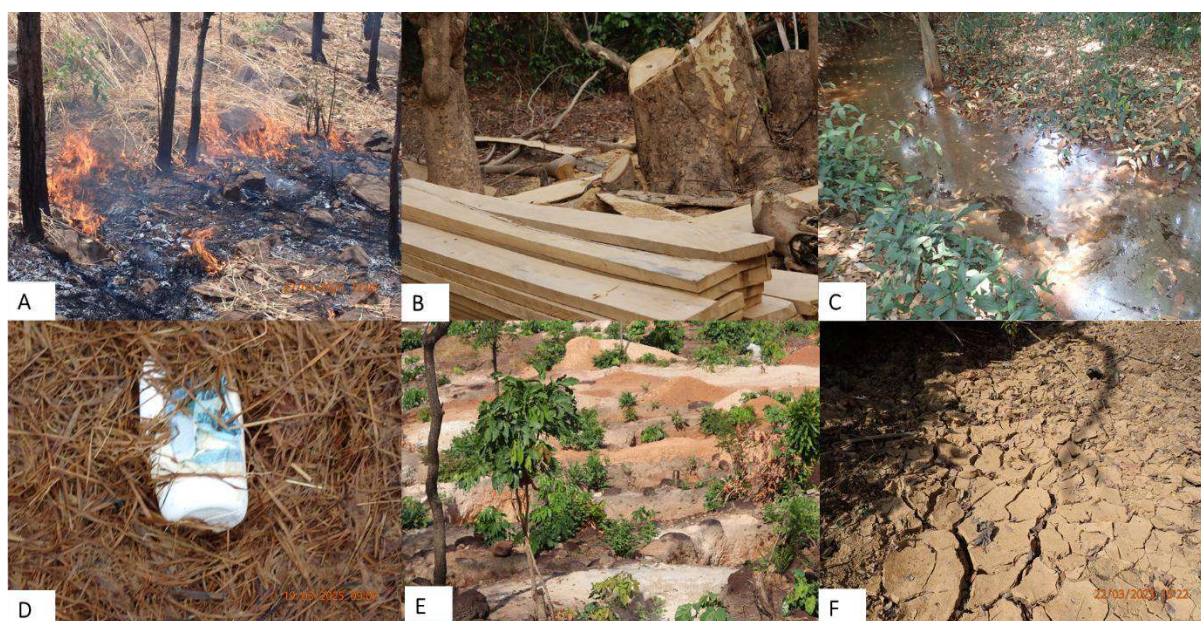


Map 44 : Localisation of observed individuals of *Hyalarana cf. fonesis*, Source ; Oryx, 2025

Taking into account information from the IUCN (2025) and Frost et al. (2024), no species with a restricted range (limited to the forest zone of West Africa, i.e. the territories of Guinea, Sierra Leone, Liberia, Côte d'Ivoire, Ghana, Benin and Togo) were identified in this study.

6.2.4.5. Current threats to the study area

Amphibians and reptiles in the study area are threatened by habitat destruction caused by human activities, the main ones being slash-and-burn agriculture, logging and bush fires, artisanal and industrial gold mining, and environmental pollution from fertilisers, pesticides and heavy metals (Photograph 42).



Photograph 42 : Illustration of threats to herpetofauna: A = bush fires, B = logging, C = motor oil and petrol spills in rivers caused by gold miners, D = use of herbicides, E = gold panning, and F = drying up of watercourses.

6.2.4.6. Discussion

This study identified 23 species of amphibian and 22 species of reptile. In comparison, the work of Doumbia et al (2020 unpublished) recorded 18 species of amphibians in the localities of Kouroussa, and in the Dinguiraye and Siguiri area Doumbia (2022 unpublished) recorded 14 species of amphibians and 8 species of reptiles. In the same localities, Doumbia & Gbê mou (2022 unpublished) counted 13 species of amphibians and 8 species of reptiles. Greenbaum & Carr (2005) report 22 species of amphibians and 34 species of reptiles in the Haut Niger Park. This greater diversity can be attributed to the better conservation of habitats in the National Park area.

None of the amphibians recorded during this assessment are new to science and/or to the study area. Furthermore, of the 16 reptile species counted during recent work, *Agama weidholzi*, *Lygodactylus gutturalis* and *Trachylepis quinquetaeniata* are well known in Guinea but are being assessed for the first time in this study area.

Amphibians and reptiles in the study area are threatened by the destruction of their habitats through human activities, the main ones being slash-and-burn agriculture, logging and bush fires, artisanal and industrial gold mining, environmental pollution by fertilizers, pesticides and heavy metals (Photograph 42)

6.2.5. Ichthyofauna

6.2.5.1. Survey effort

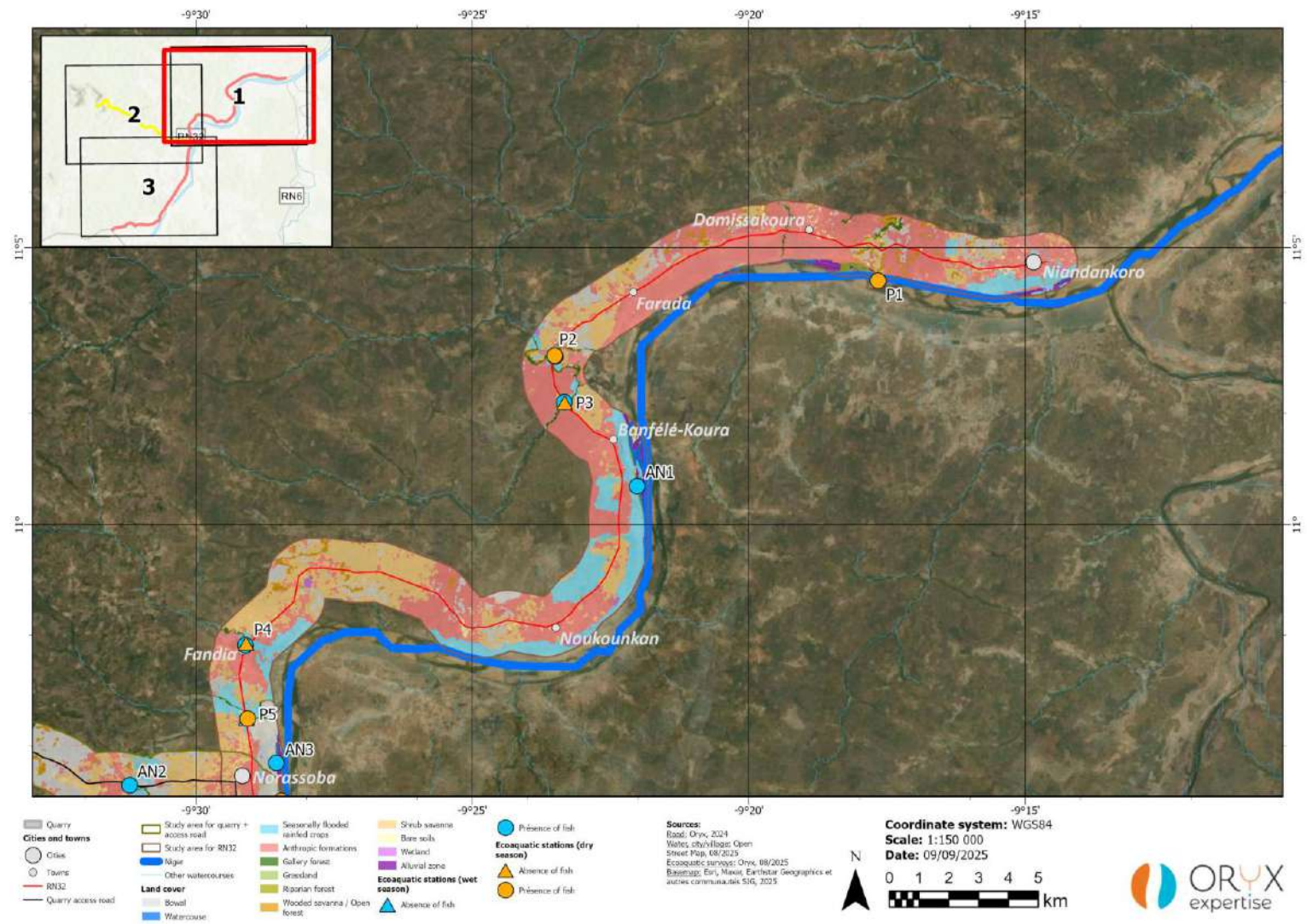
During the dry season survey mission, which took place from 18 to 27 March 2025, 11 sampling sites spread over nine rivers were surveyed in order to establish the initial state of fish diversity in the study area. Along the RN 32, 10 sites selected from nine hydrosystems were visited, three of which are located in the Niger. A single sampling site was investigated at the quarry and its access road.

During the rainy season inventory mission, between 13 and 19 July 2025, 15 sampling sites were surveyed. Most of these sites were located in rivers crossing the RN 32, but there were also 6 stations in the Niger, including 3 artisanal fisheries (at Banfélékoura, Norassoba and Balato) and 2 sampling stations located on the track leading to the Kounkono quarry.

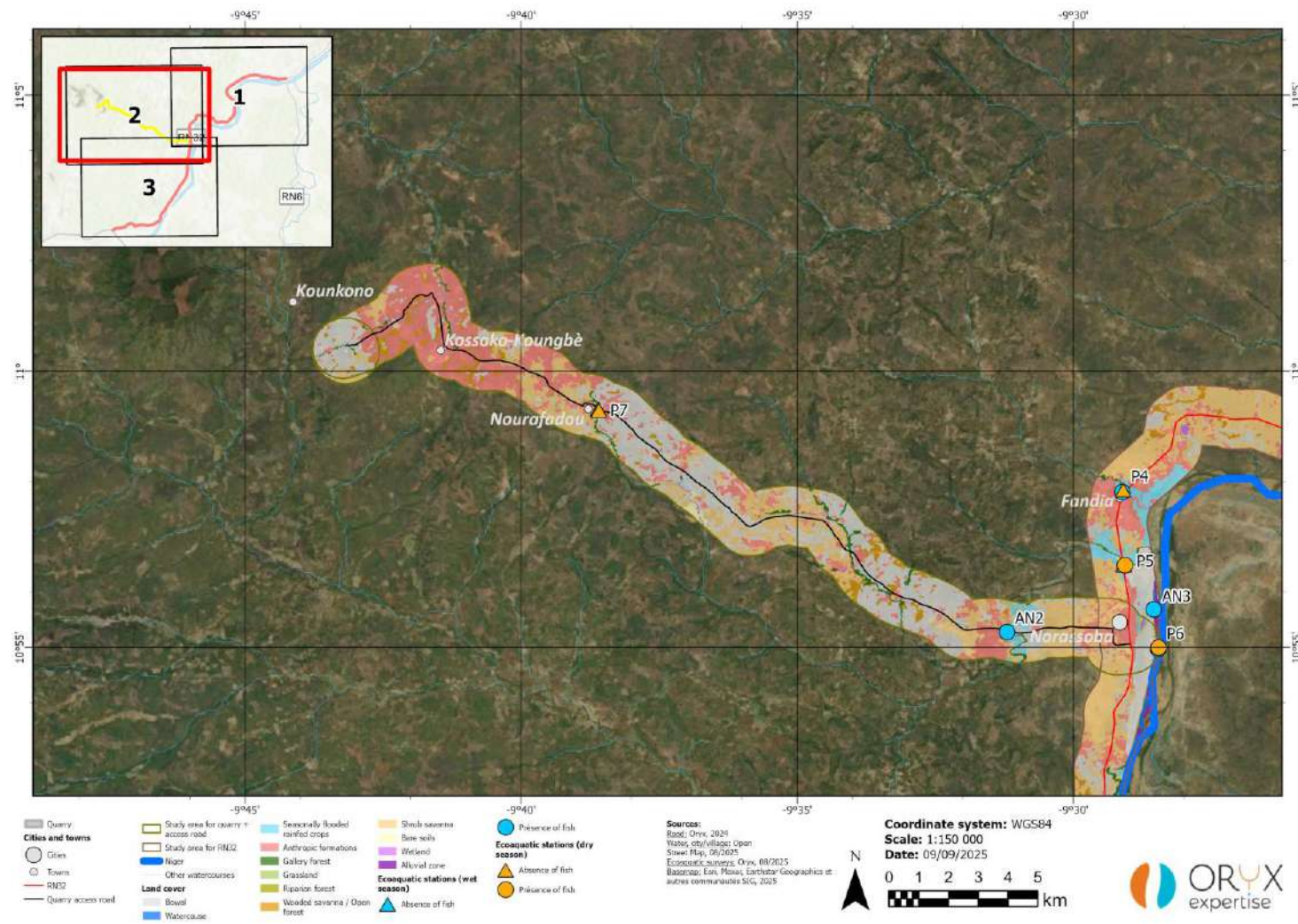
Map 45, Map 46 and Map 47 show the sampling points for both seasons.

The environmental parameters of the stations are presented in Appendices 12 and 13. Appendix 14 presents photographs of the sampling stations and Appendix 15 presents photographs of captured specimens.

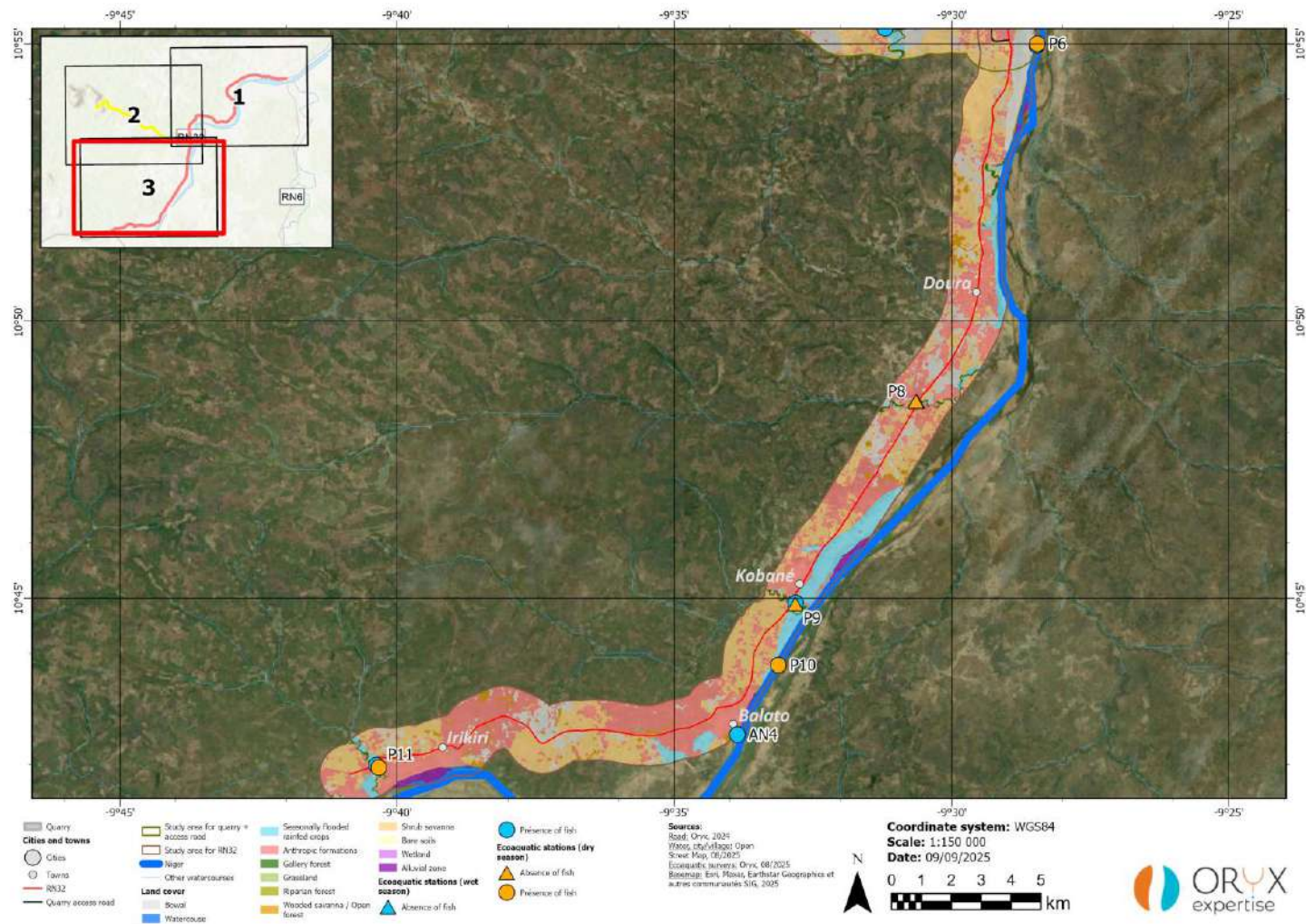




Map 45 : Fish sampling station 1/3



Map 46 : Fish sampling station 2/3



Map 47 : Fish sampling station 3/3

6.2.5.2. Fish diversity and abundance

A total of 48 species were inventoried, belonging to 8 orders, 16 families and 31 genera. By far the most diverse order was Siluriformes with 19 species, followed by Characiformes with 9 species (Figure 43). In terms of frequency of occurrence of catches, the most represented orders are the Cypriniformes (35% of catches, linked to significant catches during the rainy season), the Siluriformes (almost 30% of catches), the Cichliformes (15.5% of catches) and the Characiformes (12.7% of catches).

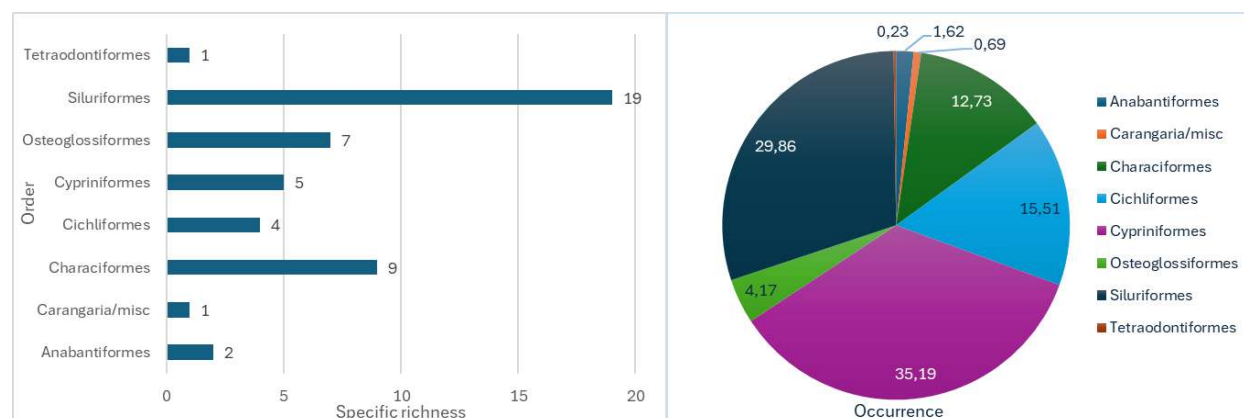


Figure 43: Relative importance of fish orders according to species richness (left) and frequency of occurrence in catches (right). The two seasons are combined.

In the dry season, fish were present at only 6 of the 11 stations surveyed (Map 45). One station was dry and others are rivers with intermittent flow in the dry season. In particular, in the quarry area and on the access road, no fish specimens were sampled. During the rainy season, fish were present at only 11 of the 13 stations surveyed (Map 45).

In terms of abundance, 432 fish specimens were sampled during the study. In the dry season, the highest abundances were recorded at sites P6, P10 and P1, all located in the Niger, with proportions of 33.33%, 33.33% and 20.31% respectively of the total abundance of catches in this season. In the rainy season, the highest abundances were also caught in the River Niger, at stations AN3 and AN4 (close to stations P6 and P10 in the dry season), but also at station P9, on a tributary of the Niger at Kobané, which combined 51% of all the catches made in the rainy season, and linked to the capture of a large number of *Enteromius pobeguini* individuals (Table 55).

Of all the species caught, *Enteromius pobeguini* was the most abundant at 28.24%. Next came *Sarotherodon galilaeus multifasciatus* (7.87%), *Auchenoglanis occidentalis* (6.94%), *Coptodon zillii* (6.71%) and *Brachyalestes nurse* (6.25%). Photographic illustrations of the species inventoried are in Appendix 15.

In the quarry area and on the access road, no fish specimens were sampled in the dry season. During the rainy season, all the data analysed came from catches by professional fishermen on the Pombili river (station AN3). A total of eight species of fish were inventoried. The most abundant species were *Auchenoglanis occidentalis* (34.48%) and *Schilbe mystus* (20.69%). *Labeo senegalensis* and *Chrysichthys nigrodigitatus* appear with a proportion of 13.79% each. The other four species are represented at abundances of between 3.45 and 6.90%.

Table 55. List of fish species inventoried, number of specimens, relative abundance and protection status (LC: minor concern)

					Wet season											Dry Season								
Order	Family	Scientific name	IUCN	Migrat	AN1	AN2	AN3	AN4	P1	P2	P4	P6	P9	P10	P11	Total	P1	P2	P5	P6	P10	P11	Total	
Anabantiformes	Anabantidae	<i>Ctenopoma kingsleyae</i>	LC		1				3				1				5							
Anabantiformes	Anabantidae	<i>Ctenopoma petherici</i>	LC	Potamodrome															2				2	
Carangaria/misc	Latidae	<i>Lates niloticus</i>	LC	Potamodrome																	3		3	
Characiformes	Alestidae	<i>Alestes baremoze</i>	LC	Potamodrome				1								1								
Characiformes	Alestidae	<i>Alestes dentex</i>	LC	Potamodrome								4				4								
Characiformes	Alestidae	<i>Brachyalestes nurse</i>	LC	Potamodrome						11					2	13			3		11		14	
Characiformes	Alestidae	<i>Brycinus macrolepidotus</i>	LC	Potamodrome								1				1					3		3	
Characiformes	Alestidae	<i>Hydrocynus brevis</i>	LC	Potamodrome																2			2	
Characiformes	Alestidae	<i>Micralestes elongatus</i>	LC	Potamodrome															2		2		4	
Characiformes	Citharinidae	<i>Citharinus citharus</i>	LC	Anadromous																3	6		9	
Characiformes	Distichodontidae	<i>Distichodus rostratus</i>	LC	Potamodrome													3						3	
Characiformes	Distichodontidae	<i>Neolebias unifasciatus</i>	LC												1	1								
Cichliformes	Cichlidae	<i>Coptodon dageti</i>	LC	Potamodrome						1						1								
Cichliformes	Cichlidae	<i>Coptodon zillii</i>	LC	Potamodrome	1										2	3		3		15	3	5	26	
Cichliformes	Cichlidae	<i>Sarotherodon galilaeus</i>	LC	Potamodrome	1											1								
Cichliformes	Cichlidae	<i>Sarotherodon galilaeus multifasciatus</i>	LC	Potamodrome	1											1	6			26	2		34	
Cypriniformes	Cyprinidae	<i>Enteromius pobeguini</i>	LC	Potamodrome									122			122								
Cypriniformes	Cyprinidae	<i>Labeo coubie</i>	LC	Potamodrome													5						5	
Cypriniformes	Cyprinidae	<i>Labeo roseopunctatus</i>	LC							1		3				4				1	7		8	
Cypriniformes	Cyprinidae	<i>Labeo senegalensis</i>	LC	Potamodrome			4									4	2						2	
Cypriniformes	Cyprinidae	<i>Labeobarbus wurtzi</i>	LC																2		5		7	
Osteoglossiformes	Mormyridae	<i>Hyperopisus bebe</i>	LC	Potamodrome	1											1								
Osteoglossiformes	Mormyridae	<i>Marcusenius mento</i>	LC							1						1								
Osteoglossiformes	Mormyridae	<i>Marcusenius senegalensis</i>	LC	Potamodrome													1		4				5	
Osteoglossiformes	Mormyridae	<i>Mormyrops anguilloides</i>	LC	Potamodrome								2				2								
Osteoglossiformes	Mormyridae	<i>Mormyrus hasselquistii</i>	LC	Potamodrome						1					2	3					2		2	
Osteoglossiformes	Mormyridae	<i>Mormyrus rume</i>	LC	Potamodrome	1											1	1			1			2	
Osteoglossiformes	Mormyridae	<i>Petrocephalus bovei</i>	LC	Potamodrome														1					1	
Siluriformes	Auchenoglanididae	<i>Auchenoglanis occidentalis</i>	LC	Potamodrome	1		10	7								18	3			5	4		12	
Siluriformes	Bagridae	<i>Bagrus bajad</i>	LC	Potamodrome													1						1	
Siluriformes	Bagridae	<i>Bagrus docmak</i>	LC		1											1				3	1		4	
Siluriformes	Clariidae	<i>Clarias anguillaris</i>	LC	Potamodrome					3							3								
Siluriformes	Clariidae	<i>Clarias gariepinus</i>	LC	Potamodrome	1			1			1		1		2	6	2		1	1			4	
Siluriformes	Claroteidae	<i>Chrysichthys auratus</i>	LC	Potamodrome			1	4				4				9	6			1	3		10	
Siluriformes	Claroteidae	<i>Chrysichthys nigrodigitatus</i>	LC	Potamodrome			4									4					3		3	

Wet season																	Dry Season						
Order	Family	Scientific name	IUCN	Migrat	AN1	AN2	AN3	AN4	P1	P2	P4	P6	P9	P10	P11	Total	P1	P2	P5	P6	P10	P11	Total
Siluriformes	Claroteidae	<i>Clarotes laticeps</i>	LC	Anadromous			1									1				3			3
Siluriformes	Malapteruridae	<i>Malapterurus electricus</i>	LC	Potamodrome			1									1	1						1
Siluriformes	Mochokidae	<i>Synodontis eupterus</i>	LC														5				2		7
Siluriformes	Mochokidae	<i>Synodontis filamentosus</i>	LC					2				1				3	3						3
Siluriformes	Mochokidae	<i>Synodontis gobroni</i>	LC																		2		2
Siluriformes	Mochokidae	<i>Synodontis membranaceus</i>	LC	Potamodrome																1			1
Siluriformes	Mochokidae	<i>Synodontis schall</i>	LC	Potamodrome			2	1								3				2	1		3
Siluriformes	Mochokidae	<i>Synodontis sorex</i>	LC																		1		1
Siluriformes	Mochokidae	<i>Synodontis violaceus</i>	LC		1											1					2		2
Siluriformes	Schilbeidae	<i>Schilbe intermedius</i>	LC	Potamodrome	1							3				4							
Siluriformes	Schilbeidae	<i>Schilbe mystus</i>	LC	Potamodrome			6	11								17							
Siluriformes	Schilbeidae	<i>Siluranodon auritus</i>	LC	Potamodrome											1	1							
Tetraodontiformes	Tetraodontidae	<i>Tetraodon lineatus</i>	LC																		1		1
Specific richness by station					12	2	9	8	2	7	2	8	3	6	3	34	14	3	7	14	21	2	35
			Abundance (%)		4,1	0,4	12	11	1,2	7,5	0,4	7,5	51	3,3	1,2		21	2,1	7,4	34	34	2,6	

6.2.5.3. Priority species for conservation

6.2.5.3.1. Threatened species according to IUCN criteria

According to IUCN criteria, of the 48 fish species identified in this study, none are considered to be of conservation priority (Table 56). They are all classified in the "Least Concern" (LC) category by the IUCN (2025). Despite the absence of priority species for conservation, the study area is part of the upper reaches of the River Niger, which is one of the areas particularly rich in freshwater fish species (Mallon et al., 2015). Consequently, it is of importance for the conservation of freshwater fish species.

Table 56. IUCN status of fish species inventoried in the study area

IUCN status	CR	EN	VU	NT	LC	DD	NE
Number of species	0	0	0	0	48	0	0

6.2.5.3.2. Species protected at national level

None of the 48 species of fish inventoried are listed in ministerial decree A/2020/1591/MEEF/CAB/SGG on the protection of species of wild fauna and flora in the Republic of Guinea.

6.2.5.3.3. Endemic or restricted-range species

Of all the species identified, only *Synodontis gobroni* is endemic to the River Niger basin. However, it is not endemic to the study area (Froese & Pauly, 2025, IUCN, 2025). None of the species has a restricted range.

6.2.5.3.4. Gregarious or migratory species

Specific data on the gregarious behaviour of the species identified in this study are not available. However, in general, fish in the Alestidae, Cyprinidae and Cichlidae families are gregarious.

In terms of migration, 34 species caught (71%) are potamodromous and 2 species (4%) are anadromous (*Citharus citharus* and *Clarotes laticeps*) (Table 57). The type of migration of the other species is not known.

6.2.5.3.5. Intrinsic vulnerability of fish species

Analysis of the intrinsic vulnerability of the fish fauna has enabled us to divide the fish into four groups (Table 57) :

- 54% of species (26) have low vulnerability (10 to 30%) ;
- 29% of species (14) are moderately vulnerable (31-50%);
- 11% of species (5) have high vulnerability (52 to 59%)
- 6% of species (3) have very high vulnerability (73% to 89%).

Table 57. Level of vulnerability and migratory patterns of the fish species inventoried

Species	Vulnerability		Migratory mode
	%	Categories	
<i>Alestes baremoze</i>	25	Low	Potamodrome
<i>Alestes dentex</i>	27	Low	Potamodrome
<i>Auchenoglanis occidentalis</i>	38	Moderate	Potamodrome
<i>Bagrus bajad</i>	52	High	Potamodrome

Species	Vulnerability		Migratory mode
	%	Categories	
<i>Bagrus docmak</i>	57	High	NA
<i>Brachyalestes nurse</i>	29	Low	Potamodrome
<i>Brycinus macrolepidotus</i>	31	Moderate	Potamodrome
<i>Chrysichthys auratus</i>	27	Low	Potamodrom
<i>Chrysichthys nigrodigitatus</i>	32	Moderate	Potamodrome
<i>Citharinus citharus</i>	30	Low	Anadromous
<i>Clarias anguillaris</i>	60	High	Potamodrome
<i>Clarias gariepinus</i>	76	Very high	Potamodrome
<i>Clarotes laticeps</i>	59	High	Anadromous
<i>Coptodon dageti</i>	30	Low	Potamodrome
<i>Coptodon zillii</i>	27	Low	Potamodrom
<i>Ctenopoma kingsleyae</i>	12	Low	NA
<i>Ctenopoma petherici</i>	10	Low	Potamodrome
<i>Distichodus rostratus</i>	50	Moderate	Potamodrom
<i>Enteromius pobeguini</i>	10	Low	Potamodrom
<i>Hyperopisus bebe</i>	45	Moderate	Potamodrome
<i>Hydrocynus brevis</i>	54	High	Potamodrome
<i>Labeo coubie</i>	39	Moderate	Potamodrome
<i>Labeo roseopunctatus</i>	15	Low	NA
<i>Labeo senegalensis</i>	45	Moderate	Potamodrome
<i>Labeobarbus wurtzi</i>	20	Low	NA
<i>Lates niloticus</i>	47	Moderate	Potamodrome
<i>Malapterurus electricus</i>	89	Very high	Potamodrome
<i>Marcusenius mento</i>	26	Low	NA
<i>Marcusenius senegalensis</i>	29	Low	Potamodrome
<i>Micralestes elongatus</i>	10	Low	Potamodrom
<i>Mormyrops anguilloides</i>	47	Moderate	Potamodrom
<i>Mormyrus hasselquistii</i>	44	Moderate	Potamodrome
<i>Mormyrus rume</i>	73	Very high	Potamodrome
<i>Neolebias unifasciatus</i>	10	Low	NA
<i>Petrocephalus bovei</i>	13	Low	Potamodrome
<i>Rubricatochromis bimaculatus</i>	10	Low	Potamodromus
<i>Sarotherodon galilaeus multifasciatus</i>	26	Low	Potamodrom
<i>Schilbe intermedius</i>	29	Low	Potamodrome
<i>Schilbe mystus</i>	40	Moderate	Potamodrome
<i>Siluranodon auritus</i>	10	Low	Potamodrome
<i>Synodontis eupterus</i>	27	Low	NA
<i>Synodontis filamentosus</i>	22	Low	NA
<i>Synodontis gobroni</i>	43	Moderate	NA
<i>Synodontis membranaceus</i>	27	Low	Potamodrome
<i>Synodontis schall</i>	20	Low	Potamodrome
<i>Synodontis sorex</i>	34	Moderate	NA
<i>Synodontis violaceus</i>	27	Low	NA

Species	Vulnerability		Migratory mode
	%	Categories	
<i>Tetraodon lineatus</i>	38	Moderate	NA

6.2.5.4. Discussion

This study was carried out in a small part of the River Niger basin in the prefectures of Kouroussa and Siguiri in the Republic of Guinea. The data collected at the various sampling sites in the project area provided an overview of the diversity of the fish fauna, some physico-chemical characteristics and the occupation of the banks. The survey identified 48 species of fish, divided into 31 genera, 16 families and 8 orders. Given the small size of the study area and the low number of stations where fish were present, the fish fauna can be described as rich and diverse. This high diversity is attributable to the fact that the river basin to which the study area belongs is the largest in West Africa (Mahé et al., 2011) and is home to a highly diverse fish fauna (295 species) (Froese and Pauly, 2025).

This study shows a higher species richness than another study carried out in the Kouroussa region in 2021, which revealed 28 species. However, this richness is lower than that (63) observed by Crespi (1998) in the Haut Niger Park, the upstream part of the present study area. This large difference is due to the fact that the park is a protected area and therefore the quality of the habitat is better. In addition, a larger area was covered by the previous work than by the present study.

A seasonal variation in the specific composition of ichthyofauna was observed. The populations of tropical rivers vary according to seasonal environmental changes, in particular temperature, rainfall and water levels (Lévêque et al. 1988; Paugy et al., 1994; Lévêque & Paugy, 2006). These variations are linked to the migration and reproduction rhythms of the species.

6.2.5.4.1. Reliability and limitations of the study

The data collected at the various sampling sites in the project area provided an overview of the diversity of fish fauna, some physical and chemical characteristics, and riparian occupation. During this study, conventional fish sampling methods (gillnets, traps, landing nets and fisheries analysis) were used during both climatic seasons to take seasonality into account.

Sampling during the dry season took place a little late in the season, when many tributaries were dry, thus limiting the number of inventory stations. The results for this season are therefore potentially underestimated in terms of species richness and abundance, which are not compensated for by sampling during the rainy season, particularly for migratory species.

6.2.5.4.2. Current threats to the study area

This study has identified the main threats to the study area's fish fauna and habitats as a result of human activities. These are

- the destruction of riparian forests due to agricultural activities. This increases the turbidity of the watercourses;
- degradation of water quality due to gold panning, erosion and run-off from farmland, bathing and washing;
- the transformation of the lotic environment into a lentic environment due to the damming of watercourses for gold panning activities;
- the disappearance of rheophilous species due to the transformation of certain lotic environments into lentic environments.

6.2.6. Summary

6.2.6.1. Importance of the study area for fauna and flora

Field inventories conducted on the study area of the RN32, the quarry and the access road highlighted the presence of:

- 189 species of plants,
- 178 species of birds,
- 23 species of large and medium mammals,
- 23 species of amphibians,
- 22 species of reptiles,
- 48 species of fish.

The animal and plant species observed mainly correspond to an impoverished procession of species representative of the Guinean savannah in a landscape altered by human activities.

The state of habitat degradation is moderate to advanced, linked to the variety and omnipresence of anthropogenic activities along the national road. These activities impact habitats, which are mostly qualified as « modified » in the study area, their functionality and the associated fauna and flora. The most impactful activities identified in the area are slash-and-burn agriculture associated with pesticides use, wood cutting, gold panning, hunting.

4 species with conservation concern were identified in the study area:

- Hooded Vulture (*Necrosyrtes monachus*) – CR
- White-backed Vulture (*Gyps africanus*) – CR
- Bateleur (*Terathopius ecaudatus*) – EN
- *Pterocarpus erinaceus* – EN

A frog species which identification remains doubtful until further genetic investigation is present in the Maimanen river near PK0 of the Project. These individuals have been temporarily attributed the *Hylarana fonensis*, a DD species. A tree species nationally protected is also present in the area: *Anthocleista nobilis*.

Cross-methods of field and population surveys revealed the absence of chimpanzee groups living around the study area, despite the presence of some favorable habitat areas. The study area was once home to chimpanzee groups, but human densities and their activities are the reason for their absence in recent years or decades, depending on the location.

No endemic species were identified during the inventories.

6.2.6.2. Reliability and limitations of the study

Linear projects such as roads or power lines are characterized by the difficulty of sampling their entire territory. To overcome this difficulty, the inventories for the baseline study of the physical and biological environment focused on the most representative environments.

Conducting surveys during the dry and rainy seasons allowed to obtain results that took seasonality into account, covering the activity periods of species that are inactive for part of the year or only present seasonally, such as migratory birds and annual plants. The time dedicated to the field studies allowed us to survey all the habitats present in the project area, resulting in representative results.

communes (decentralisation), plus the thirteen urban communes of the city of Conakry. The communes are headed by elected mayors. The mayor runs the commune with the support of a communal council, which is organised differently in urban and rural areas.

In urban areas (capital of the prefecture or Conakry), these are known as Communes urbaines (CU - at least 5,000 inhabitants). These are divided into neighbourhoods (presided over by neighbourhood chiefs, an executive office and a council of elders representing customary power).

In rural areas, the Communes rurales (CR) are divided into districts (several villages) and represented by the locally elected district president.

Also, insofar as the CR and the sub-prefecture have the same administrative boundaries, their authorities work in close collaboration, with the sub-prefect exercising supervisory power over the CRs.

Finally, the districts are subdivided into sectors, and in the village localities, the various power bodies and organisations are represented mainly by the council of elders and the notables (elders of the founding lineages of the village).

6.3.1.2. Overall administrative, geographical and demographic situation of the study area

The project area, following the route of the current RN 32, is located in the governorate of Kankan: it crosses the prefecture of Kouroussa in the sub-prefectures of Koumana, Balato and Doura, and the prefecture of Siguiri in the sub-prefectures of Norassoba, Nounkounkan and Niandankoro.

According to the Annuaire statistique 2022 published by the Institut national de la statistique de Guinée (INS, 2023), Guinea had a total population of 13.2 million, with 48.6% men and 51.4% women in 2022. The average size of a Guinean household was 7.1 people.

With a total population of 2.47 million, the Kankan region is the most populous in Guinea, with a proportion of men of 49.9%, slightly higher than the national level. Around 78.6% of the region's population lives in rural areas, which is higher than the national average (63.5%).

The Table 58 below provides an estimate of the population of the towns located in the project's indirect zone of influence. The prefecture of Siguiri accounts for 79% of the population in the zone of influence. The towns of Norassoba, Niandankoro and Doura have relatively high populations compared with the others. The breakdown of the population by sex in these towns and villages is rarely available, as the demographic data is mainly derived from interviews with key informants (Prefectural Director of Planning, sector chief, district president, town hall, neighbourhood chief, health post chief, etc.), or from Local Development Plans (LDPs). Some local demographic data may therefore be less reliable than others.

The map below shows the location of the study area and the administrative boundaries of the project.



Map 49 : Administrative division of the study area, Source: Insuco, 2025

From a geographical and agro-ecological point of view, the study area lies at the heart of the agricultural plain of the Niger basin, made up of a succession of alluvial plains used mainly for rainfed rice, fonio and manioc, for market gardening in the form of fenced perimeters that are sometimes irrigated in the rainy season, and for livestock rearing in the dry season. This corridor of alluvial plains bordering the two banks of the Niger is, in the case of the left bank where the study area is located, bordered to the north-east by a progressive relief made up of hillsides where rain-fed agriculture is also practised, and topped by bowé (geological formations, often cleared by erosion, characterised by their flat surface and nutrient-poor soil).



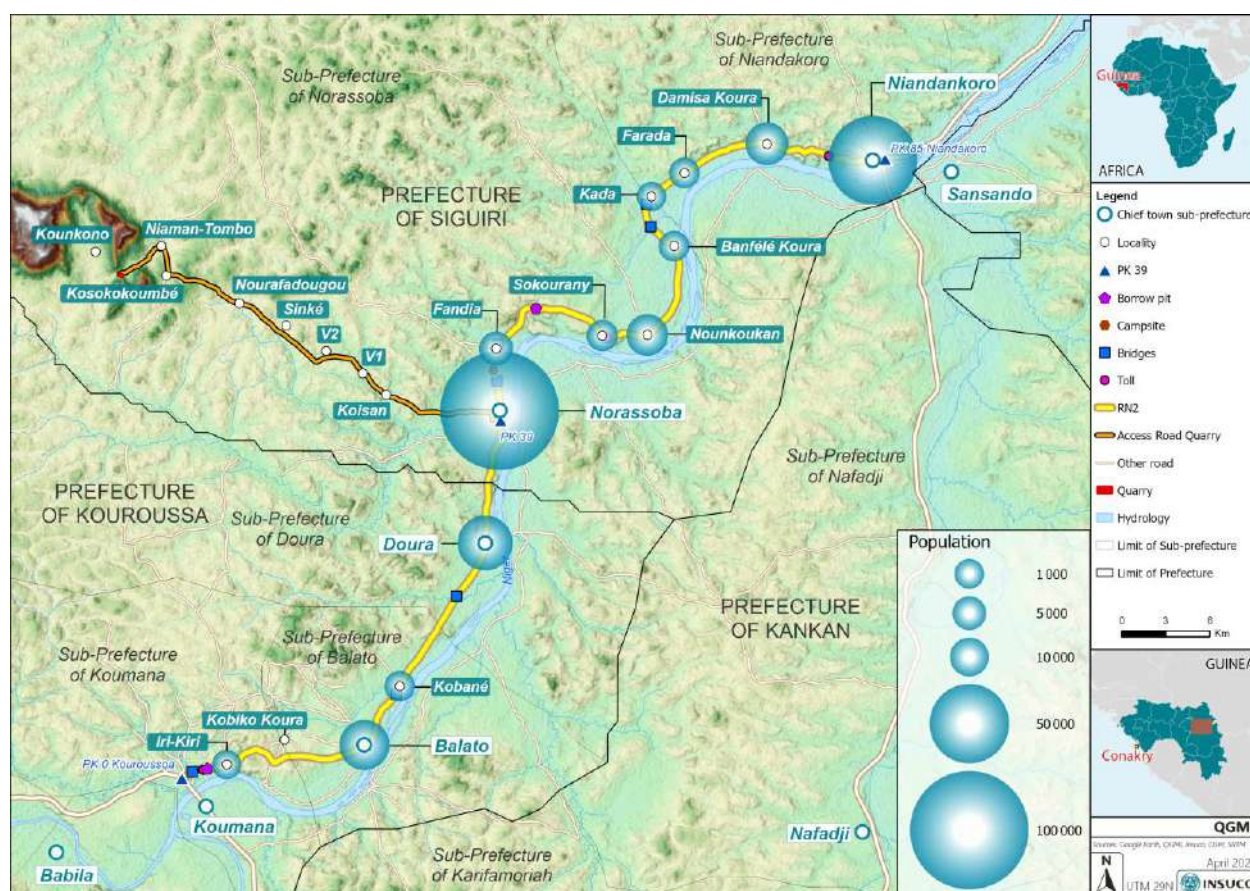
Photograph 43 : View of the alluvial plain of the Niger basin from a hillside between Kobany and Doura, Source: Insuco, April 2025

Prefecture	Sub-prefecture	District	Sector/locality located in the area of indirect influence of the Project	Population located within the project's zone of indirect influence (number of inhabitants)		
Kouroussa	Koumana	Koumana 1	Iri-Kiri	800		
	Balato	Balato	Balato	21 000		
		Kobané	Kobikokoura	NA		
		Kobané	Kobané	2 000		
	Doura	Doura 1	Doura 1	25 850		
		Doura 2	Doura 2			
Doura 3		Doura 3				
Siguiri	Norassoba	Nankoroma 1	Nankoroma 1	88 500		
		Nankoroma 2	Nankoroma 2			
		Nanatraore 1	Nanatraoré 1			
		Nanatraore 2	Nanatraoré 2			
		Fandia 1	Fandia 1	5 000		
		Fandia 2	Fandia 2			
	Track to the Kounkono quarry (in the Norassoba sub-prefecture)	Koisan (Koyaisan)	Koisan (Koyaisan)	NA		
		Fadou	Fadou			
		Kosokokoumbé	Kosokokoumbé			
		Niaman-Tombo	Niaman-Tombo			
		Kounkoro	Kounkono	12 839 ⁹		
		Nounkoukan	Nounkoukan 1		Nounkoukan 1	
			Nounkoukan 2		Nounkoukan 2	
			Nounkoukan 3		Nounkoukan 3	
			Banfélé Koura 1		Banfélé Koura 1	2 000
			Banfélé Koura 2		Banfélé Koura 2	
		Sokoura	Sokoura		2 800	
		Niandankoro	Kada	Kada	800	
			Farada	Farada	2 000	
			Damisa Koura	Damisa Koura	14 000	
Niandankoro 1	Niandankoro 1		59 230			
Niandankoro 2	Niandankoro 2					
Total			28	236 819		

⁹ Data from the Nounkoukan local development plan, based on the 2014 census. No updated data was available.

Table 58 : Localities within the project's zone of indirect influence, Source: Insuco, 2025





Map 50: Demographic distribution of the project's indirect zone of influence, Source: Insuco, 2025

6.3.2. Socio-economic profile of the study area population

It should be remembered at the outset that the household surveys carried out as part of this study provide a general picture of the situation of households in the study area and are not intended to provide an exhaustive and complete picture. These data are therefore combined with data from consultations, bibliography and expert opinion.

The analysis of the socio-economic profile of the populations in the study area (ZI) is based mainly on socio-economic surveys and consultations with resource people in the study localities.

The socio-economic survey covered a total of 128 households divided between urban, peri-urban and rural areas, as detailed in section 2.2, the socio-economic surveys were carried out in 128 households. In order to optimise the logistics of the survey and the mobilisation of the local authorities (see Table 7), which shows the stakeholders in the localities concerned by each of the quantitative and qualitative data collection tools, it was decided to target 4 localities and to carry out around 30 surveys in each. Each of the 4 localities was chosen so that these socio-economic household surveys would be spread out along the project's zone of indirect influence and within localities with varied demographics. The households to be surveyed in the target localities were selected at random in order to achieve a diversity of socio-economic profiles.

Table 7 details the distribution of household surveys within each selected locality

The consultations were carried out in all the sub-prefectures as well as in smaller localities (see Table XX, Chapter 12).

6.3.2.1. Population and demographics

In total, the 128 surveys collected data on 993 individuals (128 heads of household and 865 household members).

The demographics of the localities included in the project's zone of indirect influence are detailed in Table 58 and located in Map 50 just above.

6.3.2.2. Household characteristics in the study area

The households surveyed have an average of 7.8 members (minimum of 1 member and maximum of 24 members). Including the head of household (HH), half of the households surveyed (49%) have between 5 and 8 members, 78% of households have between 3 and 8 members, a third have at least 9 members and only a quarter have between 1 and 7 members. Only two households have a single member. Figure 44 illustrates household size in other ranges.

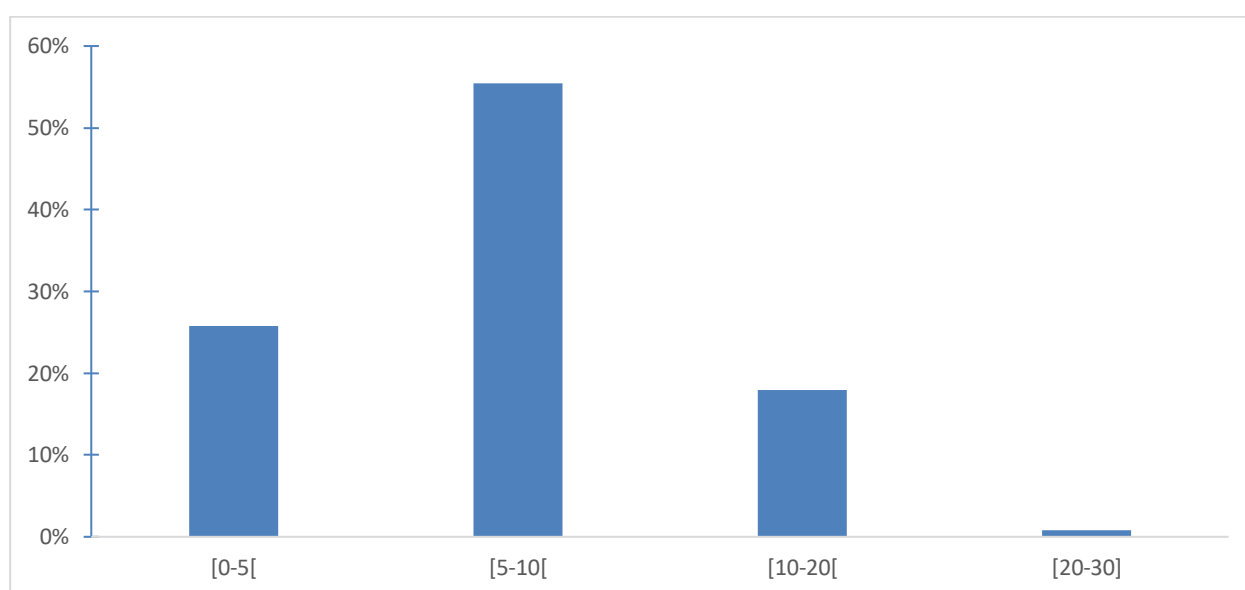


Figure 44 : Distribution of households by number of members (n=128), Source: Insuco, 2025

The children of the HH and his wife(s) represent 60% of household members, husbands and wives 22%, heads of household 13%, and other family members (father, mother, aunt, nephew, grandchildren, etc.) only 2% of household members. Children entrusted to the household by relatives account for 4% of household members. This is a common practice, and one of the reasons for it is to give these children easier access to schools close to the host household's home, and also to lighten the household's financial burden by entrusting one of its members to a better-off household.

Of the 128 HH surveyed, only 9 are women (7% of HH), 7 of whom are widows (only one male HH is a widow, providing evidence of the preferential transmission of power within households to sons when the father dies). 21% of couples are monogamous, 65% are polygamous and 13% of HH are single, divorced or widowed.

The average age of the HH surveyed was 51, with the youngest being 17 and the oldest 81. Nearly three-quarters of the heads of household are aged between 31 and 60.

The study area is at the heart of a region where the Malinké ethnic group is predominantly Muslim. This is evidenced by the fact that all the households surveyed, all Guineans, practise Islam and identify themselves as belonging to the Malinké ethnic group.

6.3.2.3. Demographics

The gender balance within the households surveyed is slightly skewed in favour of women, who make up 54% of the population compared with 46% for men, which is in line with the gender balance in Guinea.¹⁰

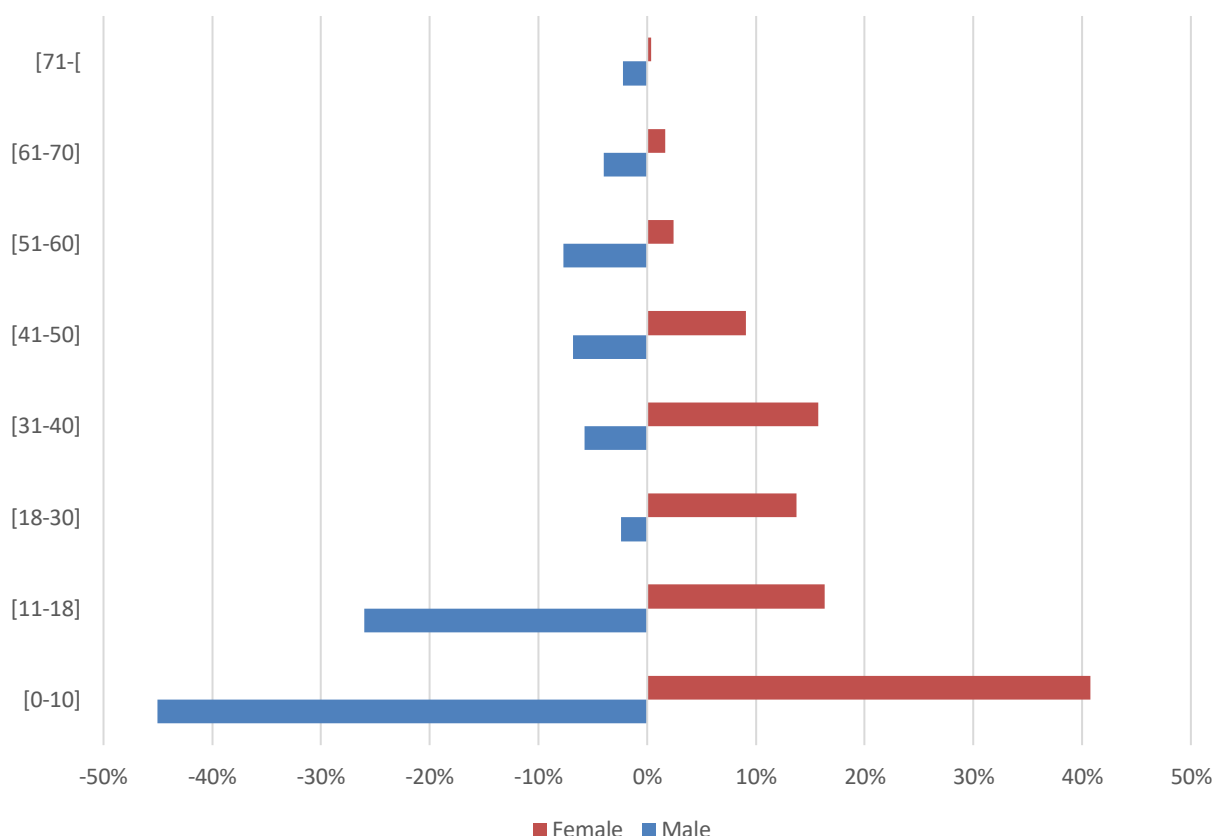


Figure 45 : Age pyramid of surveyed household members (n=993), Source: Insuco surveys, 202 5

Examination of the age and sex distribution of the members of the 128 households surveyed reveals the specific demographic features of the localities in the study area (Figure 45). The general shape of the pyramid obtained, with a broad base that narrows progressively as age increases, is typical of a predominantly young population: the average age of the population is 21 (with a median of 13), 62% of its members are under 18 and 81% are under 40. The pyramid is therefore distorted for adolescents and young adults (age group 18-30), and in particular for men under 18, whose weight distorts the age pyramid of male members more than that of women of the same age, whose pyramid is more harmonious. The relatively low weight of the 18-30 age group among men can be explained by their economic migration outside the study area and outside their household.

One of the consequences of this distortion of the age pyramid in favour of younger individuals is that it inflates the Demographic Dependency Ratio (DDR), which currently stands at 165% among the households surveyed, compared with 94.8% at national level. This high rate, which measures the ratio of the number of individuals dependent on others for their economic income (young people and the elderly) to the number of individuals of wealth-producing age (agriculture, salaried income, etc.), illustrates the strong economic pressure on the productive population, which has to ensure the subsistence of proportionally more "inactive" people.

¹⁰ According to the Annuaire statistique 2022 published by the Institut national de la statistique de Guinée (INS, 2022).

6.3.2.4. Period and reasons for moving to the region

The vast majority (98%) of households surveyed in the study area have lived there for more than 10 years, or for as long as they can remember.

Family reunion is the main reason (50% of recent migrant households). Opportunities as workers in the mining industry (mainly gold mining) are also an important reason for moving to the area (for 13% of recent migrant households).

6.3.3. Household economic strategies and livelihoods

The household socio-economic survey questionnaire included questions on the two main income-generating activities (IGAs) carried out by the head of household and his or her members.

6.3.3.1. Activity systems within households

Multi-activity household strategies can be found at different levels. For example, an individual in a household can be pluriactive, and a household made up of mono-active individuals can be pluriactive if its members practise different activities.

At household head (HH) level (see Figure 46 , broken down by gender):

- All heads of household engage in at least one IGA;
- 84% of HHs say they carry out at least two IGAs (different student jobs, housewife, etc.), which illustrates a multi-activity strategy based on the household and its members. However, this pluriactivity only concerns 67% of active female heads of household, the other half using their remaining time for household chores or studies.

Nearly two-thirds (62%) of HHs with only one activity are mainly engaged in farming.

In the case of pluriactive HHs, the most common combinations of the first two IGAs are :

- Combining farming with livestock rearing (33% of HHs);
- Combining farming with a craft or "small trade" such as mechanic, bricklayer, tailor, etc. (14% of HHs);
- Combining farming with gold panning in the dry season (9% of HH). It should be noted, however, that the proportion of HH declaring gold panning as one of the two IGAs practised in the survey is low compared to the extent of this practice in the study area.

Illustrating a household economy focused mainly on the exploitation of renewable natural resources, 93% of HH consider agriculture and livestock rearing, and in some cases fishing, hunting or the collection of non-timber forest products (NTFPs), as their primary IGA, and 89% of HH practise agriculture as their first or second IGA.

A few main IGAs are practised by male HHs: in addition to farming, 9% practise a "small trade" (tailor, blacksmith, mechanic, etc.), while 2% of male HHs are wage earners, as are self-employed tradespeople (nurse, transport operator, etc.), and only 1.7% practise commerce.

Women HHs focus solely on agriculture (with 56% of women HHs), trade (22%), fishing and gold panning (11% each) as their main IGAs.

The second IGAs practised by the HHs are also diversified (see Figure 47 , broken down by gender) and concern only two-thirds of the women who, when they mainly practise agriculture, turn to livestock rearing, small retail trade or NTFP collection.

These multi-activity strategies put in place by households and their HHs respond to the need to diversify sources of income, whether in kind (e.g. rice grown and partly self-consumed) or in cash (the sale of mined gold, the proceeds from the sale of livestock or the earnings of a carpenter or mechanic). A single activity within the household is often insufficient or too risky to ensure that the needs of all household members are met.



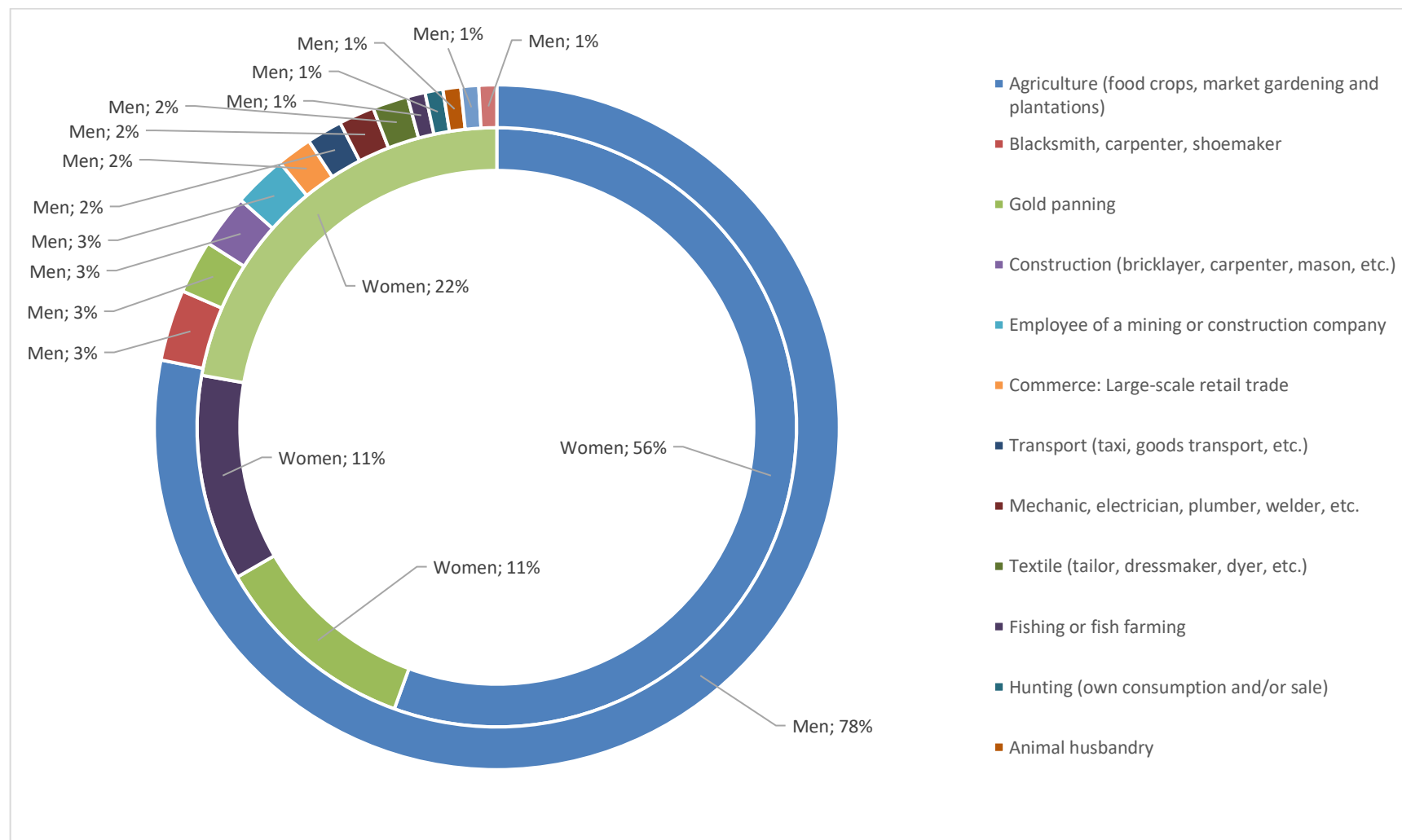


Figure 46 : Main IGAs practised by heads of household (n=128), Source: Insuco, 202 5

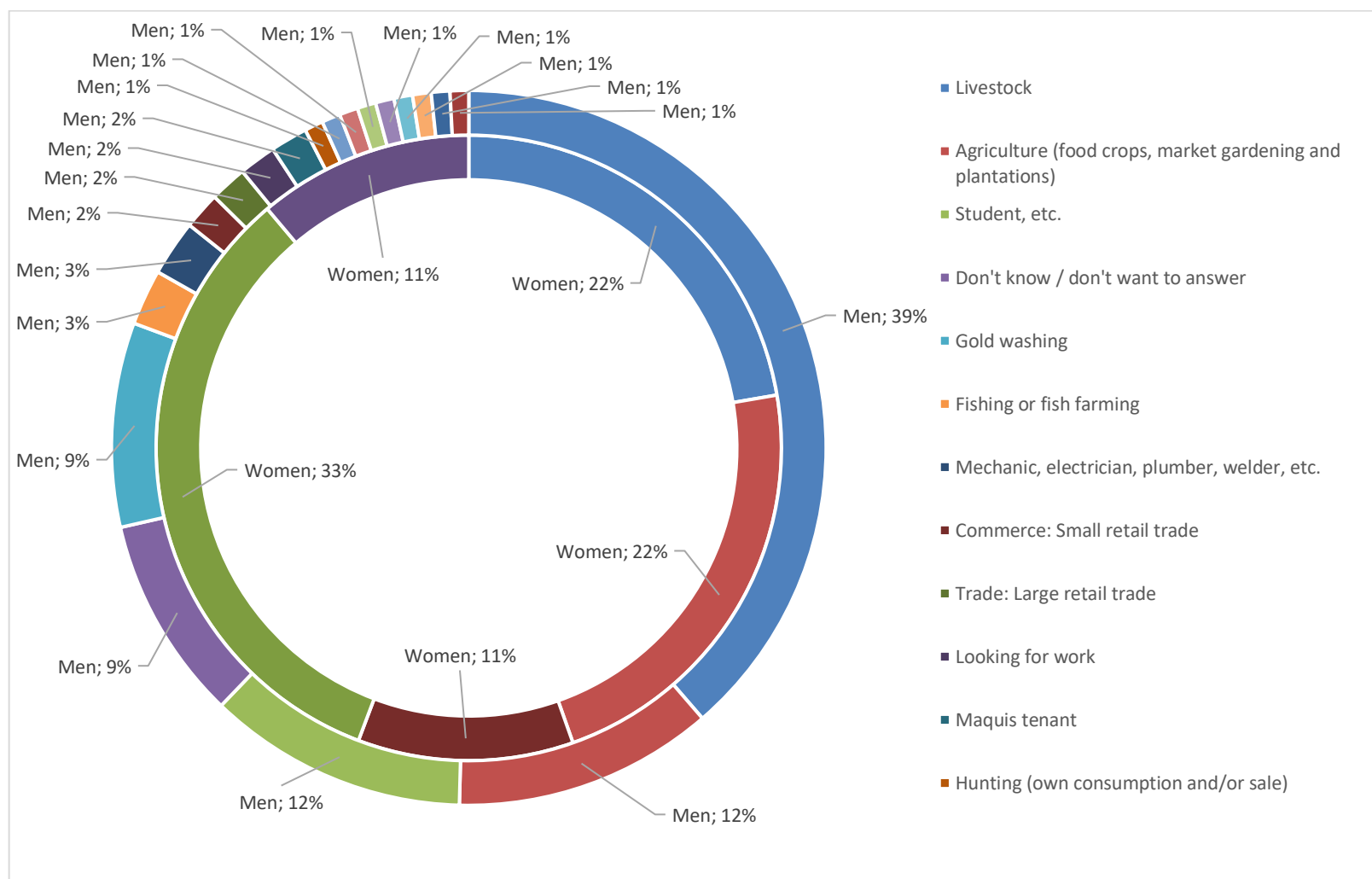


Figure 47 : Second IGA practised by heads of household (n=128), Source: Insuco, 202 5

The Figure 48 below shows the distribution of other household members able to work (individuals aged 16 and over) by main IGA practised and by gender.

The results show that 36% of other members of the household able to work were not engaged in IGAs at the time of the survey: the majority were housewives (23% of other household members aged 16 and over), students (7%) or retired (4%).

For the remaining 64% of both men and women, farming is the main occupation (35% of other male household members and 50% of other female household members aged 16 and over). The IGAs that follow are varied, for both male and female members: small retail trade (roadside fruit sales, local shop), tailoring, gold panning, etc.

It should be noted that retail trade, and in particular petty trade, plays a significant role in the household economy: mostly carried out by women, this activity is symbolically and economically crucial for them and their households, enabling them to cover the costs of their daily expenses (school fees, health costs, purchase of condiments, etc.).

For non-HH members, 84% said they did not engage in a second IGA (other than housewifery, for example). For the remaining 16%, second IGAs are concentrated (in order of importance) on gold panning, farming, NTFP collection, small retail trade or livestock rearing.

Few members directly consider natural resource exploitation activities as IGAs in their own right, such as the collection of non-timber forest products (NTFPs, dead wood, cowpea, honey, etc.), fishing or livestock rearing, although these activities are practised by many households.

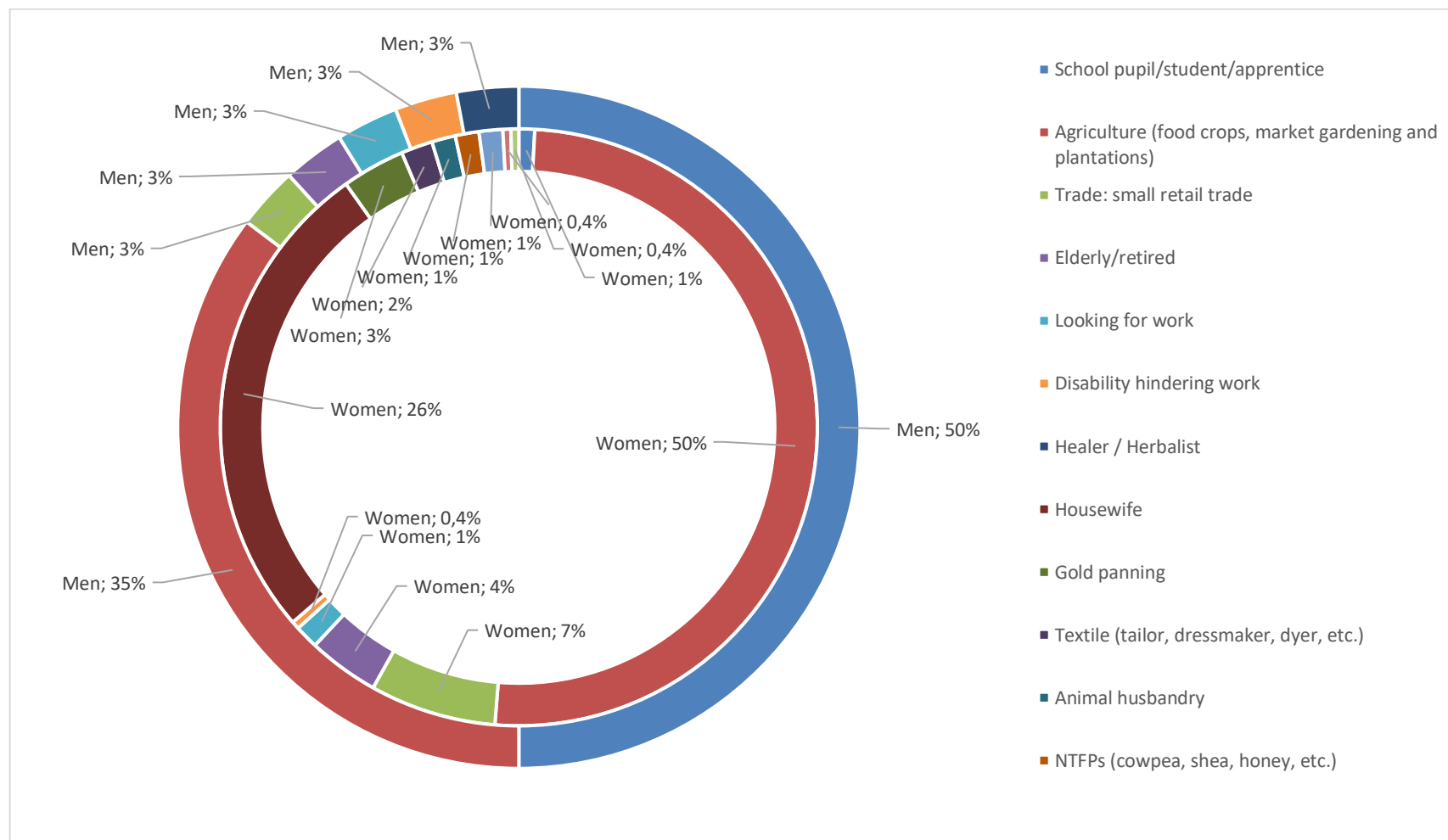


Figure 48 : Main IGAs practised by other household members (n=267), Source: Insuco, 2025

6.3.3.2. *Input- and labour-intensive agriculture*

Cropping systems

The vast majority of households claim to farm (93% of households surveyed). Farming is essentially peasant-based, characterised by the practice of clearing undergrowth to renew fertility, and dominated by the cultivation of rice, cassava, maize and fonio (see Figure 49), with clearly distinct uses (self-consumption versus sale of produce):

- The first is essentially focused on self-consumption, with food production of lowland rice (grown on the alluvial plain of the Niger), lowland rice and hillside rice, as well as other crops, mainly starch crops such as maize and fonio (self-consumption rate of over 75% of production);
- A second production system in which crops are self-consumed but also generate substantial cash income when part of the harvest is sold on local markets: groundnuts, sweet potatoes, taro and yams for starchy crops, and mangoes, papayas and mandarins for plantation crops (self-consumption rate of between 30% and 60%);
- The last production system is mainly geared towards sales, with cash crops such as market garden produce, fruit crops (oranges, lemons, grapefruit, oranges and pineapples) and the cash crop par excellence, the cashew tree (self-consumption rate less than or equal to 30% of production).

Market gardening is the most important agricultural activity for women, enabling them to meet or contribute to their household needs (health, education, food, etc.) through the sale of their produce. 43% of farming households said they were involved in market gardening, on an average area of 1.5 ha¹¹ (minimum 0.4 ha and maximum 3 ha), with a self-consumption rate of less than half of production.

The study area is bordered to the north-west by hillsides, suitable for rain-fed farming, which plunge into the alluvial plain of the Niger, theoretically suitable for irrigated farming. However, the lack of government support for rehabilitating long-abandoned irrigation infrastructure means that water is poorly controlled in the dry season, resulting in the cultivation of a single cycle of cereal crops per year, with poor agronomic performance, and the concentration of irrigated areas in a few market gardening zones. In this case, irrigation is carried out by individuals or groups of market gardeners, over a small area and with limited equipment: manual irrigation with calabashes, buckets, or at best, and more rarely, with a motor pump. This precarious irrigation depends on the proximity of a water source (an active well or a river that has not dried up). On plots far from such a source, farmers graze their herds in the dry season.

¹¹ This figure is likely to be overestimated, due to the difficulty for households to know the area under cultivation.





Photograph 44: Alluvial plains typical of the Niger basin in Upper Guinea, Source: Insuco, April 2025



Photograph 45: Market garden areas in the rural commune of Norassoba, Source: Insuco, April 2025

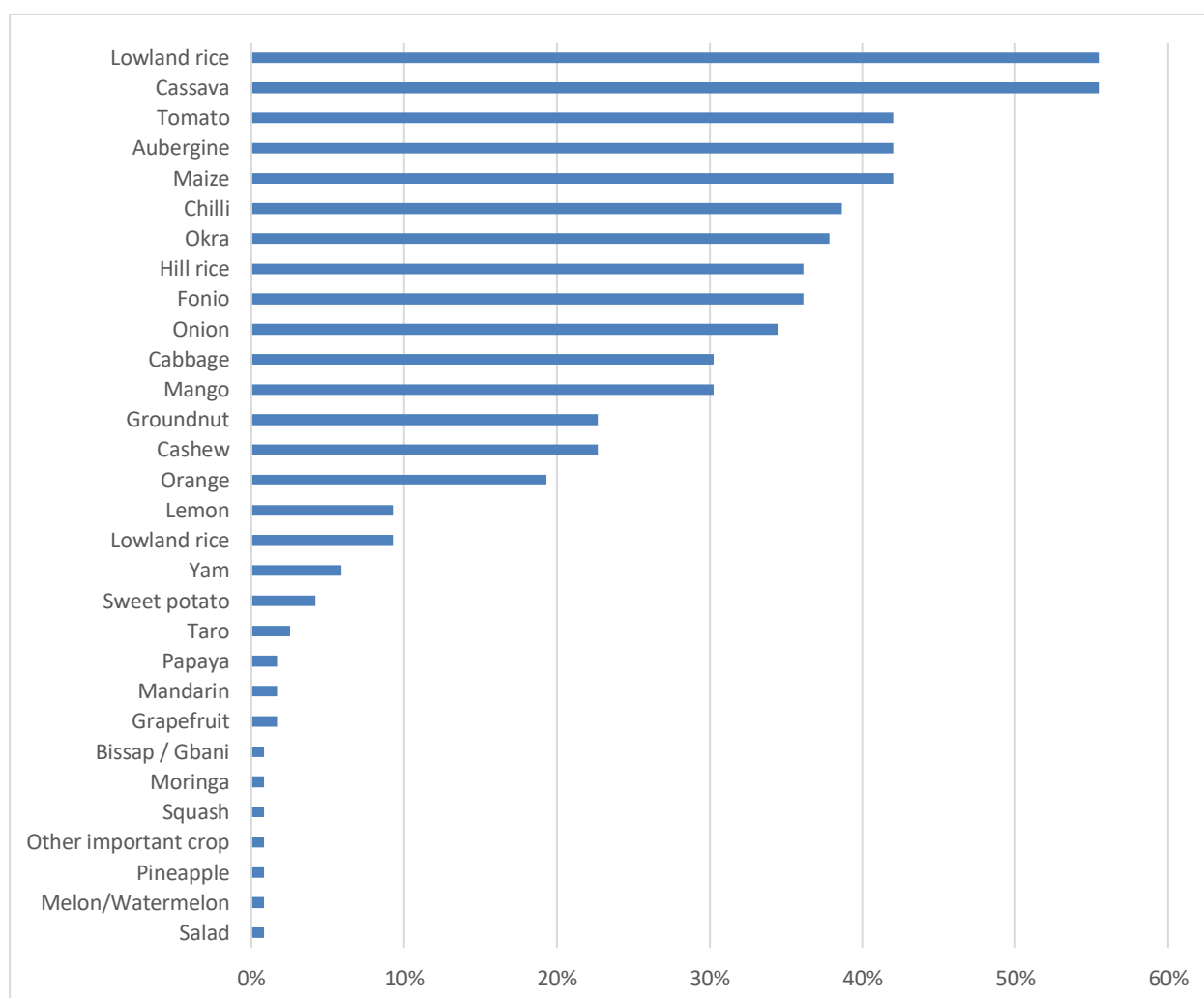


Figure 49 : Crops grown by farming households (n=119), Source: Insuco, 202 5

As a result of the isolation of the localities and households along the national road between Koumana and Niandankoro, 53% of farming households sell their produce at small markets in the towns and villages where they live, or on the edge of the field or road for 33% of farming households, and only one farmer sells his produce at a market in a large town (most likely Kouroussa or Siguiri, see Figure 50).

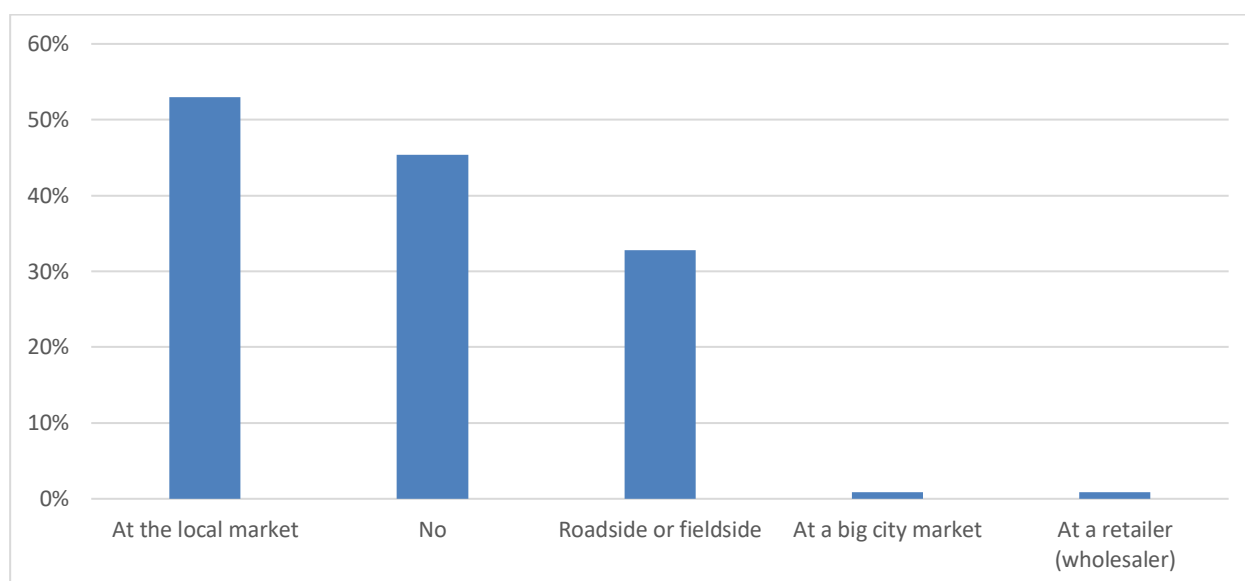


Figure 50 : Places where agricultural produce is sold (n=119), Source: Insuco, 2025

6.3.3.3. Expenses, inputs and equipment

Access to inputs and greater mechanisation is one of the main challenges facing this type of family farming, which has few financial and material resources and little support from the public authorities.

The farming practised by the households surveyed is not very input-intensive: plant protection products are the most widely used inputs (91% of farming households surveyed) and represent a significant average annual expense (GNF 773,000) for the farms. Transport is a burden borne by 84% of farming households, but represents a low financial burden (an average of GNF 289,000 per year per household). The use of chemical fertilisers, adopted by 54% of farmers, represents a major expense (GNF 884,000 per household per year on average). Ploughing, which is only an expense borne by 18% of the farming households surveyed, is the highest average expense: GNF 1,663,000 per year for these households, confirming the high cost of this service offered by owners of plough oxen (who can access lowland areas in particular, which is not the case for tractors). There are two possible explanations for the low proportion of ploughing in farm expenses: the other farming households in the survey population either already own plough oxen (72% of farming households), or do not count ploughing as a monetary expense, having used plough oxen in exchange for work on the ox owner's plots during other cropping stages. Finally, the purchase of organic manure (this resource is also freely available in agro-pastoral areas) concerns only 8% of farming households, with expenditure averaging GNF 146,000 per year per household, the lowest of the other types of expense.

A third of the farming households surveyed (35%) use labour from outside the household, paid mainly in cash, to supplement family labour. This labour represents a major expense for them (an average of GNF 651,000 per year per household, with a median of GNF 500,000). Intra-community mutual aid also represents a labour force from outside the household that comes in during labour-intensive periods, such as weeding, sowing or harvesting.

Almost all farming households own the basic equipment used in peasant agriculture in the area: hoe, daba, axe and machete. Nearly three-quarters of farmers own ploughing oxen and ploughs, which are crucial for this stage of farming on the region's river plains. 45% also own crop protection sprayers (the other households that need them rent or borrow this equipment, or resort to manual weeding), and between 4% and 17% own picks, shovels and/or spades. Only one household owns a tractor for faster ploughing on the plains. None of the households reported owning motor-driven irrigation pumps, which probably means that farming households do not have access to them (logistically or financially) even though they are in demand, or that they occasionally hire the services of the owners of this equipment.

6.3.3.4. Access to agricultural land

Almost all (94%) of the surveyed farming households were individual or lineage owners of at least part of the farmland they farmed, which confirms the situation for all households in the study area. 17% loaned part of the land they owned to other households free of charge, and only 2% rented it out in cash (720,000 and 1,400,000 GNF/year for each of these two households). 14% of farming households also rented or used other agricultural plots free of charge: the majority of them (76%) had access to these plots free of charge. 14% rented or paid for access to these plots, either in cash, at an average of GNF 1,060,000/year, or by paying part of the harvest (between 10 and 25% of the lowland or hillside rice harvest in this case), representing an average of GNF 368,000/year/operator. The very low proportion of households that have to pay landowners for the plots they farm illustrates that land pressure is still relatively low, although it is becoming increasingly prevalent and a source of conflict.

6.3.3.5. *Other agriculture-related issues*

■ **Economic isolation**

As discussed in the previous and following subsections, agriculture in the study area faces major challenges linked to the area's isolation and the limited economic resources of households:

- Poor access to means of production (apart from land and labour): financial credit, inputs, equipment, etc;
- Economic and physical isolation, limiting opportunities for selling produce and thus affecting the competitiveness of the sector;

■ **Climatic events in the agricultural plains of the Niger basin.**

For several years now, communities living along the banks of the River Niger in the study area have had to contend with extraordinary flooding during the rainy season. These floods cause considerable damage to residential areas and roads, but also to agricultural areas, where in the 2024 harvest season, most of the crops grown on the plains (where most of the cereal crops are grown) were destroyed by flooding. For example, the communities of Norassoba told us that 95% of the estimated production of food crops on the plains was destroyed during the last cropping season (the 2024 rainy season), forcing farming households to find financial resources (a quarter of the households surveyed had taken out a loan in the twelve months prior to the survey) to buy rice. For many households, gold panning has freed up financial resources to buy food to compensate for the food destroyed.

6.3.3.6. *Farm income*

First of all, we should present the agricultural economic indicators that will enable us to estimate the levels of income that households derive from gold panning.

s that households derive from agriculture. These indicators have been adapted to the context of the study area.



Breakdown of agricultural value produced	
GP (gross product)	
<i>Annual value of production, whether sold or partly consumed by the farming household. It depends on the yields obtained and the value of the products, i.e. the selling price for sold products or the equivalent market price for self-consumed products.</i>	
=	
IC (intermediate consumption)	
= Fertilisers + Phytosanitary products (herbicides and pesticides) + Manure + Transport + Ploughing	
+	
CACF (annual consumption of fixed capital, or depreciation, equivalent to wear and tear on equipment and buildings)	
<i>This variable could not be estimated</i>	
+	
NPV (net value added)	
= Family farm income + Remuneration of external labour + Rent (monetary or in kind) + Land rent	

Table 59: Agricultural economic indicators (Cochet, 2015)

■ Gross product (GP)

Rice (mainly on hillsides and plains, but also in lowlands) is the dominant food crop and also generates the highest average gross product, at 13,305,000 GNF/year/producer household (most of this gross product is

consumed within the household). The other starchy crops with a high self-consumption rate have a lower average GIP of GNF 2 343 000/year/producer household for fonio and GNF 1 658 000/year/producer household for maize.

Groundnut production, a crop that provides a significant contribution both in terms of nutrition through self-consumption and financially through the sale of the produce, generates an average gross margin of GNF 6,231,000/year/producer household. Cassava, for its part, generates an average GNF 2,354,000/year/household.

With regard to cash crops, most of which are produced for sale, market gardening, which is practised by almost half of the farming households surveyed, generates an average gross margin of GNF 4,922,000/year/producing household, which represents a significant contribution to household finances, particularly in terms of covering living expenses, health costs, children's school fees and costs for social events. Other cash crops such as lemons, cashews, oranges and mangoes generate GNF 2,599,000 per year per producer household, GNF 2,088,000 per year per producer household, GNF 1,055,000 per year per producer household and GNF 528,000 per year per producer household respectively.

■ Family farm income (FFI)

On average, intermediate consumption (IC) as well as remuneration for external labour and sharecropping costs (cash or in-kind rents) represent 16% of the FFI, with a median of 11% due to the fact that some households have an FFI lower than the sum of these costs and therefore a very high ratio between these costs and the FFI, which pulls the average ratio upwards.

Once the ICs and other components of net value added (NVA) have been deducted, the average annual FFI of the farming households surveyed is estimated at GNF 16,838,459. However, the median is GNF 9,524,500, illustrating a wide disparity in the survey population, with FVA exceeding GNF 60,000,000.

Of the 119 households that declared that they farmed, 6 of them, or 5% of farming households, had FFI that was lower than the IC and the expenses that make up the NPV, generating a negative PB (between -564,000 GNF and -2,680,000 GNF) for the twelve months preceding the survey. The most likely explanation for this situation is the impact of flooding caused by heavy rainfall in the study area during the 2024 rainy season. 17% of farming households also said that they had not been able to harvest at least one crop they had planted in the twelve months prior to the survey. The majority of these lost crops were starchy crops, most of which are self-consumed and form the basis of the household diet.

6.3.3.7. Plant NTFP collection

More than half of the households surveyed (54%) reported collecting non-timber forest products¹² (NTFPs):

- *Parkia biglobosa* (*nééré* in Malinké, *nété* in Sousou, *néri* in Poular, collected by 84% of collecting households), the fermented seed core of which is used to make soubala, a widely consumed spice, and the ground pulp of which forms the basis of a porridge rich in food supplements and for its pharmaceutical properties;
- *Vitellaria paradoxa* (*séyou* in Malinké, *kaaré* or *kolo* in Poular, *karité* in Wolof and French, collected by 75% of collecting households), whose oil-bearing seeds are used to make the highly prized shea butter (used in cooking and cosmetics);
- *Anisophyllea laurinakantinyi* (*gbéyi* in Malinké, *kansi* or *kantinyi* in Sousou, *kansi* in Poular, collected by 39% of households), whose fruit is eaten fresh;
- *Saba senegalensis* (*sagba* in Malinké, *laré* in Sousou, *laré* in Poular, collected by 38% of collecting households) whose fruit is eaten fresh or cooked, the leaves are used as an anti-vomiting agent, and the latex is used in rubber;
- *Detarium senegalense* (*bodö* in Malinké, *boto* in Poular, *boto* in Sousou, collected by 20% of collecting households), whose fruit is edible after cooking;

¹² The description of the NTFPs listed does not include all the pharmaceutical properties of these species, which are recognised and used locally.



- *Combretum micranthum* (*kankaliba* in Malinké, *kinkéliba* in Sousou, *kankaliba* in Poular, collected by 17% of collecting households), the leaves of which are consumed as an infusion (diuretic and febrifuge properties) and the roots as a decoction (vermifuge properties);
- Wild honey (collected by 14% of households concerned);
- *Lannea nigritana* (*bembé* in Malinké and *lokouré* in Sousou, collected by 9% of collecting households), whose wood ash is used to make soap and the inner layer of the bark is used in massage to tone muscles.
- *Adansonia digitata* (*kiri* in Sousou, *boki* in Poular, *séda* in Malinké, baobab in French, collected by 7% of collecting households), whose fruit is eaten as is or processed to produce a drink popular throughout the region;
- *Parinari excelsa* (*koura* in Malinké, *sougué* in Sousou, *koura* in Poular, collected by 1% of collecting households), whose fruit is edible and whose bark, crushed, macerated and chewed, is used as a healing agent;
- Bark, leaves and other pharmaceutical products (collected by 9% of collecting households).

On average, households collecting NTFPs reserve 66% of the harvest for consumption within their household, with the remainder being sold.

Among households that market part of their collection, the NTFP that generates the most cash income is honey, bringing in an average of GNF 717,000/year, followed by shea with GNF 405,000/year, *nééré* with GNF 363,000/year, sagba with GNF 107,000/year and gbeyi with GNF 45,000/year.

In Kounkono, because of the lack of a commercial outlet (the cost of transport to the Norassoba market is too high), women do not collect NTFPs with high added value other than *nééré* and shea.

Balato is home to a shea butter processing and packaging centre (cf managed by the Cercle des femmes pour le développement network, enabling local women to find outlets for this promising sector.

The collection of NTFPs is essentially a women's activity and, like market gardening, represents a significant source of income (monetary or otherwise) within the household economy, particularly through the sale of shea butter and soubala.

The low pressure on access to this resource has not led local communities to introduce strict administrative measures (zoning and distribution of use rights by local authorities). Thus, in the vast majority of localities, access to harvesting areas is unrestricted. However, some localities, such as Niandankoro, indicated that for NTFPs that are mainly collected for sale, such as *nééré*, shea or honey, access may be conditional in agricultural areas on authorisation from the household or lineage holding the land administration rights.

In some areas visited by households in the EZ, the availability of NTFP resources is declining. The main reasons given for this are

- Demographic pressure on resources;
- Climate change and variations in rainfall;
- The shift in the practice of early burning from October (just after the rainy season) to the period from January to March, which coincides with the flowering period and affects harvests;
- Bush fires used by hunters to flush out game.

6.3.3.8. Hunting

12% of households surveyed reported hunting. Hunting is a small-scale activity practised only by men with guns, and most of the game is consumed by the hunters themselves (on average, households consume 86% of the game they hunt).

Rodents are the most hunted game (agouti, hare or porcupine, for 12 out of 15 hunting households and an average of 6 catches per year). Hunters who sell their catches earn an average of GNF 48,000 per year.

Next come partridges (9 out of 15 hunting households, with an average of 7 taken per year). Hunters who sell their catch earn an average of GNF 54,000/year.



Only two households reported hunting larger game such as antelope, white-necked duiker or other small artiodactyls, with an average of 2 kills per year. Hunters selling their catches earn an average of GNF 450,000 per year.

This activity generates a monetary income of 131,000 GNF per household per year.

As with plant NTFPs, demographic pressure and the disappearance of natural habitats, particularly woodland, are leading to a decline in the region's hunting stock.

6.3.3.9. Fishing

Nearly one in three households surveyed (29% of households surveyed) said that they fished as independent fishermen (without a fishing master/mate relationship). However, a distinction must be made between two types of user of fisheries resources:

- Households, which make up the majority of fishing households, engage in small-scale supplementary fishing throughout the year, with a peak of activity in the dry season, intended for self-consumption within the household, mainly using still and drift nets, but also using lines, seines and a technique consisting of pouring an infusion or decoction of plants upstream of a watercourse, which has the effect of anaesthetising or confusing the fish, which are then caught downstream by both men and women using nets attached to a circular frame made of flexible plant stems. On average, households go out 4 times a week to fish in ponds, minor streams, rivers and sometimes on the River Niger, mainly for catfish, carp and, more rarely, crabs.
- A few households (6% of the households surveyed) in each village on the banks of the River Niger call themselves somono, meaning 'fishermen' in Malinké, which is a professional category of fishermen. These professional fishermen fish all year round (with an average of 5 to 6 trips per week in the high season between May and September), generating an average gross annual income of GNF 8,000,000, with a low average rate of self-consumption of less than half the catch. The species caught are mainly carp and catfish, with crabs to a lesser extent. These households fish mainly with still or drift nets or hawks. As the income from fishing is not sufficient for many Somono households to meet their needs, farming is also important in these households.

There does not appear to be any zoning of watercourses and the River Niger, and access to them appears to be unrestricted.

The study area is also home to customary pond festivities, which take place every year in May and are very popular in most of the villages and towns on the Niger plain between Koumana and Niandankoro. This festival takes place at least in Koumana, Balato, Norassoba, Nounkounkan and Niandankouro and consists of the opening of a fishing season in the ponds that dot the alluvial plains. Once the lineage owning the administrative rights has given permission, people from the locality and neighbouring villages can join the crowd entering the ponds to fish with nets attached to a circular frame made of flexible plant stems. This custom is of great importance and acts as social cement, allowing families to take advantage of the arrival of relatives living outside the locality to organise baptisms and weddings.

It also marks the start of the agricultural season, when young people from the villages living elsewhere in Guinea or abroad can lend a hand to their parents and relatives in preparing the agricultural plots.





Photograph 46: Pond in the rural commune of Balato, Source: Insuco, 2025

It should be noted that many local communities have reported a decline in fish stocks, probably due to the destruction of spawning grounds, the increasing silting up of the bed of the River Niger (in the study area), and demographic pressure.

6.3.3.10. **Farming**

The vast majority of households surveyed (86%) say they keep animals. The most common types of livestock are (in order of occurrence):

- Cattle for 98% of livestock-raising households, with an average of 9 head per household, with a maximum of 73 head and a median of 7 head. These herds are mainly raised as draught animals (capital labour for the study area, which is mainly located on agricultural alluvial plains) and for meat, with only 5% of cattle-raising households selling milk, with a peak in production in July, August and September, during the rainy season, with negligible monetary income, as the milk is consumed within the household. Of all the cattle-raising households surveyed, only 14% paid to have their herds herded (an average of GNF 837,000 per year), which is not representative of the system of delegating herd management to local herdsmen: most households seem to have their cattle herded by members of the household or lineage, or by young boys free of charge.
- Poultry farming accounts for 41% of poultry farming households, with an average of 16 head per household, with a maximum of 150 head and a median of 10 head. 31% of poultry farmers use industrial feed, and these are farms with an average of 13 head. This input costs farmers an average of GNF 1,151,000 per year;
- Sheep farming for 34% of farming households, with an average of 8 head per household, with a maximum of 45 head and a median of 4 head;
- Goat rearing for 31% of farming households, with an average of 6 head per household, with a maximum of 25 head and a median of 4 head.

Pig farming is not practised, corroborating the low level of this type of farming in this region of Guinea, which has a very large Muslim majority.

Herds are left to roam during the dry season and are parked or moved to non-agricultural areas during the rainy season in order to limit the devastation caused to crops. Managing grazing areas and transhumance schedules is therefore a major challenge. Herding costs an average of GNF 837,000 per year for cattle farmers, who pay the herdsmen: in fact, it is often unpaid young boys who herd the cattle.



Transhumant herding does not include the study area in its annual grazing.

In addition to their importance as draught animals for cattle farms, in most cases these herds represent a small amount of savings on the hoof, which are needed to organise social events or pay school fees. This activity is also of great social and symbolic importance.

Only 2% of livestock-raising households have not vaccinated their animals in the last twelve months. On average, the households concerned vaccinate their animals 2 to 3 times a year, at an average cost of GNF 76,000 a year (median GNF 45,000 a year).

Households with a positive investment in livestock (i.e. having invested more than they generated by buying/selling animals) have earned GNF 7,793,000 over the last twelve months, although the median is GNF 4,813,000/year, illustrating a wide disparity in these investments, with some households generating a lot.

It should be noted, however, that 60% of livestock-raising households are either in a situation where their livestock-raising system is performing poorly, with high livestock mortality, or in an investment situation where the household has bought more head than it has sold in the last twelve months. For these households, these scenarios result in negative livestock capital over the twelve months preceding the survey.

Due to the lack of time available for the surveys and consultations, it was not possible to estimate the annual monetary income from livestock.

6.3.3.11. *Gold washing*

6.3.3.11.1. Historical background

As Robin Petit-Roulet points out (Petit-Roulet, 2023), gold panning in West Africa dates back at least to the Middle Ages and contributed to the influence and power of the Ghana Empire, the Mandingo Empire and then the Songhai Empire. In Guinea, the focus was on manual mining until the turn of the 21st century, but the rise in the price of gold led to an intensification of old gold mining practices in the 2000s. "From the 2010s onwards, the activity underwent an initial phase of transformation through the use of light mechanisation, in particular the widespread use of metal detectors, which led to forms of "hypermobility" on the part of gold miners (Dessertine, 2016. From 2015 onwards, the activity underwent a second phase of transformation linked to the growing use of mechanisation based on heavy excavation equipment (jackhammers and hydraulic shovels) and ore processing equipment (crushers). At the same time, industrial mining is developing.

6.3.3.11.2. Scope and areas of operation

In the surveys, only one-fifth of households had a member who declared that they had engaged in gold panning in the twelve months preceding the survey. This rate appears to be an underestimate of the extent of gold panning in the dry season in Upper Guinea, and of what was stated during consultations with local communities.

Many members of households in the localities studied take advantage of the dry season (a period of 1 to 4 months between February and June) and the low economic value of farming at this time of year to travel to the gold panning sites. Some members also migrate permanently throughout the year to regions with high gold potential, such as Bouré in the Mandiana prefecture. The choice of site is motivated by its location in the locality or commune where the gold panners live, for reasons of ease of access to the site: a resident from the commune and a fortiori from the locality where the site is located will be favoured in terms of access and taxation on the ore collected. But the announcement effect, often amplified by word-of-mouth and the resulting rumours, is also a factor influencing a gold miner's choice of site, whether or not that site is in the commune, the prefecture (Kouroussa, Siguiri, Mandiana, Kankan) or even the country where he lives (Guinea, Mali, Senegal, Ghana, Côte d'Ivoire), (Cf Map 51.). Similarly, migrants from neighbouring countries come to the study area to work in gold panning: from Mali, Côte d'Ivoire or Burkina Faso, they immigrate seasonally for a few months or, in the case of many Burkinabè, for several years, setting up permanent camps on the mining sites.





Map 51: Migration and seasonal immigration from the study area for gold panning activities, Source: Insuco, 2025

According to the Prefectural Department of Mines and Geology, the study area, which runs along the left bank of the River Niger between Koumana and Niandankoro, is included in a gold mining corridor exploited by artisanal and semi-artisanal gold miners¹³. At the time of the study, the gold panning sites located within the project right-of-way or in the direct vicinity were in particular at Iri-Kiri in the commune of Koumana, along the access track to Koukono, but also near the Kounkono quarry without being included in the right-of-way at the time of the study. Although they are not in the direct vicinity of the project's right-of-way, other sites are located in its indirect zone of influence or within the territory of the localities crossed at the time of the study. However, the very high degree of mobility that characterises gold panning (mobility in the collective opening of sites and in the choice of sites by individual panellists) means that it is not possible to prejudge the location of gold panning sites in the months and years to come, or their proximity to the project's right-of-way zone or zone of indirect influence.

6.3.3.11.3. Sociotechnical itineraries and resource governance

■ Shafts and galleries associated with crushing and paving workshops

Most of the gold miners interviewed, both inside and outside the study area, are involved in manual gold panning, exploiting shafts and galleries ranging from a few metres to several dozen metres deep. The deposits mined are primary (vein deposits, embedded in the rock) or secondary eluvial or colluvial deposits.

¹³ Including the use of jackhammers, crushers, etc.



Photograph 47: Gold panning site active at the time of the study, located near Iri-Kiri alongside the RN 32, a crushing and paving unit is visible on the right of the photograph, Source: Insuco, May 2025

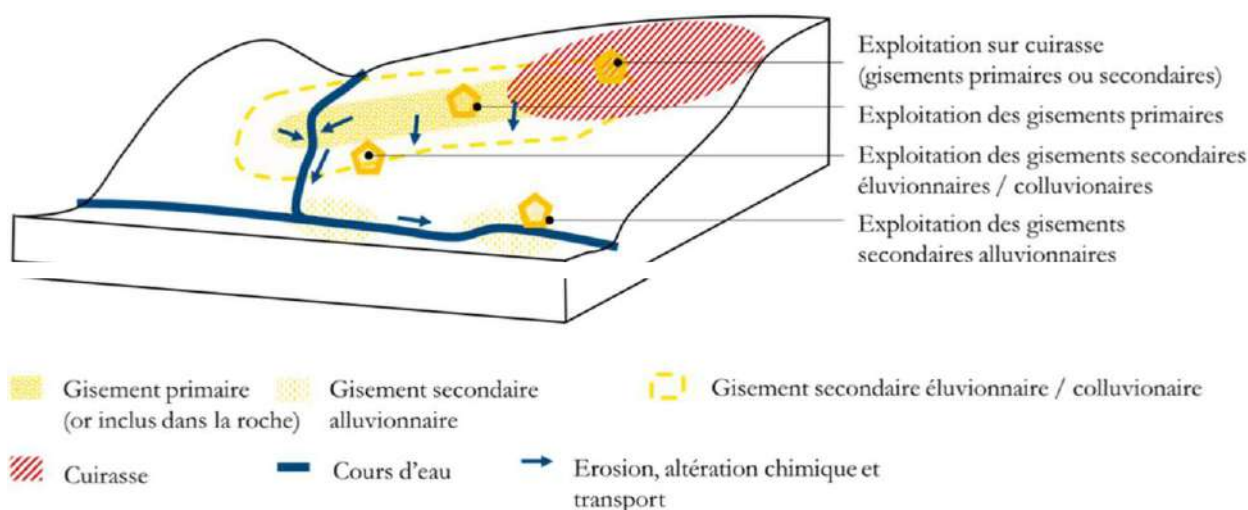


Figure 51: Diagram of gold deposits, Source: Petit-Roulet, 2023

Mining a shaft can last from a few days to several months. Work and resources are organised and structured, and the ore follows this socio-technical itinerary (Lanzano and Arnaldi di Balme, 2017):

- The diggers (men with different specialisations) are in charge of digging the shafts and galleries and bringing up the *dakan* (20-litre plastic drums cut in half, acting as a unit of measurement) of earth poor in ore until they reach the gravel layer with a higher gold content. These gravel *dakan* are generally hauled up by women and shared according to a highly codified distribution key among all the operators involved in the venture.
- "Generally speaking, each operator is personally responsible for washing his part of the gravel. The gravel is stirred in a calabash with water, and then :
 - The heavier gold powder surrounding the gravel tends to remain on the bottom of the calabash or board, recently imported by Burkina Faso gold miners, where it is then recovered. Washing is sometimes done in basins dug into the ground near the pit" (Lanzano and Arnaldi di Balme, 2017).
 - Gravel with a higher ore content, once washed, is transported home to be crushed in a mortar to extract the gold particles, which requires additional washing with a calabash.
- In cases where the gravel/earth mixture has a lower ore content (from the layers that have risen from the shaft before reaching the vein rock) or where the gravel with a higher ore content is purchased directly by the owners of the crushing and washing plants, the latter process large quantities of gold-bearing earth, which is ground to a powder and then washed with a board to concentrate the gold powder. "These crushing and washing plants are set up along the rivers from which they draw the water used to wash the ore" (Petit-Roulet, 2023). In the study area, it is mainly (if not exclusively) Burkinabè who are responsible for this branch of the socio-technical itinerary.

These mineral workers and the service providers (for example, the owners of motor-driven pumps to drain the holes where necessary, or the owners of air sprayers to maintain a sufficient level of oxygen in the holes) are under the supervision of the hole manager or *nyado*, who finances, coordinates and controls the activities of the well for which he is responsible, and reports directly to the *tomboloma* ("those who watch over what is forbidden/who enforce the law" in Malinké). The *tomboloma* is a group of men appointed by the village's customary authorities, presided over by *the soti kémo*, whose main role is to oversee gold panning activities on sites within the village. This group is at the centre of the governance of the resource, and in particular manages the peripheral stakeholders on the sites, such as the *donzos* responsible for security and, where applicable, the "Red Cross" (the local name for the people responsible for ensuring the safety of the wells and helping the miners), as well as the state authorities, to whom taxes are also paid, and, where applicable, the landowners.

"Normally, the gold produced by the miners is sold to private buyers who have a ministerial licence: their presence in the *bè*¹⁴ area is authorised by the *tomboloma* against payment of a fee" (Lanzano and Arnaldi di Balme, 2017). In the study area, it would appear that only private buyers treat the ore with mercury in order to amalgamate the gold powder.

The Figure 52 : Governance of gold mining sites details the governance of gold mining sites.

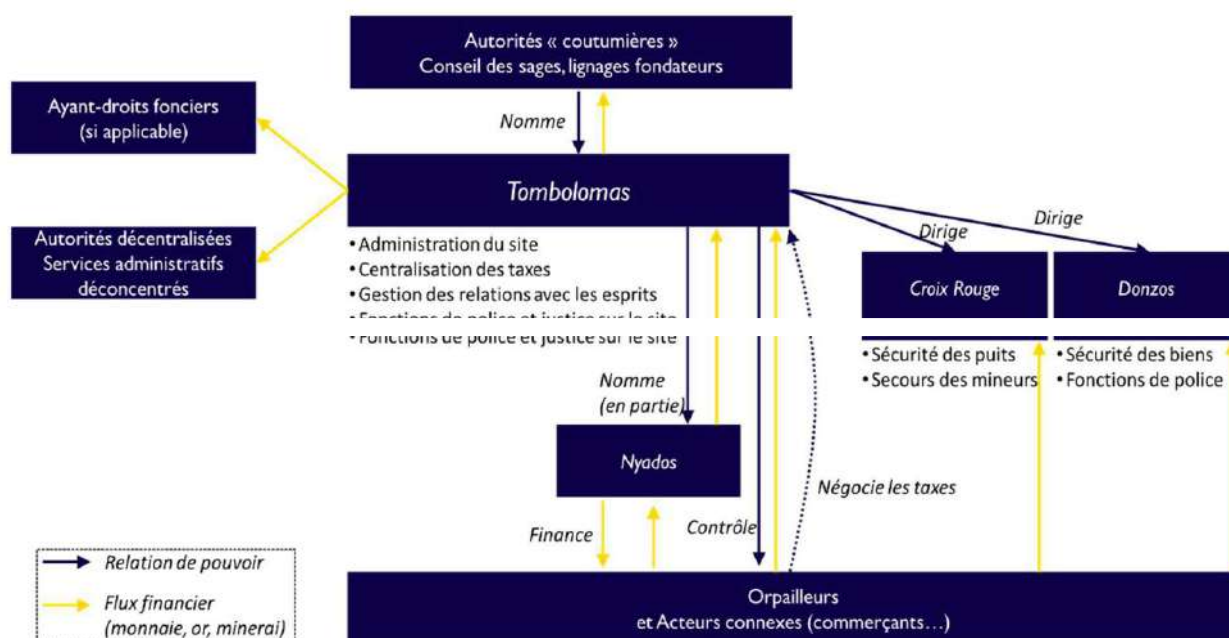
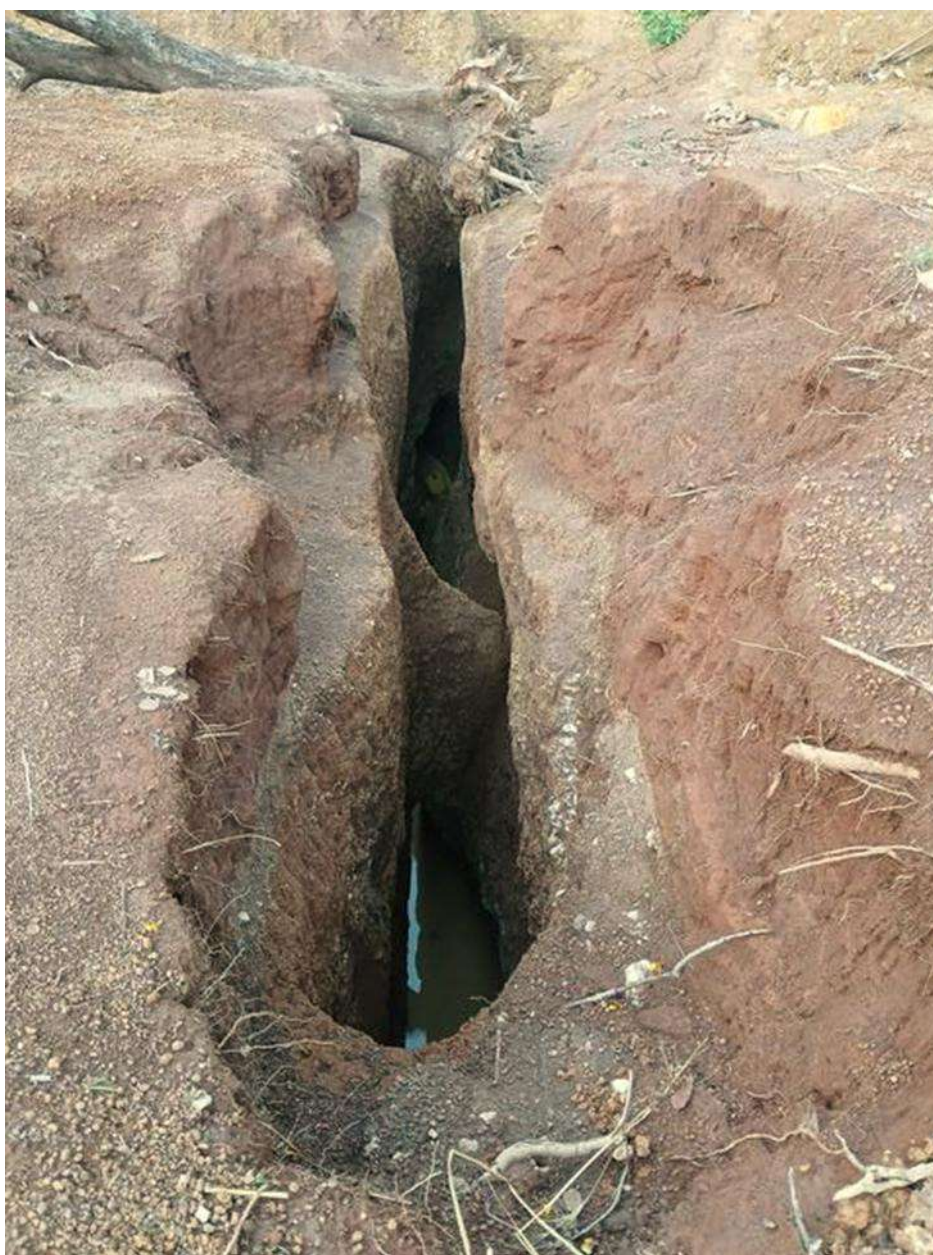


Figure 52 : Governance of gold mining sites

Work on the gold panning sites is generally gendered: women are confined to pulling up the *dakan* by rope and washing. Several consultations with women from local communities indicated that their access to gold panning sites outside their locality or commune was often at stake, that there was strong competition to be granted a hole where they could, sometimes in turn, lift the *dakan*, and that favours granted to the *nyado* or other actors supervising the site were sometimes necessary.

However, it should be noted that on the sites in the Koumana sub-prefecture, no distinction is made and women may also be responsible for digging, transporting ore, etc.

¹⁴ Extraction site strictly delimited, identified and marked out each year, under the authority of representatives of local institutions.



Photograph 48 : Gold panning pit near Iri-Kiri inactive at the time of the study, Source: Insuco, April 2025

■ Surface mining: metal detectors and open-pit mines

"Alongside extraction by pits and galleries, two major forms of surface extraction have been developing for several years [in Upper Guinea and in the prefectures hosting the study area (although the sites concerned are not in the study area)]:

- On the one hand, prospecting using metal detectors, which enable gold nuggets to be found at shallow depths of a few tens of centimetres. This practice results in a form of 'hypermobility' (Dessertine, 2016) among gold miners, who are constantly on the move in search of the richest deposits without digging deep. [Only one member of the households surveyed said they were involved in this technique as a digger].
- On the other hand, surface gold panning has developed in recent years through the creation of small open-pit mines. Extraction takes a number of more or less mechanised forms: excavation with pickaxes, jackhammers and hydraulic shovels. This form of mining is combined with the development of crushing and panning workshops [also used in shaft and gallery mining]" (Petit-Roulet, 2023).

The consultations did not reveal the presence of cyanidation sites to recover the gold particles still present after mechanical processing of the ore, which is corroborated by studies confirming the limited use of this technique.

These different technical ore mining routes are found in the study area, although in the direct vicinity of the project right-of-way. At the time of the study, there did not appear to be any mechanised surface extraction using shovels or jackhammers.

Numerous other forms of gold panning are present in the region: reopening of old shafts, recovery of ore from active shafts in industrial mines, dredging of watercourses, etc. (Petit-Roulet, 2023) But these less widespread forms do not appear to predominate in the study area.

However, as this activity is widely practised by local communities and very probably by future Project Affected People (PAPs) (some sites being directly adjacent to the RN 32), it will be necessary to carry out a specific study on gold panning when developing the Resettlement Action Plan (RAP).

6.3.3.12. Revenues, issues and impacts

Income from gold panning is highly variable and the gold panners consulted agree that it is uncertain, which brings into play a range of magicoreligious practices among those involved in the sector in order to "attract good luck". The Figure 52 also details the many stakeholders who manage or are peripheral to the resource and to whom taxes must be paid.

*"We can leave 50% of our gold to the authorities and owners with the taxes",
Consultation with young people in Nounkounkan, 24/4/2025.*

Estimating an average income from gold panning is therefore risky. By way of illustration, once taxes had been deducted, the 28 gold-panners who were members of households stated that they earned an average annual income of GNF 5,000,000, although there were wide variations: a minimum of GNF 0, a maximum of GNF 72,000,000 and a median of GNF 1,425,000. These values are given for information only and it should be noted that, in addition to the fact that depreciation and charges relating to equipment are not taken into account in the calculation, the declarant's self-censorship bias certainly plays a significant role in the reliability of these data.

Gold panning plays a major role in the economy of the households concerned and their locality. When gold panning is practised in the dry season, it is relatively complementary to agriculture, for which the capacity for investment by households or made available by the communes and the State to enable it to be practised in this season is very limited (confined to the development of market gardening areas for a few months in the wettest lowland areas) or even totally non-existent.

As a result, gold panning helps to cover many household expenses, from the purchase of clothing and food for the lowest incomes, to the repair or construction of a home and the purchase of a motorbike for the luckiest.

*"Out of 100 buildings in Dura, 80 are rehabilitated using income from gold panning"
Consultation with young people in Dura, 18/04/2025*

Localities with active gold panning sites have a policy of welcoming gold panners, whether they are natives or from other prefectures or countries. Adding value to the resource generates significant taxes for those responsible for regulating this activity and stimulates the local economy (trade, catering, etc.).

This situation is increasingly justified by the fact that there are many issues affecting local agriculture, with no real support from the State:

- Devastation of agricultural crops by the exceptional flooding of the River Niger during the rainy season.



- Episodes of increasingly intense drought in the dry season.
- Pressure on agricultural land leading to a fertility crisis which, combined with the unreasoned use of chemical inputs, is causing a drop in yields.

This complementarity between agriculture and gold panning is financial and temporal if gold panning is only practised in the dry season, which is not the case for more and more gold panners who now practise all year round, prompting the government to ban gold panning during the 2024 agricultural season.

However, this complementarity does not seem obvious from a land point of view, where although several gold panning sites in the prefectures of Kouroussa and Siguiri are located in bowé and hillside areas with low agricultural potential, others are located in plains and other areas with high agricultural potential. In addition, agricultural rehabilitation of former mining sites is still very limited, and plantations such as cashew trees seem to be the only examples in the study area.

This context of increasing land pressure, coupled with the weak application of the legal mining framework by the state authorities in this sector and the impact of gold panning on the environment (soil degradation, worsening of mudflow phenomena and pollution, albeit local mercury pollution in particular), raises questions about the social and environmental sustainability of this activity, which could be a major development lever for Guinea.

6.3.3.12.1. Secondary and tertiary sector IGAs

6.3.3.12.2. Secondary sector

Like the first two IGAs, secondary sector activities are practised by 5% of the members of the households surveyed, and are varied: tailoring and dyeing, catering (maquis, sale of doughnuts, bread, etc.), welding, electricity, mechanics, carpentry, bricklaying, etc.

Annual income per household member ranges from GNF 300,000 to GNF 18,000,000, although there is a disparity in income, with the median (GNF 7,200,000) balanced against the mean (GNF 6,992,000), illustrating a symmetrical distribution of income.

6.3.3.12.3. Trade

Trading is practised by almost 7% of household members over the age of 15, and is a central activity in the economy of the households concerned. For the most part, it is a small retail business (kiosk or small neighbourhood shop).

Annual income per household member ranges from GNF 450,000 to GNF 30,000,000, although there is a disparity in income, with the median (GNF 2,400,000) half the average (GNF 5,027,000).

6.3.3.12.4. Tertiary sector and salaried jobs in companies

Service occupations such as transporters, health workers, nurses, midwives and traditional healers generate a higher average annual income than the two types of IGA presented above: GNF 11,704,000 on average per member, with a maximum of GNF 24,000,000 and a minimum of GNF 600,000, with a symmetrical distribution of income (median GNF 12,000,000).

There is a wide disparity in incomes among service sector occupations, whether in private employment or not: some annual incomes are as low as GNF 1,500,000 and others as high as GNF 55,080,000, with a median of GNF 9,000,000.

6.3.3.12.5. Civil service

Only one member of a surveyed household said they were a civil servant (teacher or professor) with a monthly salary of GNF 230,000, giving an annual salary of GNF 2,760,000.

6.3.3.12.6. Household income



The income of each household was calculated by adding together the income from each IGA presented above. Note that :

- Non-monetary agricultural income (self-consumed production within the household) is included in this calculation.
- For fishing and NTFP collection, only gross cash income was calculated.
- For livestock farming, only investment over the last twelve months was calculated.

The values presented below are indicative and concern only the 128 households surveyed. At the very least, they give an idea of the order of magnitude of household incomes in the study area, as well as the preponderance of certain IGAs in the household economy.

The average annual household income is GNF 20,752,000/year, with a median of GNF 15,732,000/year. 29% of households surveyed have an average annual income of less than GNF 10,000,000. It should be noted that these figures include investments from livestock farming, bearing in mind that they are burdened by the 60% of livestock farmers who are either in a situation of poor performance of their livestock farming system with high herd mortality, or in an investment situation where over the last twelve months the household has bought more head than it has sold. In terms of daily consumption units (CUs), the average income is GNF 16,958/UC/day, with a median of GNF 12,342/UC/day.

Without taking these investments in livestock into account, the average annual household income is **20,993,000 GNF/year**, with a median of 16,161,000 GNF/year, and still 29% of households surveyed have an average annual income of less than 10,000,000 GNF. On a daily basis, this average income is 17,229 GNF/UC/day, with a median of 12,503 GNF/UC/day.

The weight of the main IGAs in the income of the households concerned is as follows¹⁵ :

- Agriculture: 73% (64% if investments in livestock are taken into account) of overall income for the households concerned.
- Secondary and tertiary sector IGAs: 50% (33% if investments in livestock farming are taken into account) of total income for the households concerned.
- Gold panning: 31% (21% if investments in livestock are taken into account) of total income for the households concerned.

6.3.3.12.7. Household monetary strategies

Financial flows

Only 2 of the 128 households surveyed (2% of households) have a bank account. However, this figure needs to be qualified given the widespread use of money transfer and savings services via mobile phone operators.

23% of households had taken out an interest-free loan or credit in the 12 months preceding the survey: 97% from relatives for interest-free loans and 3% from traders (average interest rate 2%). No household reported having taken out a loan with a bank, and loans from relatives were relatively high, illustrating the study area's lack of access to banking services.

43% of these loans were in the process of being repaid, 33% were in arrears at the time of the survey and 23% had already been repaid.

The reasons for borrowing were varied, with the most frequently cited being :

- Payment of healthcare costs for 60% of borrowing households;
- Investment in agriculture and livestock for 60% of borrowing households;
- Payment of food-related expenses for 23% of borrowing households;
- Payment of education costs for 7% of borrowing households;

¹⁵ This data concerns households that practise it: not all farming households practise gold panning, for example.



- 4 households also borrowed to invest in a commercial activity, to help relatives, to finance the renovation or construction of their home or to buy consumer goods (motorbikes, telephones, etc.).

Concerning aid received or sent and the receipt of pensions:

- 35% of households receive an average of 3 financial remittances from relatives, a third of them from relatives living abroad (diaspora working in Europe or the sub-region). The study area is not immune to the phenomenon of economic migration of young people to other countries in the region or Europe. The lack of economic prospects is one of the main reasons why young people try to emigrate for economic reasons, or go gold panning.
- 3 households received aid in kind or money from the state or development projects.
- 9% of households reported sending an average of 3 remittances to relatives.
- Only two households received rent or land rent, with an average value of GNF 720,000 and GNF 7,000,000 per year.

Household expenditure

The purchase of foodstuffs is the most important item of expenditure in terms of amount and priority among the households surveyed: 97% of households surveyed cited it as an important expense. This finding can be linked to the major losses suffered by farming households in 2024.

Next comes investment in agriculture/livestock, which is the second most important item in terms of amount and priority among the households surveyed (93% of households cite it, see).6.3.3.2

Health is also an important and costly item of expenditure (92% of households cite it, see).6.3.3.17

Illustrating the isolation of the study area, transport costs were cited by 72% of the households surveyed as an important item, ranking 5th out of 8.

The purchase of clothing, education costs and costs related to social events, although relatively less important in terms of financial amounts than the items mentioned above, are nevertheless cited as important by 52%, 48% and 44% of households surveyed respectively.

Finally, although only cited by 13% of households surveyed, expenditure on renovating or building the household's home is the third most important expense in terms of financial amount.

These data were corroborated during the consultations, where the speakers emphasised the damage caused by the floods of the 2024 rainy season to agricultural crops and buildings, as well as the physical and economic isolation of the area.

Women are the pillars of the household and its economy: while they are responsible for running the household, they are also often financially responsible for health and education costs, although the head of the household also contributes to these expenses.

It should be noted that the payment of monetary amounts as part of compensation for the loss of implementation of resettlement plans for projects declared to be in the public interest will certainly be used to finance the economic emigration of members of the household to Europe, West African countries or Conakry.

6.3.3.13. Access and mobility

Although all the localities in the study area border or are close to the RN 32, only the sections near Koumana, Norassoba and Niandankoro can be considered relatively isolated from the rest of the region. This observation is relative, as the condition of the RN over long stretches makes the transport of goods and people and communication erratic and dependent on weather conditions. In the rainy season, it is not uncommon to find lorries bogged down for several days or even weeks along the road, or to observe the complete isolation of village territories surrounded by flooded areas.

71% of households surveyed own at least one motorbike, 34% own at least one bicycle (6% have only this means of transport), but a fifth of households surveyed have no means of transport at all. Although transport companies and bush taxis linking Kouroussa to Siguiri are not obliged to use this route, they prefer to use the Kouroussa-Kankan-Siguiri tarmac road, which, although longer, greatly reduces the risk of vehicles getting bogged down or incurring high repair and maintenance costs.



As for the track linking Norassoba to Kouunkono, it is in such a state of disrepair that the 32 km that make it up cost GNF 50,000 for a passenger to get there by bush taxi.

This physical isolation exacerbates the economic isolation of the study area, and does not encourage households to invest in IGAs that could be profitable if the produce could be sold: market gardening, fruit plantations, NTFPs (nééré or karité for the most profitable), catering, repair and mechanical services, etc.

6.3.3.14. Public administration

The public administrations (excluding health, education and water supply services, which are dealt with in the following sections) located in the project's area of influence are mainly located in the sub-prefectures of Koumana, Balato, Doura, Norassoba and Niandankoro (Map 52). These infrastructures are primarily deconcentrated services such as sub-prefectures and police stations, and deconcentrated services such as town halls. The sub-prefectures and town halls house their essential services relating to civil status and agriculture and livestock.



Map 52 : Location of public administrations in the project's area of influence, Source: Insuco, 2025



Photograph 49. On the left, the Koumana town hall and on the right the Norassoba sub-prefecture, source: Insuco, 2025

6.3.3.15. *Economic and socio-cultural infrastructure*

The organisation of local communities into distinct groups of young people (men up to around 40-45 years of age), women, elders or people engaged in the same activities (farmers, stockbreeders, gold miners, hunters, fishermen, craftsmen, etc.) forms the basis of the social organisation of the localities studied. Although not systematically formalised by law, these groups are structured and represented by one or more individuals.

Mosques, youth centres and wise men's halls are often part of the infrastructure that enables these groups to socialise. However, as with health and education facilities, social infrastructures are in a state that requires rehabilitation and very rarely have access to a source of electricity.

Football pitches are also important places for socialising, as are the ponds and fishponds where pond festivities are held (see 6.3.3.9)

The economic infrastructure located in the project's zone of indirect influence is mainly characterised by daily markets such as those in Koumana, Doura and Nounkounkan, and weekly markets in all the other communes and large towns in the study area. These markets are meeting points for communities living in neighbouring or isolated localities. Table 60 below details their opening days.



Table 60 : Markets in the study area, Source: Insuco, 2025

Prefecture	Municipality	Locality							
			Mon	Tue	Wed	Thu	Fri	Sat	Sun
Kouroussa	Balato	Balato			X				
Kouroussa	Balato	Kobané			X				
Kouroussa	Doura	Doura	X	X	X	X	X	X	X
Kouroussa	Koumana	Koumana	X	X	X	X	X	X	X
Siguiri	Niandankoro	Niandankoro	X						
Siguiri	Norassoba	Norassoba				X			
Siguiri	Nounkounkan	Banfélé Koura							X
Siguiri	Nounkounkan	Nounkounkan	X	X		X	X	X	X

Cereal mills (rice, maize, fonio, manioc, etc.) are also very common in the localities. Most are privately owned, but some are also owned by farming associations and groups. Their owners offer their services for the local processing of starch products, for the preparation of attiéké, cereal porridge, fritters, etc.

Other major economic infrastructures include service stations all along the RN 32, which frequently experience diesel shortages, and factories that make sachets of drinking water, located mainly in the larger towns of Balato, Damisa Koura, Doura, Niandankoro, Norassoba and Nounkounkan.

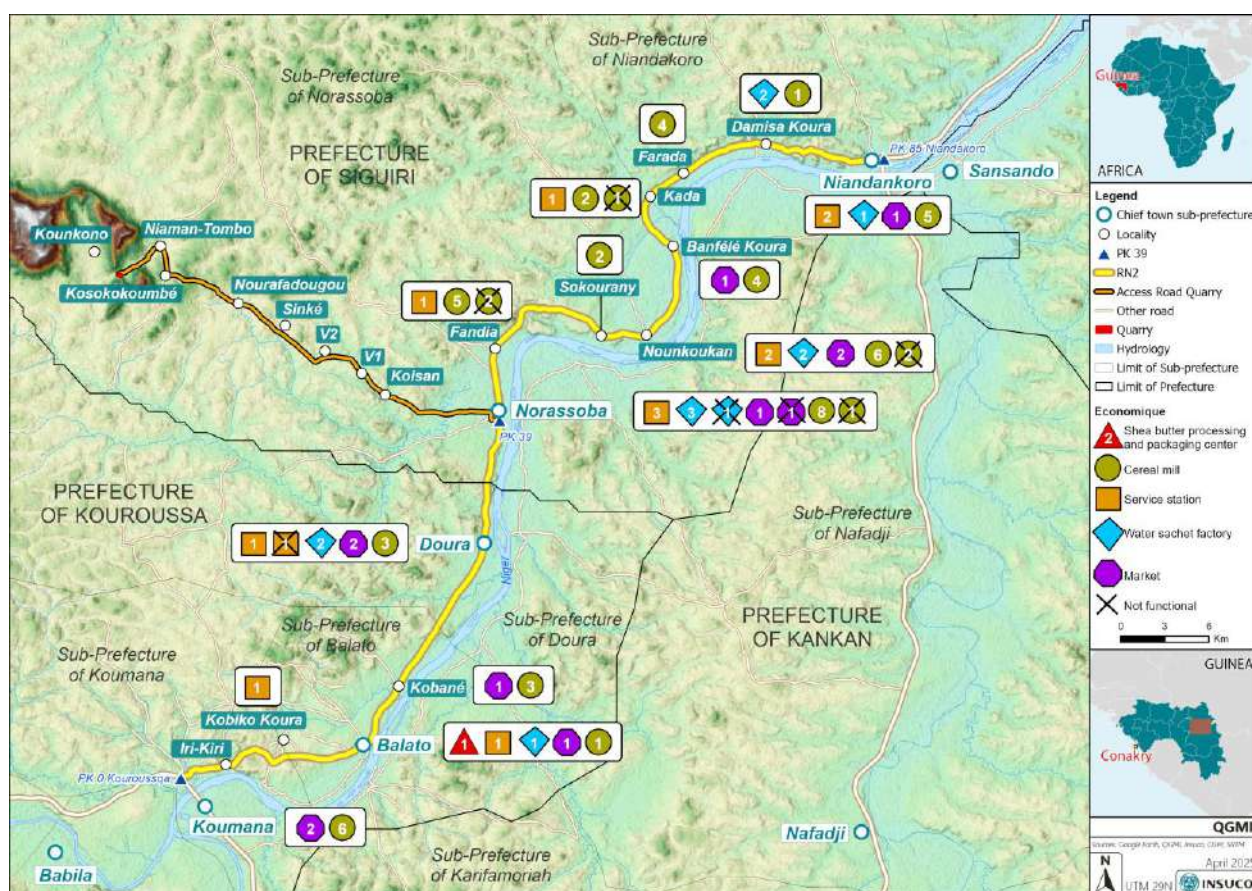


Photograph 50 : Water production plant, Source: Insuco, 2025

Balato has a shea butter processing and packaging centre.

Apart from the festival of ponds, there are no sites of tourist interest in the project's zone of indirect influence.

The Map 53 shows the location of the economic and social infrastructures included in the project's zone of indirect influence. It should be noted that in urban areas, other economic and social infrastructures are used by study area residents but are located outside the project's zone of influence.



Map 53: Location of economic and social infrastructures in the project's area of influence (the figures given refer to the number of infrastructures concerned), Source: Insuco, 2025





Photograph 51: On the left a mosque, on the right a youth centre, Source: Insuco 2025

6.3.3.16. Housing and household durables

6.3.3.16.1. Housing quality

The vast majority of households surveyed own their home (88%). The remaining tenth:

- Reside in a dwelling owned by another member of the lineage/extended family, or on loan (for 11% of households surveyed).
- rents their accommodation (for one household surveyed in Doura) for an average monthly rent of GNF 300,000.

The dwellings of the households surveyed are either made of baked clay brick walls (for 41% of households), cement blocks (for 32% of households) or banco (dry clay brick, for 27% of households), illustrating the poor durability of local construction in the case of banco. The floor is made of a cement slab for 71% of households, or tiled (2% of households), and 27% of households have a rammed earth floor. Almost three-quarters of households have tin roofs, while the remaining quarter have straw roofs. Although banco buildings and straw roofs are still very common among the Malinké in Upper Guinea, the boom in gold panning and the potentially substantial income it generates (refurbishing the dwelling is one of the first expenses of the gold panner when he generates income), This, combined with the decline in the social status of so-called "traditional" buildings, is leading to an increasing presence of cement block and tin roof buildings in the landscape of the study area.



Photograph 52 : Dwellings with "traditional" architecture, Source: Insuco, April 2025

6.3.3.16.1. Water and sanitation

All households have sanitation facilities at their place of residence and use latrines: 77% use latrines with a simple pit and 23% use improved latrines with a propped-up pit and concrete slab.

Only half of households have access to a safe source of water: a borehole with a pump (42% of households), a tap in the dwelling or on the plot (6% of households surveyed) or a dug well (4% of households). 48% had priority access to a non-borehole well or drank water directly from rivers or the River Niger, all of which are likely to provide contaminated drinking water, especially in an area as easily flooded as the study area. Among households without a tap on their plot or in their dwelling, the average journey time to fetch water was 3 minutes, and 11% of households surveyed took 10 minutes or more (one way).

For 35% of households surveyed, the source of drinking water does not provide enough water throughout the year, with an average of 3 to 4 months of drying up or a significant drop in flow, confirming the trend in the region towards an intensification of climatic events: an increasingly dry dry season and a rainy season with increasingly heavy rainfall.

Women (all households surveyed), girls under 15 (32% of households) and boys under 15 (20% of households) in the households surveyed are responsible for fetching water. Only 8% of households have an adult male in charge of this chore.

The information provided during the household surveys was corroborated during consultations with local communities, and the trend can be generalised to the entire study area.

0 the location of boreholes equipped with human-powered pumps and standpipes in the project's zone of indirect influence. The localities in the study area are unequally endowed with borehole-type water supply infrastructure, allowing for better water quality and availability: this is the case for Norassoba, which although relatively densely populated, has only one borehole with a human-powered pump for every 6,000 inhabitants, whereas Doura has 3 times as many for the same number of people. Although each locality has wells (both dug and undug), the latter present a greater risk of seasonal water shortages and of providing water of poorer quality



Photograph 53 : Drilling station at Balato, Source: Insuco, 2025

6.3.3.16.2. Access to electricity

The majority of households surveyed (41%) have no access to electricity, either via the public grid (EDG) or via an alternative supply system (individual or collective at neighbourhood level). The national electricity grid does not yet serve the localities of Koumana to Niandankoro, although this could soon change: the electricity interconnection project between Mali and Guinea was in the construction phase of medium-voltage pylons along the RN 32 at the time of the survey, and connections in the sub-prefectures crossed were planned. Only 59% of households surveyed had access to alternative supply systems:

- 56% had access via solar panels.
- Two households had access to electricity only via a private generator.
- One household uses rechargeable batteries.

These figures for electricity coverage are well below the national figure.





Photograph 54: RN 32 at Nounkounkan and power lines under construction at the time of the study, Source: Insuco, April 2025

6.3.3.16.3.Domestic energy

With forest cover still present in the study area, the use of firewood for cooking is commonplace for all the households surveyed. None used charcoal or any other source of domestic energy.

In contrast to water collection, the members of the household most often asked to collect wood were women (81% of households surveyed), but also the men and boys in the household (49% and 28% respectively). Girls under the age of 15 in 16% of households are also responsible for this task. Only two households surveyed had firewood or charcoal delivered to their homes.

6.3.3.16.4.Level of household equipment

Access to means of communication is widespread in almost all households through the ownership of telephones, smartphones and radios, but it should be noted that only 14% of households surveyed own a television. Only one of the 128 households surveyed did not own a telephone, radio or television.

40% of households surveyed that own at least one smartphone or computer have at least one other member who connects to the internet on a daily basis. Without exception, these members all have an account on a social network:

- Facebook for 82% of these members.
- Whatsapp for 80% of these members.
- TikTok for 18% of these members.
- Instagram and X for 2% each.

Only 6% of households have a generator, 6% have a fan and only 3%, 2% and 1% of households surveyed have a fridge, air conditioner and computer respectively.

6.3.3.17.Health

6.3.3.17.1.Health service provision

The Map 55 shows the various health facilities located within the project's zone of indirect influence. We can see that for households living in rural areas, health posts and health centres are the most accessible facilities in the event of a health problem, given their low level of equipment and materials available for patient care.

The different health facilities available to the households surveyed can be distinguished according to their category and location:

- Public health centres in the sub-prefectures, visited by 98% of sick members of the households surveyed. These are mainly the health centres closest to the households' homes: Koumana Balato, Doura, Norassoba, Nounkounkan and Niandankoro. At the time of consultation, nurses and community health workers are the professionals most frequently encountered (96% of patients concerned), followed by doctors for only 4% of patients, illustrating a key challenge for these health facilities, which is the presence of competent staff to treat patients' pathologies (one health centre in two was not headed by a doctor at the time of the survey). Their other main challenges are the lack of supplies of pharmaceutical products and equipment.
- Public hospitals at prefectural level, visited by 31% of sick members of the households surveyed. The hospitals in Kouroussa and Siguiri (outside the zone of indirect influence) are the second most visited health facilities, followed by nurses for 56% of the patients concerned. In this type of facility, doctors are the most frequently consulted (89% of patients concerned). As is the case in most hospitals in Guinea, lack of equipment and staff are the main challenges facing these facilities.
- Private health centres, pharmacists and community health workers were consulted by 7% of the sick members of the households surveyed. These institutions are often unofficial and run by health workers from local public health centres and health posts.
- The houses of traditional healers and practitioners are also frequently visited (2% of sick members of households surveyed). These are places where traditional healers or marabouts are consulted.
- Public health posts in the districts, which are rarely visited (due to the proximity of health centres in the communes), with 2% of sick members of the households surveyed going there. The nurses were the main professionals encountered at this time. Their main challenges were lack of materials, equipment, budget and staff.
- GPs (itinerant or self-employed, consulted by 3% of the sick members of the households surveyed) or street vendors selling medicines (consulted by 15% of the sick members of the households surveyed) are also very common in areas where access to conventional care is difficult (due to lack of financial resources or isolation);
- It should be noted that none of the sick members of the households surveyed said they practised self-medication, a sign either of self-censorship or of a gradual abandonment of these practices, as the national context is moving towards a devaluation of these practices.





Map 55 : Location of community health facilities in the project's indirect area of influence, Source: Insuco, 2025

6.3.3.17.1. Illnesses and disabilities

Of the members of households surveyed (993, all ages), 11% said they had been ill in the last 30 days (this rate rises to 23% for HHs alone).

Malaria is undoubtedly the main health problem in the study area (40% of sick members), as are, to a lesser extent, typhoid fever (19% of sick members), injuries, fractures or other physical trauma (14% of sick members) or gastric problems (13% of sick members). Less than 5% of sufferers (respectively) also cited the following conditions: skin problems, problems related to pregnancy and childbirth, respiratory problems, toothache, hypertension, anaemia, etc. (cf. Figure 53). It should be noted that the diagnosis of certain pathologies can sometimes be improved in healthcare establishments, due to a lack of equipment or skills.

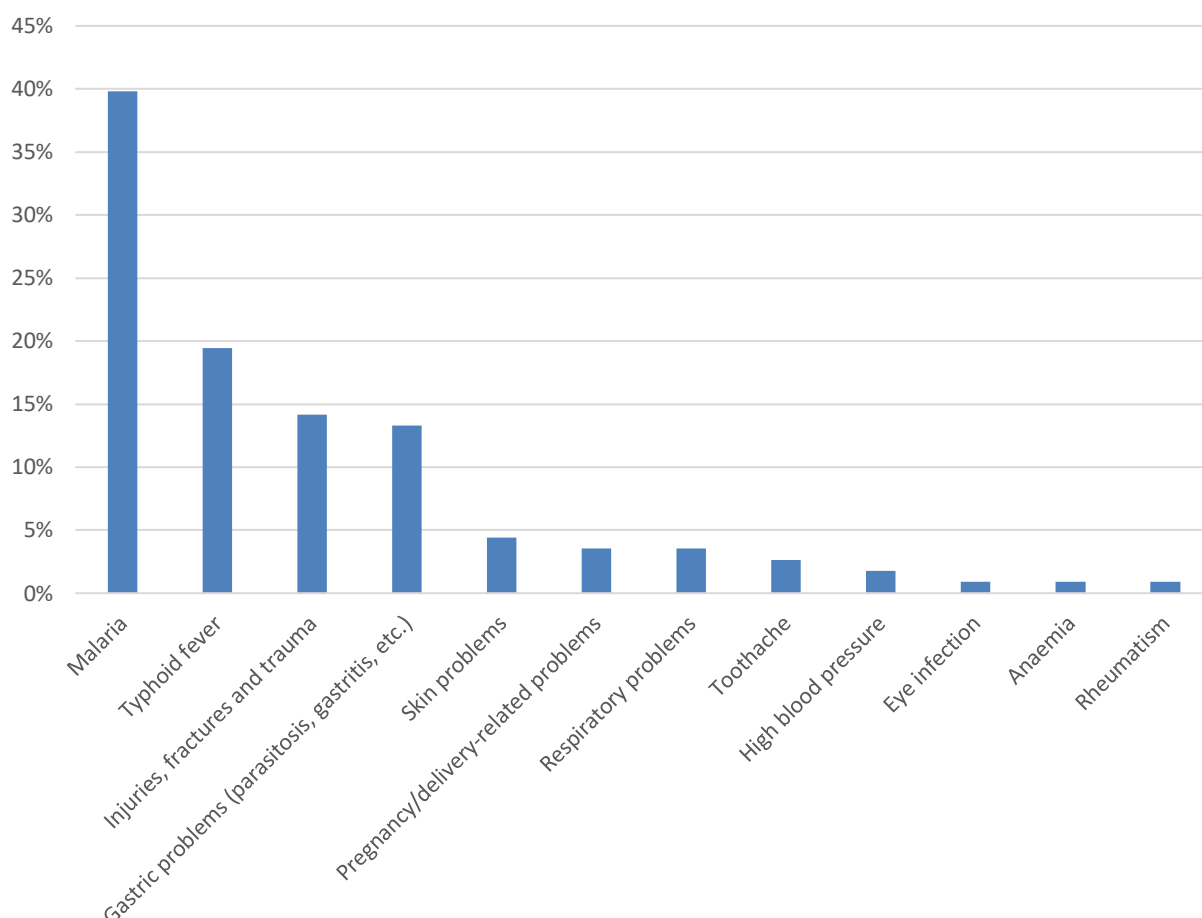


Figure 53 : Occurrence of the most common types of illness contracted by sick members of the households surveyed (n=113),
Source: Insuco, 2025

A similar observation was made by the health facilities in the study area, for whom the main public health problems were malaria, followed by anaemia, respiratory problems and acute gastric infections and diarrhoea.

Specifically for women of childbearing age (over 12), three quarters had already given birth, the youngest being 14. Of these, 2% had experienced pregnancy-related complications in the twelve months prior to the survey (a figure that is undoubtedly underestimated due to social censure on this subject and the high proportion of male heads of household who were survey respondents). Among women who had already given birth, 51% had given birth at least once at home, 7% had given birth at a birth attendant's and 87% had given birth in a health facility: 75% at a health centre, 12% at a hospital and 0.5% at a health post.

Only 5% of households surveyed had members who did not use mosquito nets for sleeping. Among households that use mosquito nets, the average coverage rate (number of members sleeping under mosquito nets divided by the total number of household members) is 85%, and 60% have all their members sleeping under mosquito nets. This finding is corroborated by the national trend of almost total adoption of the use of mosquito nets in households.

1% of the members of the households surveyed have a disability (all living in a separate household), and 40% of these are heads of household (i.e. 3% of heads of household). The most frequently cited disabilities were motor disabilities, mental disabilities (for 30% of people with disabilities), sight problems (completely or partially blind (for 20% of people with disabilities), chronic cardiovascular or other diseases (for 20% of people with disabilities).

6.3.3.17.2. Food coping strategies

Of the 128 households surveyed, 59% said they had experienced at least one hunger gap in the 12 months prior to the survey, particularly around August, when starchy crops had been sown but not yet harvested and prices were high.

During this lean period, the following strategies are adopted, in decreasing order of practice:

- Consumption of cheaper or less popular foods (85% of households experiencing a lean period).
- Reducing the number of daily meals (57% of households experiencing a hunger gap).
- Restriction of consumption by adults in favour of small children (44% of households experiencing a hunger gap).
- Leaving food with friends or family (44% of households experiencing a lean period).
- Limiting portion sizes (41% of households in lean season).

6.3.3.18. Education

6.3.3.18.1. Educational provision

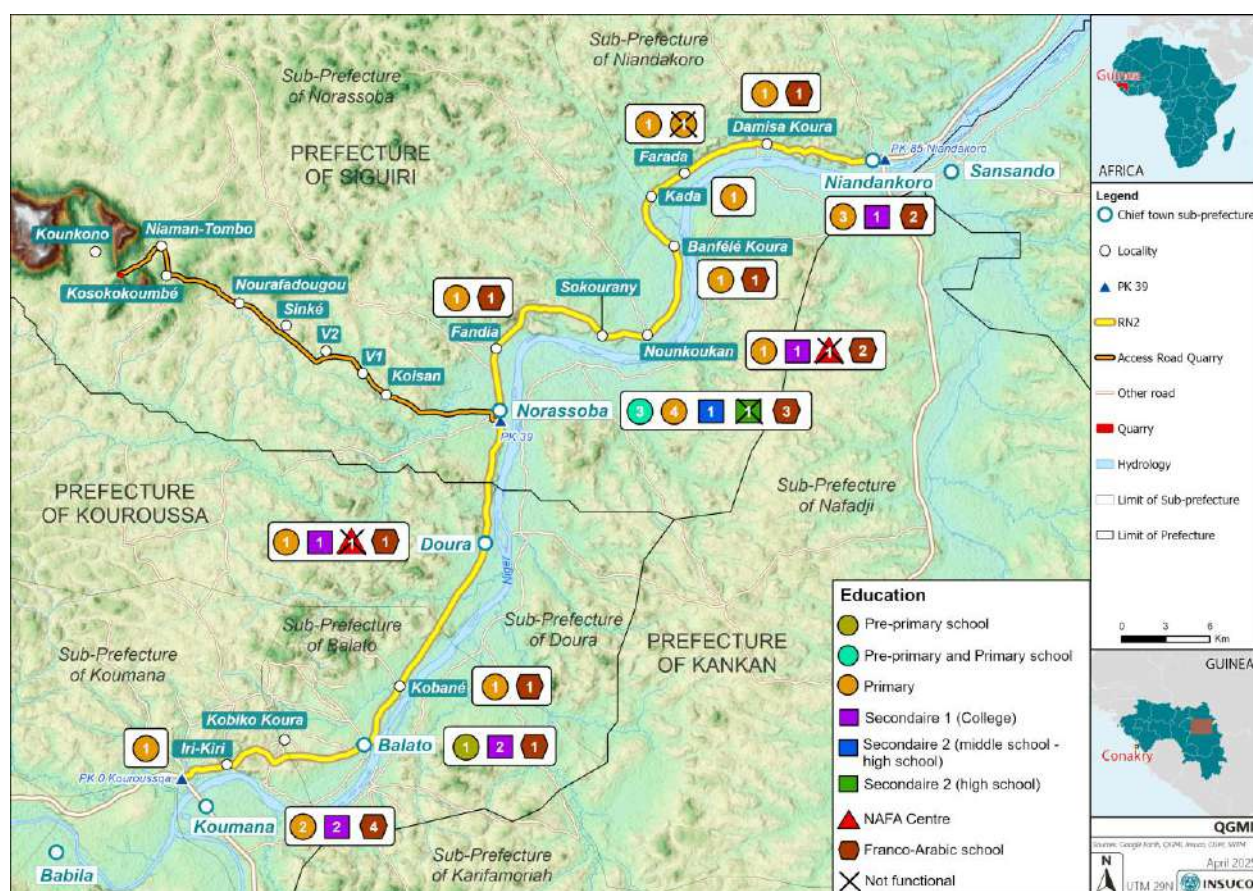
Numerous educational facilities are located throughout the study area and attended by the households surveyed.

- Secular pre-primary education, which is only available in the rural communes of Balato and Norassoba, is provided in specific sections of primary schools or in private nurseries/kindergartens for children aged 3 to 6.
- Secular primary education is mainly public at the level of each sector (equivalent to a village or a district of a town) in the study area.
- Private Franco-Arab schools, part of the primary education system recognised by the Guinean state, alongside secular and Catholic education. This type of education, which combines traditional general primary education with Koranic teaching, has been present in Guinea since the 1940s. These educational structures are present in almost all the localities in the study area, Islam being the main if not the only religion in the area.
- Secondary education - public secular secondary school in each of the rural communes in the study area.
- Secondary education - public secular high school, of which only one in Norassoba provides education in the study zone. The other lycées are in the nearest prefectures: Kouroussa and Siguiri, or even Kankan.
- The NAFA centres, located in the rural communes of Doura and Nounkounkan, are facilities that give priority to illiterate children, particularly girls, aged between 9 and 14, who are not in school or who have dropped out, with the aim of reintegrating them into general education or into the socio-professional circuit. The Guinean government set up its first centres in 1994, and they have expanded rapidly to 92 by 2020-2021.

With double-digit growth in the number of students enrolled nationwide, the education system, from primary school to high school, is being put to the test by having to meet the training needs of teachers, while at the same time developing reception services with a limited budget.

The schools in the study area have too many pupils (225 on average, with an average of 42 pupils per class and an average of 5 teachers per school), inadequate sanitary facilities (4 latrines per school, or an average of 63 pupils per latrine), and are also facing the challenges of a shortage of staff, inadequate training and the fact that their salaries are not covered by the state (43% of teachers are not paid by the state), as well as a lack of material resources and dilapidated and inadequate infrastructure (none of the 48 schools surveyed have access to electricity). The enrolment of girls (currently 36% in the schools surveyed) and the lack of resources for pupils' families to continue their children's education is also a major challenge for schools.





Map 56 .Location of collective education facilities in the project's indirect area of influence (the figures given refer to the number of facilities concerned), Source: Insuco, 2025

6.3.3.18.2.Level of education of household members and school enrolment rate of children

Only one household has a HH who speaks only Mikiforè, the other HHs all speak at least Malinké, 9% also speak French, 5% also speak Sousou and 2% also speak Arabic, and only one HH also speaks Poular.

85% of the heads of household surveyed can neither read nor write in French or Arabic, 88% have never been to school and the 9 heads of household surveyed have never been to school.

Among the 15% of HHs who are literate :

- 58% write and read French.
- 21% write and read Arabic.
- 5% write and read French and Arabic.
- 16% write and read in the local language.

75% of other household members (aged at least 7, the legal school age) cannot read or write: 87% of girls and women and 52% of boys and men. Most of the other literate members learn French, but less than a fifth of them also learn Arabic.

There is little parity between boys and girls in access to compulsory education (aged between 7 and 16 inclusive): 61% of boys in this age group go to school, compared with 45% of girls. The two main reasons given were to help with domestic chores or household IGAs.

In terms of schooling among all the members of the households surveyed aged 16 or over, only 9% had attended at least primary school. Figure 54 shows the distribution of these members aged over 16 according

to the different levels of education and their gender. We can see that of the members of households who have had access to education :

- 24% have a level equivalent to that of primary school (sixth form and Koranic school), all genders combined. Among women, this rate is 20% of all women who have had access to education, compared with 19% of men;
- 57% have a level equivalent to that of secondary school: 60% of women and 56% of men;
- 19% have a level equivalent to that of secondary school: 20% of women and 19% of men;
- None of the members of the households surveyed aged 16 or over had studied to university or technical level.

Women are systematically less likely to continue their education after primary school.

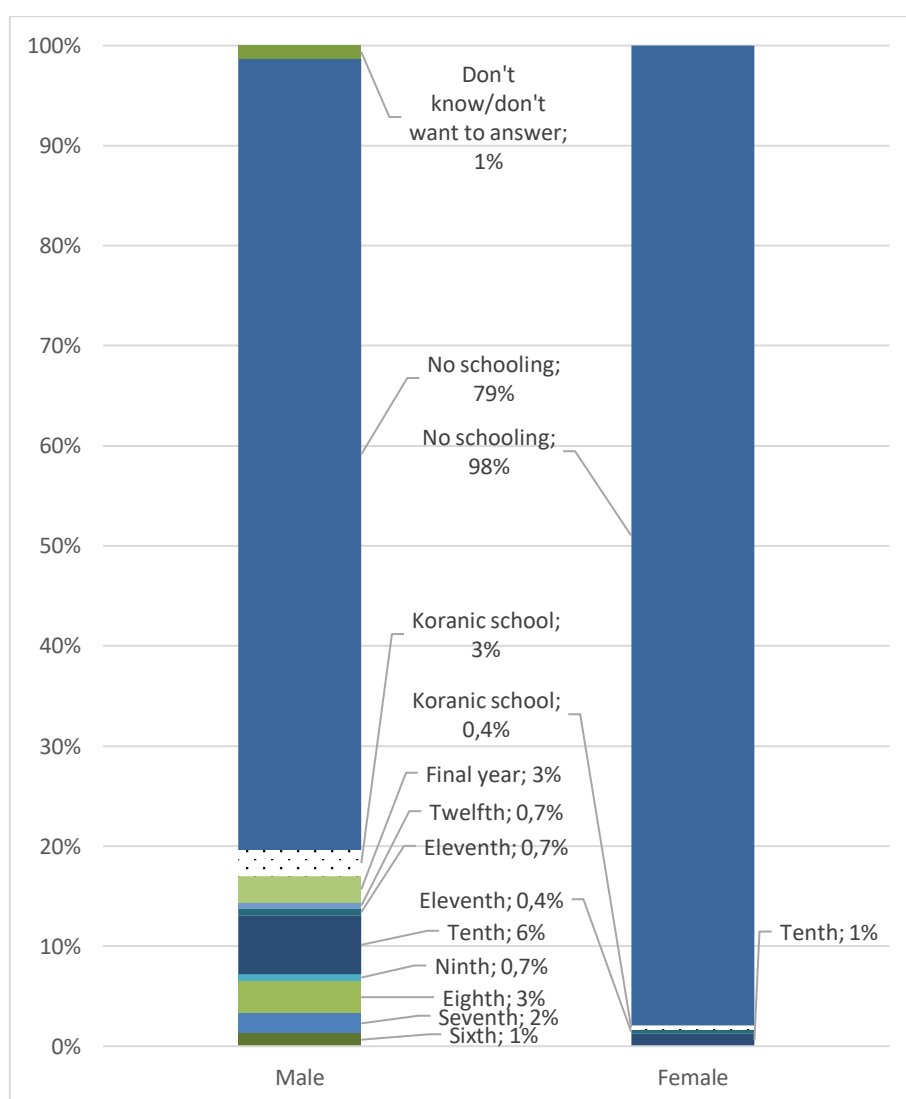


Figure 54 : Highest level of education achieved by members of surveyed households aged 16 and over (n women=243 and n men=153), Source: Insuco, 202 5

6.3.4. Household vulnerability

Vulnerable people are those who, because of their gender, ethnicity, age, physical or mental disability, economic disadvantage or social status, may be more affected than others by the impacts of the project

and who may be limited in their ability to claim or enjoy compensation. These groups should be considered when implementing the ESIA management plans prior to the start of the pre-construction phase.

When the RAP is implemented, the vulnerability of the PAPs should be measured in greater depth, as they are the stakeholders who will suffer the greatest level of impact.

In the context of the project and at the stage of this impact study, (Tableau 61) details the different stakeholder groups identified according to their potential vulnerability to different project impacts.

In addition to this analysis of vulnerability, it is important to mention that women and young people are groups that do not traditionally hold either economic capital or local power within local communities (villages and lineages in particular) and are therefore potentially more likely to feel the negative impacts of the project more acutely.

It should be noted that issues relating to indigenous communities are not present in the study area or are too minor to have any influence on vulnerability. In fact, the issue of indigenusness in this region of Guinea does not meet the criteria set by international institutions when indigenusness is a factor of discrimination.



Tableau 61 Groups potentially vulnerable to project impacts

Potentially vulnerable groups	Main impacts and project phases concerned						
	Physical and economic resettlement	Increased workload for women hosting workers	Traffic accidents	Noise and dust emissions	Risk behaviour with construction workers: GBV/EAS-HS/VCE/IST ¹⁶	Pressure on essential services (water access infrastructures, health services, etc.) from project workers and newly settled users due to the attractiveness of the study area	Demand on ecosystem services from newly settled users due to the attractiveness of the study area
	Preparation phase	Construction phase	Construction and operation phase	Construction phase	Construction phase	Construction and operation phase	Operation phase
Women and girls	X	X			X	X	X
Children			X	X	X		
Elderly people	X		X	X			
People with disabilities	X		X				
People/households with low socio-economic resources	X		X	X	X	X	X
Breeders			X				X

¹⁶ Gender-Based Violence (GBV), Sexual Exploitation and Abuse (SEA), Sexual Harassment (SH), Violence Against Children (VAC), Sexually Transmitted Infection (STI)

6.3.5. Gender perspectives

Household survey respondents' perceptions of gender inequalities and women's local entitlements provide a proxy for gender issues in the study area.

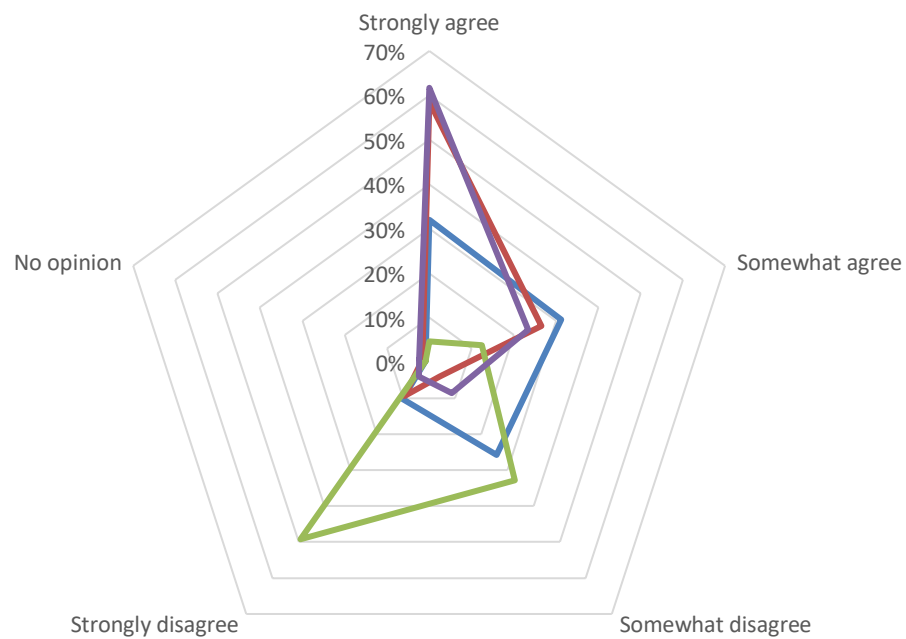
For example, 36% of survey respondents acknowledge that women are not treated in the same way as men within their community (e.g. participation in community decision-making), while only 13% feel that women do not have access to the same economic opportunities as men, 82% think that women should not be able to decide how to spend their household money (this is confirmed by the positions taken during consultations with local communities), and 85% of respondents agree that a man has the right to physically correct a woman (wife, daughter, cousin, etc.) if he feels that a woman is being abused.) if he feels that a fault or behaviour deemed inappropriate has been committed.

It should be noted that the respondents to these surveys were essentially heads of household, the vast majority of whom are male, which constitutes a bias on these gender issues but also sheds light on the positions of this type of actor.

The figure below details the respondents' opinions on these assertions.



- Women are treated in the same way as men in this community (e.g. participation in community decisions).
- Women have access to the same economic opportunities as men in this community.
- Women should be able to decide how to meet household expenses



In addition, these same respondents felt that the most common forms of violence against women in their communities were verbal abuse, followed by isolation (social or physical), physical violence and, to a lesser extent, sexual violence (see Figure 55). However, only 6 respondents (5% of HHs) felt that women were threatened and/or subjected to physical/sexual violence in the neighbourhood at least once a month, while all the other respondents felt that women were rarely threatened and/or subjected to physical/sexual violence in the neighbourhood.

Over the last twelve months, almost half of the respondents to the household surveys had attended at least one awareness-raising session on violence against women (an average of 2 sessions a year). The vast majority of these sessions were held by a specialist NGO (95% of respondents) or, to a lesser extent, during a meeting/discussion with one or more representatives of local groups (youth presidents, women's presidents, elders, etc., for 21% of respondents), during a health consultation (18% of respondents) or by social services (13% of respondents).

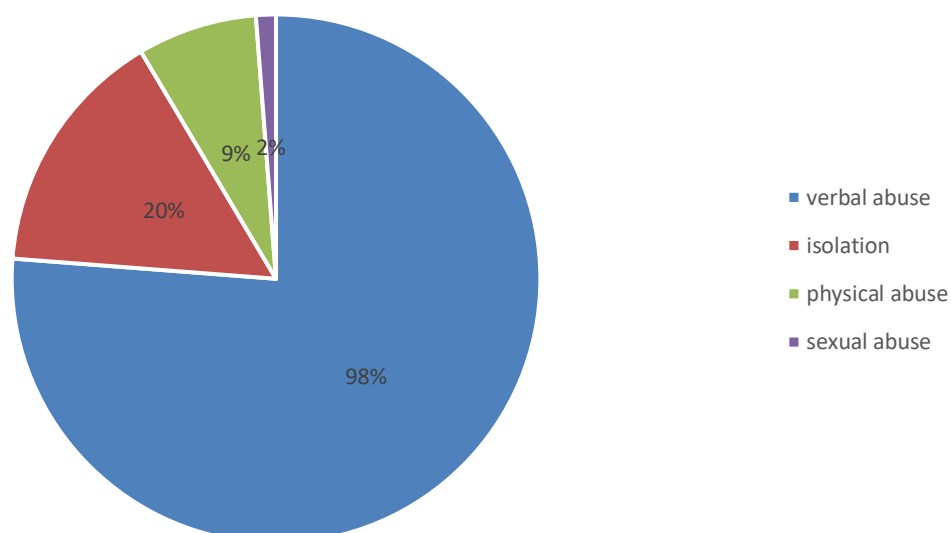


Figure 55 : Household survey respondents' opinions on the type of threat most faced by women in the study area (n = 128),
Source: Insuco, 202 5

It should be noted that respondents' self-censorship in answering these questions is a bias that should not be overlooked, as are local attitudes to female circumcision, which is seen by many as a socio-cultural practice that must be perpetuated, as an inescapable rite of passage to adulthood for young girls and boys.

These figures should also be considered only in the light of the localities targeted for this social baseline and are not intended to be extrapolated. They nevertheless serve as a barometer of gender-related issues, and should be highlighted alongside the national figures:

"According to the EN-VBG (2016), 80.7% of women and girls aged 15 - 69 have experienced an act of violence since the age of 15, including 29.3% of sexual violence. A total of 11.8% of women have been raped at least once since the age of 15 and 6.6% have been raped in the last 12 months. This means that, extrapolated, 223,091 women and girls aged 15-64 are victims of rape each year (based on 2020 population data). - UNFPA Guinea, 2024¹⁷

6.3.6. Conflicts

The main source of conflict in the study area concerns access to and management of land resources:

- Conflicts within a lineage when land is shared between descendants (sons or nephews).

¹⁷ <https://guinea.unfpa.org/fr/topics/violences-bas%C3%A9es-sur-le-genre-et-pratiques-n%C3%A9fastes>

- Conflicts within a lineage, between lineages, between lineages from different villages or districts, or with outsiders to the villages concerning :
 - Delimitation of the parties' land holdings.
 - The opening of gold panning sites by users on land whose managers had only authorised farming.

Conflicts between farmers and stockbreeders over the devastation of crops are also common.

These conflicts are exacerbated by growing demographic pressure and interest in exploiting certain resources such as gold.

Conflict management generally follows the same circuits, with successive hierarchical levels depending on the seriousness of the conflict or the absence of agreement at the previous level: they are first managed between the plaintiffs, then the elders of the lineages intervene, then the doyens (including the soti kémo, the eldest of the lineage considered to be the founder of the village) and the chef secteur (duti kémo), then the district president, then the mayor and the sous-préfet, and if an agreement is still not reached, the plaintiffs can refer the matter to the prefecture and the court.

6.3.7. Settlement history and land situation

6.3.7.1. Principles of land resource management

Written Guinean law is deemed to apply directly throughout the Republic of Guinea. However, many areas of the country do not apply this written law in practice.

For example, throughout the study area, very few, if any, landowners have land titles within the meaning of the Land and Property Code. This does not prevent the recognition of the rights of land occupants under customary law and the presence of a market for the sale of land. A certificate of transfer is nevertheless sometimes requested by the buyer in the case of land transactions in residential areas in the centres of rural communes, but this is anecdotal.

Customary law is exercised over a resource area through a bundle of rights that may be accumulated by a single individual or distributed within a group of people, namely :

- Operational rights or rights of use, relating to human action on resources, such as exploitation or development.
- Administrative rights relating to the control of operational rights, such as the coordination of use, delegation, transmission, transfer or sale.

The notion of resource area includes a variation of uses in a given area. For example, farming activities are carried out in different ways depending on the season or farming method (fallow land, concentrated grazing for soil fertilisation, rice-growing plains, etc.).

This situation explains the deployment of a bundle of rights that varies from one resource area to another (between a plain and a lowland, for example), but it also explains why the same resource area can be used for different purposes and have different land tenure statuses, depending on the season, for example (a plain used by an individual for rice-growing can become a grazing area in the off-season, the use of which comes under village collective management).

In the localities under study and in the study area as a whole, land resources can be managed in three main ways:

- **Individual** management, where administrative rights are held by the head of household. Use rights may be held by the head of household or by a person from outside the household in the case of sharecropping, loans or rental in cash or in kind.
- **Lineage** management, where administrative rights are held by the head of the lineage (or lineage elder). Use rights may be held by the head of a lineage household, by other members of the lineage, or by a person from outside the lineage. In the latter case, the land will be loaned or rented (in kind or in monetary form), depending on the local land tenure context and in particular the pressure on land tenure in the area. This management method is the most common in the study area.
- **Community** management, where administrative rights are usually held by the village chief, often from the founding lineage in the case of the study area. Use rights are granted to members of the village community. NTFP harvesting, for example in community forest areas, or subsistence



farming are often practised there, unlike plantation farming, which is mostly practised on land managed individually or by a lineage. Other uses (hunting, NTFP harvesting, animal husbandry) are subject to the approval of the village chief.

6.3.7.2. Settlement history and application of these principles

The study area is historically part of the Mandingo or Mâli empire, founded by Soundiata Keita in the 12th century, which reached its apogee under the reign of Mansa Moussa in the 14th century, until its collapse in the 15th century with the Songhaï empire. This was followed by the Samorian conquests, the colonial period and the independence of the Republic of Guinea.

The ethnic situation of the study area is characterised by a mosaic of ethnic groups, see 6.3.2.2

In the case of the rural localities where the consultations took place, the villages concerned were mostly founded during the colonial or pre-colonial period by Malinké lineages in search of resource areas in which to farm, raise livestock or hunt. Table 62 summarises the founding periods of some of these localities¹⁸, their founding lineage and the lineages that arrived directly afterwards.

Table 62 : Summary of founding lineages of localities in the study area

Locality	Founding period	Founding lineage	Subsequent lineages
Balato	Pre-colonial/colonial	Arrival of the Bambara, who were later driven out by the Traoré (called Damassi because they were blacksmiths)	Camara, Kourouma, Sacko, Touré, Kanté and Konaté
Norassoba	-	Doumbouya	Camara, Traoré, Brété, Touré, Cissé, Condé, Sylla, Konaté, Oularé and Keita
Kounkono	-	Kourouma	Sidibé, then Sylla, Condé, Kanté, Traoré, Keita and Doumbouya
Fandia	-	Camara	Magassouba, Sidibé, Diallo (the latter two being Malinké from Wassolo), Doumbouya, Kourouma, Traoré, Condé, Keita, Diané and Barry
Nounkounkan	Pre-colonial	Magassouba	Camara, Béréte, Kourouma, Condé, Diakité, Sangaré, Traoré, Touré, Konaté, Koita, Sylla and Keita
Niandankoro	-	Doumbouya	Koulibaly, Camara, Traoré, Sidibé, Condé, Kouyaté, Diallo, Konaté and Sacko

In rural areas, and to a lesser extent in urban areas, the pressures on natural resources (hunting, fishing, gathering and timber forest products) are not yet a sufficient issue for the terms of access to be truly restrictive: access is at most via a request and a symbolic donation to the customary authorities in charge of managing the resource areas concerned.

As far as access to agricultural land is concerned, an application generally has to be made to the chiefs of the lineages concerned, who will establish the conditions of access to this land, which will differ depending on whether the applicant is from the lineage in question, is a resident of the locality or is from outside the locality.

6.3.7.3. Local powers

¹⁸ No information was collected for Koumana and Doura due to time constraints or a refusal by consultation participants to provide information on a situation that is causing tension between the customary authorities.

Local power is exercised at several hierarchical levels:

- At district level (administrative division of the commune), authority is exercised by the district president and his councillors.
- At sector level (administrative division of the district), by the sector chief and his councillors;
- At village level (where this is not directly merged with the sector), by the village chief (*duti kémo*) assisted by the village elders, including the *soti kémo*, representative of the founding lineage, and the imam, holder of religious authority;
- Women and young people also have their own representative bodies, through separate groups led by their representatives.

6.3.8. Cultural heritage sites

As part of this social baseline, consultations with traditional authorities concerning the history of their village territory revealed that certain sacred sites or sites of cultural importance are present within or in the immediate vicinity of the study area:

In the right-of-way area of the future quarry site in the locality of **Kounkono**, there is a genie at the foot of a tree on the slopes of the granite massif, which was lying fallow at the time of the study. The site is called *Farakouloumba*, which means the great shallows (located at the foot of the massif), *fara* meaning "shallows" and *kouloumba* "the big piece". This site is a place of offering to the genie who will intercede on behalf of the petitioner to ensure that he is lucky during his gold panning activities. The genie at this site is linked (as a lesser entity) to the genie responsible for protecting the village of Kounkono, whose residence is outside the project's zone of indirect influence. The¹⁹ manager responsible for interacting with the genie is from the Kanté lineage, who are blacksmiths. This site only has an impact on the village of Kounkono and access to the site is forbidden to women, griots and the uninitiated, and any offerings brought during a ceremony must either be consumed on the spot or left behind but must never be recovered.

In the case of the opening of the quarry, the site must be moved, and the treatment must be the offering of a red rooster, a red goat and red and white kola nuts. Once this treatment has been carried out, the genie is moved immediately to the residence of the genie to whom he is linked. The people we spoke to seemed confident that the treatment would be quick and easy, allowing the site to be moved.

¹⁹ Telephone number of the person in charge: +224 620 37 62 09





Map 57 ; Location of the genie site near the site of the future Kounkono quarry



Photograph 55: Site concerned by the opening of the granite quarry at Kouunkono, the genie site is located at the foot of the tree at the top centre of the photograph, Source: Insuco, April 2025



Photograph 56 : Genie's residence in the right-of-way of the future granite quarry at Kounkono, Source: Insuco, April 2025

Outside the project right-of-way zone, in **most of the villages along the RN 32**, there are strings of ponds and puddles that are the site of festivities in May and are sacred in nature (see section 6.3.3.9). These ponds are generally outside the zone of indirect influence of the project. Photograph 57 shows the Nounkoun pond, which gave its name to Nounkounkan.



Photograph 57: Nounkoun pond in Nounkounkan, Source: Insuco, April 2025

In the project's zone of indirect influence, close to its right-of-way without apparently overlapping it, there are cemeteries in **the Niandankoro** area whose location has raised concerns among those consulted. Close to or within the project's zone of indirect influence, close to its right-of-way without overlapping it, are several sites of socio-cultural interest in the **Balato** area:

- Sacred forest where a genie resides, important for all the village communities. It is a place of prohibitions and ceremonies.
- Sacred forest named *Saditou*, located on the banks of the River Niger. This forest contains an ancient cemetery where ceremonies are held in memory of the founders of the locality.

Outside the area of indirect influence of the project, in Nounkounkan, there is a site of exemplary socio-cultural, historical and spiritual character. This site, known as *Djinkono*, is a fortified architectural complex in Nounkounkan that was once the heart of a succession of fortified enclosures erected to counter enemy raids during the Samorian wars. This complex consists of a fortified enclosure wall (which is regularly restored) and round huts, all made of plastered dry mud bricks and thatched roofs, a cemetery and an area where the fetishes of the founding Magassouba lineage are stored, whose descendants still live there.





Photograph 58 :: Different views of the Djinkono architectural complex in Nounkounkan, Source: Insuco, April 2025



Map 58 : Location of Djinkono in Nounkounkan, Source: Insuco, 2025

During numerous consultations in the localities of the study area (including Koumana, Norassoba, Niandankoro and Nounkounkan), the people consulted seemed very reluctant to share information about sites of socio-cultural importance. This reluctance seems very likely to be due to the fact that the practices associated with these sites are condemned in the name of Islam and are considered to be idolatry that

must be discarded. This does not mean that these sites are no longer important to some people, and if the project impacts on their integrity, appropriate management measures will need to be put in place.

This study does, however, bring to the attention of Project stakeholders that, given the socio-cultural history of the study area and the reluctance of stakeholders to mention at first sight the presence of certain sites, aspects of which remain secret, other sites with a cultural heritage (genius residences, sacred forest, initiation site, archaeological site, cemeteries, etc.) are almost certainly located within the zone of indirect influence and potentially within the project right-of-way area. These sites will be identified, characterised and located exhaustively during the studies to be carried out as part of the RAP in each locality affected by the project's zone of influence. Mitigation measures will have to be put in place in the event of discovery/during consultations with stakeholders, as early as the study phase.

6.3.9. Ecosystem services

Ecosystems provide numerous services known as ecological or ecosystem services. These services represent the benefits that ecosystems provide to human societies. The Table 63 details the ecosystem services present at the site.

Table 63 : Perceived importance of ecosystem services present in the study area

Type of service	Perceived importance	Use of the service
Provisioning (material resources drawn from ecosystems)		
Agricultural land	+++	Practice of annual/bi-annual agriculture (food or cash crops) on burnt land and plantation agriculture (cashew, mango, etc.). On plains, lowlands and hillsides.
Grazing areas	++	Present
Fisheries resources	+++	Present mainly in ponds, river areas and the River Niger.
Hunting resources	+	Present: access to this resource is becoming increasingly limited as a result of slash-and-burn agriculture and urbanisation (in urban and peri-urban areas).
Clay and straw	+++	Resources used for the construction of dwellings in these so-called "traditional" materials and shelters, which are in the majority in the study area.
Sand and gravel	++	Artisanal extraction of sand and gravel by young people and women
Plant NTFPs	++	
Biochemicals, natural medicines and pharmaceutical products	+++	Access to the resource is increasingly limited as a result of slash-and-burn agriculture, heavy exploitation of firewood (terra firma forest) and urbanisation (in urban and peri-urban areas). Significant collection of high-value-added NTFPs (nééré and karité).
Wood and other wood fibres	++	Plant NTFPs are mainly exploited by local women.
Other fibres, e.g. cotton, hemp, silk	Not much present	
Biofuel	+++	Access to the resource is increasingly limited due to slash-and-burn agriculture, overexploitation of the resource and urbanisation (in the case of urban and peri-urban areas).
Fresh water	+++	
Genetic resources	Present	
Cultural (non-material aspects of biodiversity, referring to the cultural, cultural and spiritual aspects of nature or the source of inspiration it represents)		
Sacred or spiritual sites	+	
Areas used for religious purposes	+	
Area of scientific activity	Present (expert opinion)	

Areas for recreational activities and tourism/ecotourism	Present (expert opinion)	
Regulation (intangible benefits provided by the proper functioning of ecosystems)		
Regulation of air quality		
Global climate regulation		
Regional/local climate regulation		
Water regulation	Present (expert opinion)	Present: but expansion of slash-and-burn agriculture and urbanisation (in the case of urban and peri-urban areas), and over-exploitation of certain resources.
Erosion regulation		
Water purification and waste treatment		
Disease regulation		
Pest control		
Pollination		
Regulation of natural disasters		
Support (services necessary for the production of all other services, ensuring the proper functioning of the biosphere)		
Biodiversity		
Primary production	Present (expert opinion)	Present: but the expansion of slash-and-burn agriculture and urbanisation (in the case of urban and peri-urban areas), and the over-exploitation of certain resources, threaten the production and balance of these services.
Access to genetic exchange		

6.3.10. Socio-economic monitoring indicators

The indicators proposed for monitoring changes in the socio-economic conditions that will be influenced by the project throughout its zone of indirect influence are summarised in Table 64. They have been defined to serve as a basis for measuring the impact of the project in the area and will have to be measured before the project is implemented, at mid-project and at the end of the project.

Table 64 : Proposed socio-economic monitoring indicators for the study areas

Socio-economic dimension	Indicator	Pre-project value	Measurement frequency
Access to essential services	Average travel time (in minutes) by members of households in the project's indirect area of influence to the preferred health facility	To be measured at the time of RAP implementation ²⁰	
Community health and safety	Annual number of road accidents on the Koumana-Niandankoro route	To be measured when the RAP is implemented ²⁰	Pre-project, mid-project and end of project
Economic access	Average daily income (365 days, in GNF ²¹) per Oxford consumption unit of households in the project's indirect area of influence	To be measured when the RAP is implemented ²⁰	

²⁰ Providing the most up-to-date value for the indicator before the start of the project

²¹ Rate: 0.00011545417 GNF for 1 USD on 26/06/2025

For information, at the time of this study, this indicator was 16,958 GNF/UC/day.²²

²² Include investments from livestock farming, see section "Livestock farming". 6.3.3.12.6



7. Analysis of critical habitats

7.1. Definition and principles according to PS 6

Critical habitat is a concept developed by the World Bank/IFC group on biodiversity conservation and sustainable management of biological resources. The purpose of this concept is to identify areas of high biodiversity value where development would be particularly sensitive and require special attention.

In accordance with IFC Performance Standard 6, the definition and triggering of critical habitat analysis is based on five main criteria (paragraph 16, PS 6):

- i. Presence of critically endangered or endangered species, as indicated on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species or under equivalent national approaches;
- ii. Presence of endemic or limited-range species;
- iii. Presence of concentrations of migratory or gregarious species of global importance;
- iv. Presence of critically threatened or unique ecosystems;
- v. Identification of areas associated with fundamental evolutionary processes.

NB: the term 'endemic' is equivalent to the expression 'restricted distribution', which refers to a limited area of occurrence (EOO - Extent Of Occurrence). For terrestrial vertebrates and plants, restricted distribution species are defined as species with an EOO of less than 50,000 km². For coastal, riverine and other aquatic species found in habitats no more than 200 km wide at any given point, restricted distribution is understood to mean having a total distribution area less than or equal to a linear geographical range of 500 km (in other words, the distance between the two most distant localities).

According to the World Bank Group's recommendations, a critical habitat analysis consists of three major steps:

1. Consultation and review of existing literature and data;
2. Fieldwork;
3. Critical habitat analysis according to application criteria, known as CHA (Critical Habitat Assessment): the subject of this chapter.

Critical habitat analysis requires the identification of an ecologically appropriate area of analysis, known as EAAA, in order to determine the presence of critical habitat for each species identified in the project's area of influence, or for each ecosystem covered by criteria (i) to (iv).

The concept of the EAAA is fundamental and quite complex. The basic idea is simply to present the fact that it is necessary to define an area of analysis for the CHA in advance. This should not be confused with the project's footprint or its presumed impact area. The area is key, as many of the criteria used to determine critical habitat are quantitative in nature (e.g. the percentage of the total population of a species present in the EAAA).

This 'EAAA' area must be delimited taking into account the distribution of species or ecosystems (within and sometimes beyond the project's area of influence) and the ecological patterns, processes, characteristics and functions necessary to preserve them. These boundaries may include watersheds, major rivers or geological features.

As previously indicated, this analysis area is used to assess the applicability of critical habitat criteria and thresholds in order to determine whether the species and/or ecosystems concerned trigger critical habitat. These are then referred to as CHQ (Critical Habitat Qualifying) species or habitats.

In all cases, critical habitat must be determined taking into account the distribution and connectivity of these features in the landscape and the ecological processes that support them.

7.2. Determination of the ecological analysis area

In theory, the EAAA may vary with each species analysed. Globally, it seems that the use of multiple EAAAs (one per CHQ species) is increasingly recommended, but in practice it seems that a single area is commonly identified.



Normally, an EAAA depends solely on the ecological factors specific to each CHQ element, and not on a project impact area. This becomes problematic for linear infrastructure that crosses several ecological areas. In recent examples of HSAs carried out in West Africa for linear projects (power lines, roads, pipelines), the terrestrial EAAA varies from 5 to 10 km around the project right-of-way. For an access road, a 10 km zone around such a road was used and approved by the IFC for recent projects in Guinea.

An analysis of the road environment did not reveal any easily usable natural units. It was therefore decided to consider:

- For terrestrial species, including avifauna, an EAAA with a distance factor of 10 km around the project area. This approach allows for a conservative consideration of the area that may include chimpanzee populations in the immediate vicinity of the project. Guinea is at the heart of the West African chimpanzee's range. According to Viera et al. (2019), the size of chimpanzees' home ranges is on average large compared to that of most other primates (Harvey and Clutton-Brock 1981), and generally ranges between 10 and 40 km² (Amsler 2009). However, significant variability has been found in the sizes of chimpanzee home ranges, from 3.1 km² for the Taï community (lowland forest, Côte d'Ivoire) (Herbinger et al. 2001) to 63 km² for the Fongoli community (savannah habitat, Senegal) (Pruetz 2006). Various social and ecological factors, including food distribution and availability, predation risk, and community size and composition, affect the distribution and size of chimpanzee home ranges (Bertolani 2013; Lehmann and Boesch 2003). Considering the size of chimpanzee territories to be circular, which is not the case but allows for a simplified approach, a 50 km² territory represents a radius of 4 km and a 70 km² territory represents a radius of 4.7 km. The choice of an EAAA with a 10 km radius around the project allows for a conservative approach that takes into account the biology of this highly endangered species. The size of the EAAA thus defined is 2,500 km², which includes the road to the quarry and an additional margin for the base camp and other temporary structures.
- For aquatic species, an EAAA corresponding to the watersheds of watercourses.

7.3. Screening analysis of species likely to trigger critical habitat

Sources of information

The data used for the screening analysis includes:

- The IBAT analysis, which includes species present within a 50 km radius of the study area
- A review of detailed species data on the IUCN Red List website
- Other data contained in books, scientific articles and consultant reports

CR/EN species

Tableau 65 : List of CR and EN species likely to be present in or near the study area according to IUCN databases (IBAT report)

Kingdom	Class	Scientific name	Common_name	Category	Confirmed present in EAAA	Carried forward
Animalia	Actinopterygii	<i>Brachyalestes carolinae</i>		EN		
Animalia	Aves	<i>Gyps africanus</i>	White-backed Vulture	CR	√	√
Animalia	Aves	<i>Gyps rueppelli</i>	Rüppell's Vulture	CR		
Animalia	Aves	<i>Necrosyrtes monachus</i>	Hooded Vulture	CR	√	√
Animalia	Aves	<i>Neophron percnopterus</i>	Egyptian Vulture	EN		
Animalia	Aves	<i>Polemaetus bellicosus</i>	Martial Eagle	EN	√	√
Animalia	Aves	<i>Terathopius ecaudatus</i>	Bateleur	EN	√	√
Animalia	Mammalia	<i>Phataginus tricuspis</i>	White-bellied Pangolin	EN		
Animalia	Mammalia	<i>Smutsia gigantea</i>	Giant Ground Pangolin	EN		
Animalia	Mammalia	<i>Pan troglodytes verus</i>	Western Chimpanzee	CR		

Kingdom	Class	Scientific name	Common_name	Category	Confirmed present in EAAA	Carried forward
Animalia	Reptilia	<i>Mecistops cataphractus</i>	Slender-snouted Crocodile	CR		
Animalia	Bivalvia	<i>Pleiodon ovatus</i>		CR		
Plantae	Liliopsida	<i>Cyanotis scaberula</i>		EN		
Plantae	Liliopsida	<i>Schizachyrium radicosum</i>		EN		
Plantae	Magnoliopsida	<i>Aspilia chevalieri</i>		EN		
Plantae	Magnoliopsida	<i>Diospyros feliciania</i>		EN		
Plantae	Magnoliopsida	<i>Indigofera pobeguini</i>		CR		
Plantae	Magnoliopsida	<i>Indigofera scarcesii</i>		EN		
Plantae	Magnoliopsida	<i>Bacopa lisowskiana</i>		EN		
Plantae	Magnoliopsida	<i>Lepidagathis epacridea</i>		EN		
Plantae	Magnoliopsida	<i>Microstachys faradianensis</i>		EN		
Plantae	Magnoliopsida	<i>Cyphostemma pobeguianum</i>		EN		

Here is a quick review of species that are not assessed in more detail in the following section:

-Brachyalestes carolinae. Fish restricted to the Niandan River basin, a southern tributary of the Niger River that will not be impacted by the road (Diallo, 2020). Not found during field studies.

-Gyps rueppelli. Species considered extinct in this part of Guinea (Birdlife International, 2021a). Not found during field studies.

- Neophron percnopterus. EAAA outside the nesting range of this species and therefore cannot meet Criterion 1, which requires the presence of at least 5 breeding units in the EAAA (Birdlife International, 2021b). Not found during field studies.

- Phataginus tricuspis. No official EOO (Pietersen et al., 2019) but estimated at almost 6 million km². The EOO should be below 500,000 km² for the potential population to reach 0.5% as required for Criterion 1. At the edge of the range. Not found during field studies.

- Smutsia gigantea. Outside the range (Nixon et al., 2019). No official EOO (Nixon et al., 2019) but estimated at almost 3 million km². The EOO should be less than 500,000 km² for the potential population to reach 0.5% as required for Criterion 1. Not found during field studies.

-Pan troglodytes verus. The presence or absence of chimpanzees in the EAAA area has been the subject of particular attention and is described in the previous chapter. Not found during field studies.

-Mecistops cataphractus. The current presence of this crocodile in the study area is considered uncertain (Shirley, 2014). EOO of 3,000,000 km², so very little possibility of CH triggering. Not found during field studies.

- Pleiodon ovatus. Species that has long since disappeared from the study area and is now only found in a small area in Sierra Leone (Van Damme, 2020).

-Cyanotis scaberula. Not seen since 1937 (Hooper & Cheek, 2019a). Not found during field studies.

- Schizachyrium radicosum. A rare species limited to a very specific habitat: low-altitude sandstone bowal grasslands (Couch, 2019). One site is known near Siguiri, more than 30 km from the project according to the IUCN, but it does not appear to be documented anywhere. Not found during field studies.

- Aspilia chevalieri. A widely distributed species, but the most recent specimen dates from 1964 and many specimens are over 110 years old (Williams & Cheek, 2019). One specimen from the Kouroussa region according to the IUCN map. Not found during field studies.

-Diospyros feliciania. Currently known from only two localities in Fouta Djallon (Cheek & Rokni, 2017). No historical localities near the EAAA. It is unclear why the species is cited in the IBAT report. Not found during field studies.

- Indigofera pobeguini. Seen only once in 1904 in the Kouroussa region (Cheek & Hooper, 2019) and never seen since. Not found during field studies.

- *Indigofera scarcesii*. Species not seen since 1970 with an old specimen near Kankan 50 km from the study area (Cheek & Hooper, 2019b). Not found during field studies.

- *Bacopa lisowskiana*. Species found in swamps and rice fields in Guinea and Mali. One specimen on the south bank of the Niger River near the study area (Canteiro & Cheek, 2019). Not found during field studies.

- *Lepidagathis epacridea*. A rare species found in the bowe forests of Guinea and Mali. One specimen northeast of Kankan (Rokni, 2018) is more than 40 km from the study area. Not found during field studies.

- *Microstachys faradianensis*. A rare species found in the woodlands and savannahs of Guinea and Mali. Only four known localities, including one specimen near Siguiri (Cheek, 2019) more than 30 km from the study area. Not found during field studies.

- *Cyphostemma pobeguianum*. An endemic species of Fouta-Djalon known only from four specimens found between 1900 and 1909. One specimen near Kouroussa (Paradis & Bidault, 2023). Not found during field studies.

Species with restricted range

The species *Pleiodon ovatus* (bivalve), *Brachylestes carolinae* (actinopterygian) and *Hylarana fonensis* (amphibian) are noted in the IBAT report as species with restricted distribution.

However, none of these species appear to require detailed assessment:

- *Pleiodon ovatus* is a species that has long since disappeared from the study area and is now only found in a small area of Sierra Leone (Van Damme, 2020).

- *Brachylestes carolinae* is a fish restricted to the Niandan River basin, a southern tributary of the Niger River that will not be impacted by the road (Diallo, 2020).

- *Hylarana fonensis* is a frog that was (IUCN SSC Amphibian Specialist Group, 2020) considered restricted to the Pic de Fon region of the Simandou range, but is now recognised as present in several parts of Guinea according to consultant reports and probably no longer meets the criteria for being a restricted range species. It is also possible that the true *Hylarana fonensis* is in fact restricted in range and that there are one or more similar species not yet described that are found in other parts of Guinea.

In addition, these species were not found during field studies.

Furthermore, the following species may be considered restricted in range but were missed in the IBAT report:

- *Cyanotis scaberula*. Not seen since 1937 (Hooper & Cheek, 2019).

- *Indigofera pobeguini*. Seen only once in 1904 in the Kouroussa region (Cheek & Hooper, 2019) and never seen since.

These species were not found during field studies and are not included in the detailed assessment.

Migratory species

According to the IBAT report and other data, there are a maximum of 52 species of migratory fish and 159 species of migratory birds in the EAAA.

7.4. Analysis of species present that are likely to trigger critical habitat

Eligible species

The table below presents the species selected for detailed assessment according to the criteria of SFI NP6. These are the species recognised as present in the EAAA.

Table 66 : Analysis of species seen near the road that meet criteria (i) to (iii). MA: Intra-African migrant – P: Palearctic migrant – Pot: Potamodrome – Amphi: Amphidrome

Species	Observation	Criterion (i): Species critically endangered (CR) and/or endangered (EN)	Criterion (ii): Endemic and/or restricted distribution species	Criterion (iii): Migratory and/or gregarious species of global importance
PLANTS				
<i>Pterocarpus erinaceus</i>		Yes	No	No
<i>Tectona grandis</i>		(Yes)	No	No
MAMMALS				
	No species	No	No	No
AMPHIBIANS				
<i>Hylarana cf. fonensis</i>		Uncertain	Uncertain	No
REPTILES				
	No species	No	No	No
BIRDS				
Monk vulture (<i>Necrosyrtes monachus</i>)		Yes	No	No
African vulture (<i>Gyps africanus</i>)		Yes	No	No
Savannah hawk-eagle (<i>Terathopius ecaudatus</i>)		Yes	No	No
Migratory birds (13 MA species, 14 P species)		No	No	Yes
FISH				
Migratory fish (34 species Pot, 2 species Amphi)		No	No	Yes

7.5. Species-related analysis

Criterion (i): Species critically endangered (CR) and/or endangered (EN)

The thresholds for determining Criterion (i) are as follows:

- Areas that support globally significant concentrations of a species classified as EN or CR according to the IUCN Red List ($\geq 0.5\%$ of the global population AND ≥ 5 breeding units of CR or EN species).
- Areas that support globally significant concentrations of a species classified as Vulnerable (VU) according to the IUCN Red List, whose loss would result in a change in status to EN or CR on the IUCN Red List and meet the thresholds defined in paragraph a).
- Where applicable, areas containing significant concentrations of a species classified as EN or CR on a national or regional list.

It should be noted that none of the species identified in the study area and classified as 'vulnerable' (VU) according to IUCN criteria have such a significant concentration that their status could be changed to EN or CR on the Red List in the event of loss/impact caused by the project. Similarly, Guinea does not currently have a national or regional list of threatened species based on criteria similar to those of the IUCN.

No areas of significant concentration of a species classified on the national list have been recorded.

Therefore, only the threshold listed in paragraph a) will be analysed (see below) for species identified as meeting criterion (i) in Table 1.

Kosso (*Pterocarpus erinaceus*) (EN)

This tree is native to West and Central Africa and is common in wooded savannah, dry forest and humid coastal savannah areas. It has a wide distribution and is found in Benin, Côte d'Ivoire, the Central African Republic, Gambia, Ghana, Guinea, Guinea-Bissau, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo. Its range is therefore very extensive.

According to the IUCN status assessment (Barstow, 2018), the EN status is mainly due to the fact that this tree is too often cut down because of the value of its wood. Its EOO is over 2 million km², so the terrestrial EAAA for this project represents less than 0.125% of its range. By equating the percentage of the population with the percentage of the area, the population should be well below the 0.5% required to trigger criterion (i).

However, as part of good conservation practice, the project should identify all individuals of this species in the project impact area and take measures to ensure that, as far as possible, individuals are not affected by project activities and are protected and monitored. In the event of unavoidable damage, a compensation plan must be put in place to ensure at least no net loss in a biodiversity action and/or management plan (BAMP/BAMP).

Tectona grandis (EN)

Although *Tectona grandis* is considered endangered (EN) in its native range in Southeast Asia, this species is planted in Guinea and is even invasive. It is therefore not presented in this report as a species of conservation concern and is included here for the record.

Monk vulture (*Necrosyrtes monachus*) (CR)

This species is widespread in sub-Saharan Africa. Within this very large range (estimated at 22,500,000 km²), the species is generally sedentary. Historically, it is one of the most abundant vultures, particularly in West Africa, but data and observations of varying coverage and quality in various parts of its range suggest that it is undergoing a very rapid decline in its global population (BirdLife International, 2022). The Egyptian vulture is often seen on the outskirts of villages or urban areas, where it feeds on meat scraps and may nest in wooded areas.

Given its range and observations during surveys, it is unlikely that the EAAA includes more than 0.5% of the population of this species (655 individuals), even less than the Kosso.

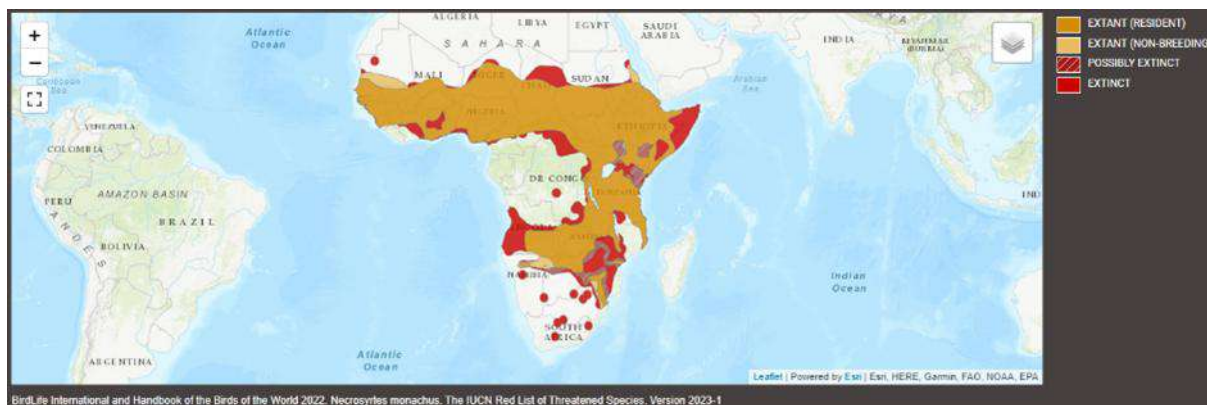


Figure 56 : Map of the distribution range of the Egyptian vulture (BirdLife International, 2022).

GN59 (IFC, 2019) allows some flexibility if areas important to such species are found. The relevant comment in GN59 states: 'For some species with a wide range, critical habitat may be determined by gathering areas, recruitment areas, or other specific habitat characteristics that are important to the species.'

It is true that the recent unofficial practice by some consultants in certain EIAs in Guinea has been to identify vulture nesting sites and treat them specifically as critical habitat. We believe that the best approach is simply to ensure the protection of all vulture nesting sites through careful project planning, regardless of whether they are truly critical habitat within the meaning of NP6. To date, there are no indications of vulture nests or regular gathering sites in the EAAA.

African vulture (*Gyps africanus*) (CR)

The situation for the African vulture is similar to that for the Egyptian vulture. It is a species with an EOO of more than 23 million km². The species is less common than the Egyptian Vulture in the study area, with only 7 individuals observed. So far, there are no indications of the presence of vulture nests or regular gathering sites in the EAAA.

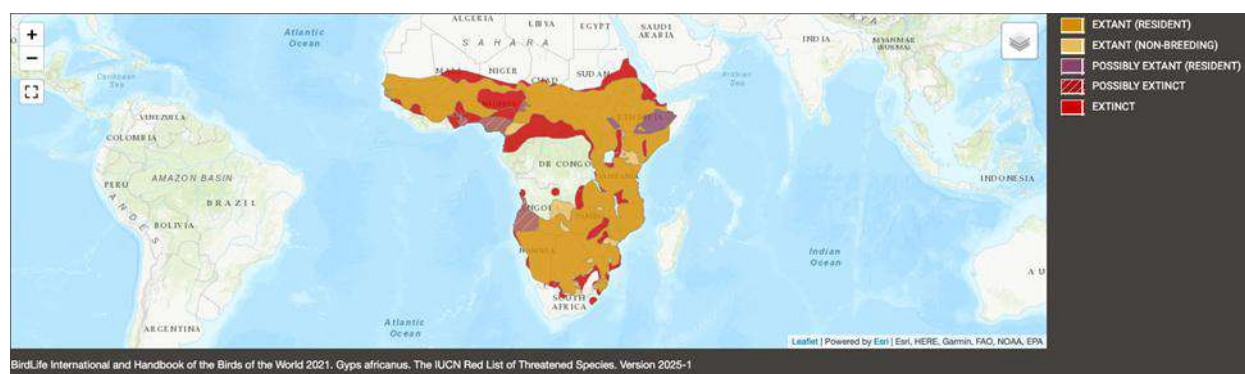


Figure 57 : Distribution of the African vulture (BirdLife International, 2021)

Savannah Hawk (*Terathopus ecaudatus*) (EN)

The situation for the Savannah Hawk is similar to that of vultures. It is a species with an EOO of over 23 million km². The species is less common, with only one individual seen, than the two vultures in the study area, and there are no indications of nesting.



Figure 58: Distribution of the Savanna Bateleur (BirdLife International, 2020)

Criterion (ii): Endemic and/or restricted species

The threshold for criterion (ii) is as follows: areas that regularly harbor $\geq 10\%$ of the global population AND ≥ 10 breeding units of a species.

Hylarana cf. fonensis (no IUCN status – new species?)

This is a special case. It is probably a new species that resembles *Hylarana fonensis*. *Hylarana fonensis* is a species with an IUCN status of DD (IUCN SSC Amphibian Specialist Group, 2020) and a very restricted range in the Simandou region of Guinea Forestière. Genetic studies are underway to determine the genetic affiliation of the specimens collected during fieldwork.

There are several possibilities:

- The specimens belong to the species *Hylarana fonensis*. In this case, the assessment of the distribution range of this species will need to be reviewed, as it may no longer be considered to have a restricted distribution range according to the IUCN definition (50,000 km²). The IUCN status will not be clear, but given the significantly larger range, it will more likely be LC, NT, or VU than CR or EN.
- The specimens confirm that this is another known species (this is quite unlikely, but not impossible).
- The specimens confirm that this is a new species. The IUCN status remains to be determined, but restricted range status is likely and it is highly probable that the EAAA will reach the 10% required to trigger criterion (ii).

- In conclusion, the potential determination of critical habitat for *Hylarana cf. fonensis* will have to await the results of genetic analyses.

Criterion (iii): Migratory and/or gregarious species of global or national importance

The thresholds for criterion (iii) are as follows:

- a) Areas known to support, on a cyclical or otherwise regular basis, $\geq 1\%$ of the global population of a migratory or gregarious species at some point during the species' life cycle.
- b) Areas that can support $\geq 10\%$ of the global population of a species during periods of environmental stress.

A total of 27 **migratory bird species** were recorded during the dry season and rainy season surveys (see Table 50). A total of 13 are intra-African migratory species that move seasonally for nesting, and 14 are Palearctic migratory species (from Eurasia).

No species were recorded in large numbers, with all observations referring to small groups or isolated individuals. None of these species are expected to occur in large numbers, in proportions greater than 1% of their global population, due to the nature of the habitats in the Project area.

Criterion (iii) is not triggered for any migratory bird species.

Most of the migratory **fish species** inventoried exhibit potamodromous migration patterns (see Table 56).

No species found during field studies was recorded in large numbers, and none of these species is expected to occur in large numbers, in proportion greater than 1% of its global population.

Criterion (iii) is not triggered for any migratory fish species observed during fieldwork.

There is one fish species potentially present in the part of the Niger along the route that could potentially reach 1%, given its relatively small range: *Pollimyrus petricolus*. Its presence in this part of Niger is possible according to the IUCN status assessment map (Olaosebikan & Lalèyè, 2020), but the fact that this species was not found during fieldwork suggests that, if present, it must be in very limited numbers and that 1% would probably not be reached.

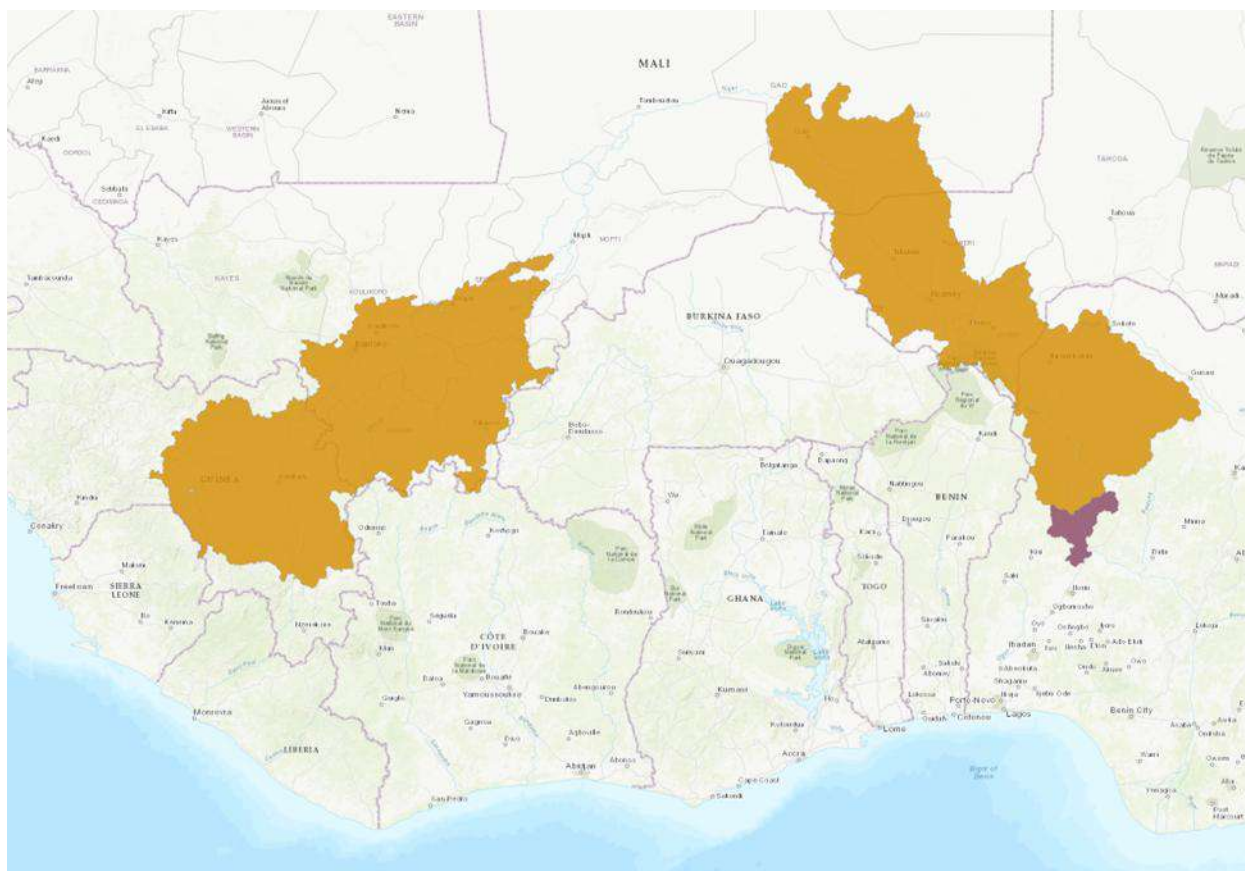


Figure 59 : Distribution of *Pollimyrus petricolus* (Olaosebikan & Lalèyè, 2020)

Therefore, no migratory species triggers criterion (iii).

7.6. Ecosystem-related analysis

▪ **Criterion (iv): Seriously threatened or unique ecosystems**

The thresholds for criterion (iv) are as follows:

- a) Areas representing $\geq 5\%$ of the global extent of an ecosystem type meeting IUCN criteria for CR or EN status.
- b) Other areas not yet assessed by IUCN but considered to be of high conservation priority by systematic conservation planning at the regional or national level.

The IUCN is in the process of establishing a Red List of ecosystems using an approach similar to that used for the Red List of Threatened Species. In the case of ecosystems present in the study area, formal IUCN assessments have not yet been carried out.

In Guinea, however, it has become common practice to use threatened habitats in the report on important areas for plants in Guinea (Couch et al., 2019 - *Threatened Habitats and Important Tropical Areas for Plants (ZTIP) in Guinea, West Africa*). This study uses criteria similar to those recommended by the IUCN.

There are two types of threatened habitats described in Couch et al. (2019) that are potentially present in the EAAA: low-altitude lateritic bowal habitat and certain types of gallery forest.

The problem here is that simply being a threatened habitat at the national level is not sufficient to automatically qualify a habitat as critical under criterion 4. Guidance Note 6 states:

"GN79. IUCN is in the process of establishing a Red List of Ecosystems following an approach similar to that of the Red List of Threatened Species. The client should use the Red List of Ecosystems when formal IUCN assessments have been carried out. In cases where formal IUCN assessments have not been carried out, the client may use systematic assessments carried out at the national/regional level by government agencies, reputable academic institutions, and/or other competent organizations (such as internationally recognized NGOs).

GN80. The threshold for determining Criterion 4 is as follows:

- a) Areas representing $\geq 5\%$ of the global extent of an ecosystem that meets IUCN CR or EN criteria.
- b) Other areas not yet assessed by IUCN, but which are considered high priority for conservation in the context of regional or national conservation planning.

Assuming that the threat assessment status of Couch et al. (2019) is equivalent to the IUCN CR or EN status, which may overestimate the threat status, an area would need to reach the numerical threshold of 5% to meet criterion 4a.

Low-altitude lateritic grasslands cover a significant portion of Guinea (see Figure 60), and the EAAA terrestrial area will not represent 5% or more of the total area.

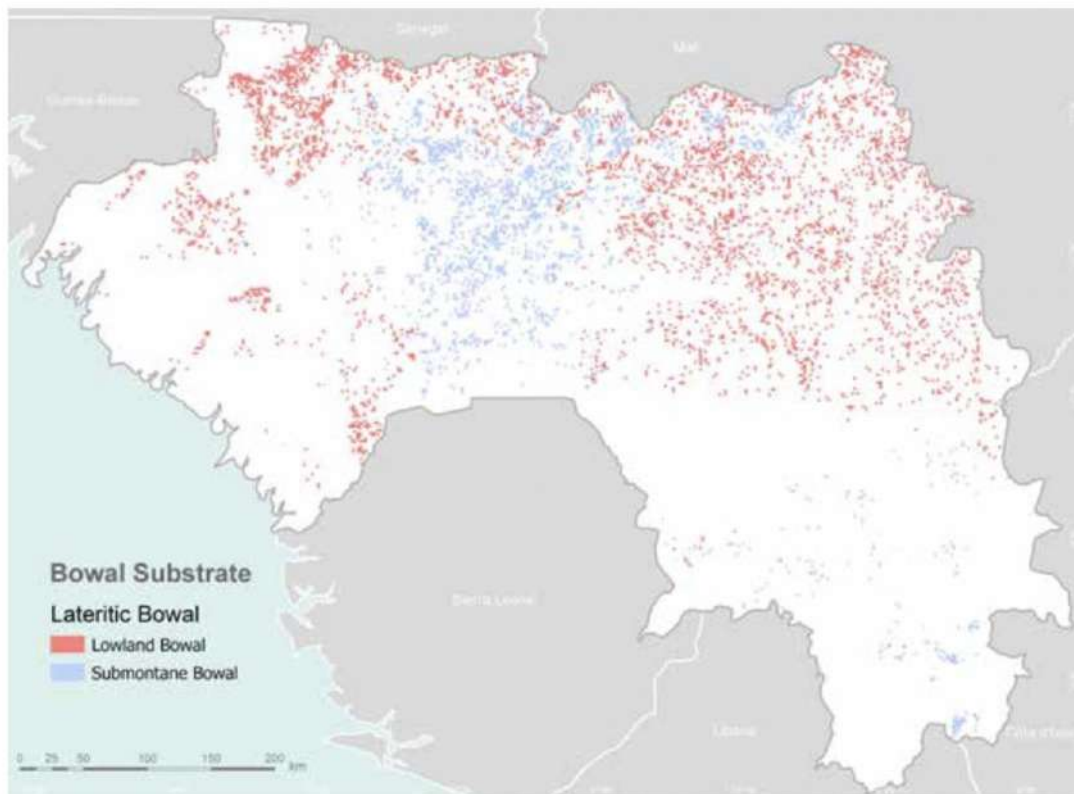


Figure 60 : Lateritic habitat in Guinea (Couch et al., 2019)

The report by Couch et al. (2019) does not recommend protecting all low-altitude lateritic grasslands:

"This habitat is so widespread and common that the risk of its disappearance seems low. Some areas are extensively exploited to supply the construction sector with materials for building and infrastructure. Other areas are at risk of having their bowal crust destroyed to allow access to minerals for mining purposes. The priority is not to protect all lowland bowé, but only small scattered areas containing threatened species..."

No threatened plant species were identified in the low-altitude bowal lateritic grasslands during the ESIA surveys.

As with low-altitude lateritic grasslands, the area of gallery forests in Guinea is thought to be quite large, which means that the limited area of gallery forests in the EAAA would not reach the 5% threshold.

But the situation is even more complex, with Couch et al. (2019) specifying that the most important specific type of gallery forest is a microhabitat belonging to the evergreen forest of the West African plains. The evergreen lowland forest in Guinea is mainly limited to Maritime Guinea and Forest Guinea, with some extensions in Upper Guinea along watercourses in the form of gallery forest. Not all gallery forests in Upper Guinea are necessarily lowland forests. The type specifically targeted by Couch et al. (2019) is the gallery forest composed of evergreen lowland forest.

Couch et al. (2019) provide a list of plant species typical of this habitat type that are threatened, and if these species were present, this could be used to identify the gallery forest in question as an evergreen lowland gallery forest. None of these species were found during fieldwork.

Criterion 4b could be interpreted very broadly, so that no numerical threshold applies and any high-priority site is considered. The report by Couch et al. (2019) does not automatically consider all threatened habitats as high priority for national conservation planning. This would seem to run counter to the objective of criterion 4, which is to identify and protect particularly important areas, and to the recommendations of Couch et al. (2019). If this interpretation of criterion 4b were used, then approximately one quarter of Guinea

would have to be considered high priority and HC based on the threatened habitat types in Couch et al. (2019).

However, based on the normal interpretation of criterion 4a, the area of these types does not reach the 5% required by NP6.

In light of this information, criterion (iv) is not triggered.

▪ **Criterion (v): areas that are associated with fundamental evolutionary processes.**

This criterion differs from the previous four criteria in that it does not have a quantitative aspect. Its application is entirely a matter of judgment. The IFC guidance note of June 2019 states:

"NO81. The structural attributes of a region, such as its topography, geology, soil, temperature, and vegetation, as well as combinations of these variables, can influence the evolutionary processes that give rise to regional patterns of species and ecological characteristics. In some cases, unique or idiosyncratic spatial features of the landscape are associated with genetically unique populations or subpopulations of plant and animal species. Physical or spatial features are described as spatial substitutes or catalysts for evolutionary and ecological processes, and these features are often associated with species diversification. Maintaining these fundamental evolutionary processes inherent in a landscape, as well as the resulting species (or subpopulations of species), has become a major issue in biodiversity conservation efforts in recent decades, particularly for the preservation of genetic diversity. By preserving species diversity within a landscape, the processes that promote speciation, as well as genetic diversity within species, ensure the flexibility of evolution within a system, which is particularly important in the context of rapid climate change."

Studies conducted to date have not identified areas that are associated with key evolutionary processes. Criterion (iv) is therefore not triggered.

7.7. Summary of the analysis of critical habitats, areas concerned, and surface areas

For the time being, pending genetic analyses for *Hylarana cf. fonensis*, the critical habitat according to NP6 is not triggered. A PAB/PGB will be produced at a later date, which will take into account the results of genetic analyses for *Hylarana cf. fonensis*.

Nevertheless, the presence of species with high conservation status is confirmed and these species will need to be taken into account in avoidance and mitigation measures, in particular:

- Kosso
- Herd vulture
- African vulture
- Savannah hawk
- *Hylarana cf. fonensis*

It should also be noted that NP6 requires that there be no net loss of biodiversity for natural habitats, and this will be taken into account in the PAB/PGB to be produced at a later date.

8. Impacts of the project on various environmental areas

The process of identifying risks and impacts must include all measures and methods necessary to detect, identify, analyse, measure or assess, as far as possible in quantitative terms, the potential negative risks and impacts (including environmental, social, health, safety, labour and security impacts) associated with the project (NP 1).

This section presents an analysis of the project's impacts on the physical, biological and human environment.

These impacts, whether positive or negative, will first be measured in a scenario prior to the implementation of mitigation measures (other than the route optimisation measures adopted prior to this study). This assessment is presented in section 8.2.

Secondly, the impacts remaining after the implementation of mitigation and compensation measures, known as residual impacts, are assessed using the same analysis method and presented in section 8.3.

Figure 61 below details the effects of the successive adoption of different types of management measures on the environmental and social impacts of the project.

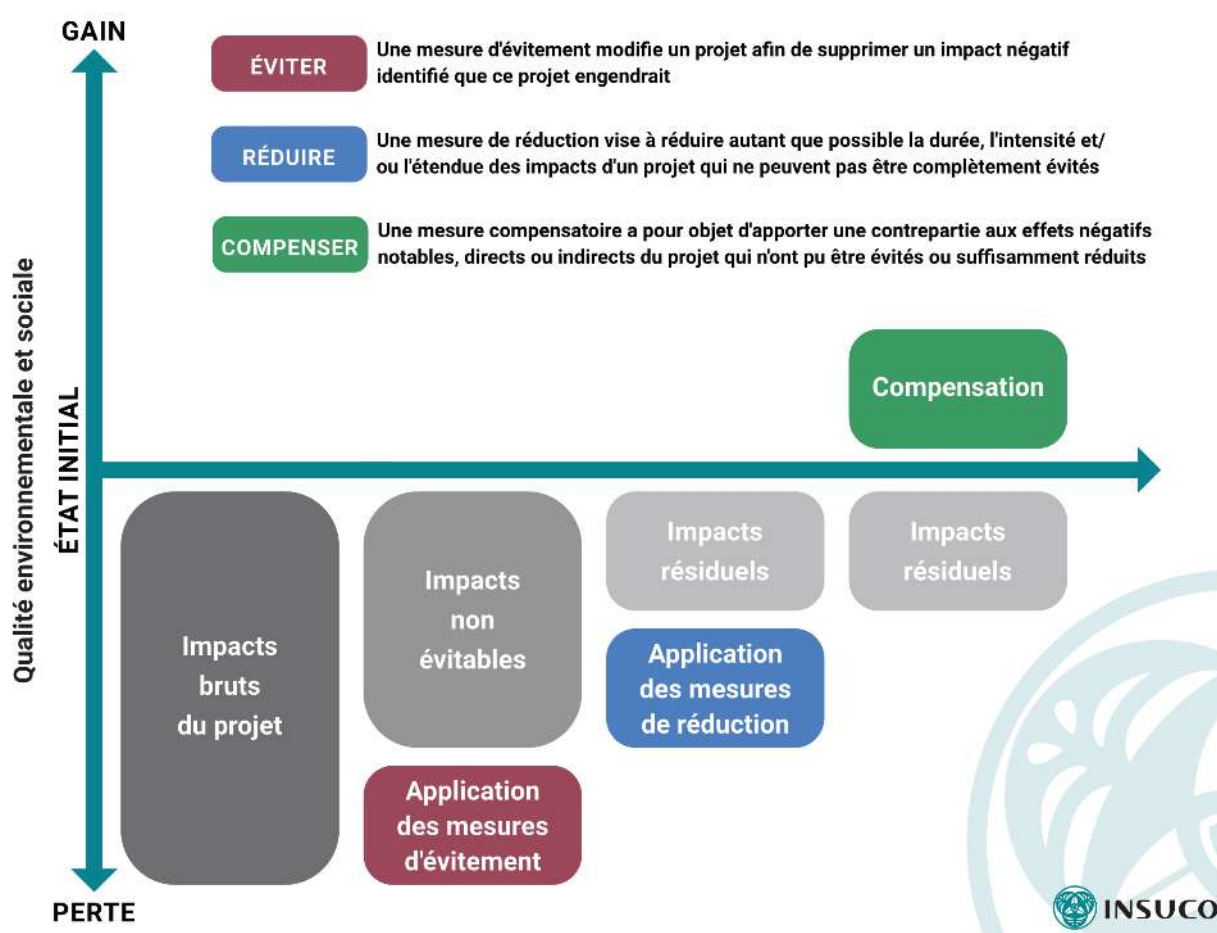


Figure 61 : Avoid-Reduce-Compensate sequence and effect on the environmental and social impacts of the project

An analysis of the cumulative impacts resulting from the interaction between the project under consideration and other projects in the study area is presented in section 13.1.

Finally, section 9 summarises the potential impacts of the project on human rights.

8.1. Identification and assessment method

8.1.1. Note regarding consideration of successive project phases

It should be noted that although requested generically in an impact assessment, the project closure phase was not considered as such in this impact assessment.

Indeed, with the implementation of a sustainable financing mechanism through toll stations to finance the upkeep and maintenance of the RN 32 and its associated structures beyond the operational phase, coupled with the handover to the Guinean State from the operational phase onwards for the operation and maintenance of the project, it seems highly unlikely that the RN 32 will deteriorate significantly at the end of the project's average 15-year lifespan and that the project will therefore generate any impacts beyond the extension of those already analysed during the operational phase. It is also worth noting that such a road project may be improved in the future, but it will certainly not be subject to a dismantling phase. In any case, any impacts caused by future works would be identical to those described here for the construction phase.

8.1.2. Impact assessment methodology

8.1.2.1. Assessment of the absolute significance of the impact

The absolute significance of an environmental or social impact, whether positive or negative, is determined based on an assessment of the following three criteria: the intensity, extent and duration of the impact's effects.

Tableau 67: Criteria for determining the absolute significance of the impact

Intensity of impact	Also known as the degree of disruption, this corresponds to the extent of changes affecting the internal dynamics and function of the affected element. It can be perceived at three levels or degrees, which are: • Low when the impact does not perceptibly alter the integrity, quality or use of the affected element and/or when the impact does not perceptibly alter the quality of life of the individuals or groups affected; • Medium when the impact partially compromises the use, quality or integrity of the affected element or when the impact partially diminishes the quality of life of the individuals or groups affected; • High when the impact compromises the integrity of the affected element, alters its quality or significantly restricts its use and/or when the impact significantly degrades the quality of life of the individuals or groups affected.
Extent of impact	The extent of the impact corresponds to the spatial scope of the effects that may be produced by an intervention on the environment. It refers to a distance and/or space within which a component will undergo a change. The extent of the impact may be: • Localised: when the impact is felt only within the limits of the project's direct impact area, and/or when the impact affects only individuals within the project's direct impact area; • Local: when the impact is felt outside the study area, but within the boundaries of the locality (village or municipality) and/or when the impact affects individuals within the indirect impact area of the project; • Regional: when the impact is felt beyond the boundaries of the locality and/or when the impact affects individuals beyond the boundaries of the indirect impact area of the Project.
Duration of impact	The duration of the impact corresponds to the length of time during which an element will undergo a change. The impact extends over a period:

- **Short**, when the effect of the impact is felt at a given moment and for a period of less than one season for environmental impacts and one year for social impacts;
- **Medium**, when the effect of the impact is felt temporarily, for a period longer than one season and shorter than the average life of the project (15 years);
- **Long**, when the effect of the impact is felt over a period equal to or greater than the average lifespan of the project (15 years).

Note: for this project, work on the road rehabilitation (Component A) and engineering structures (Component B) will be carried out as work progresses along the route. Therefore, even if the project lasts more than one season, we will consider in this impact assessment that the duration of the impact will be short for each section of the route concerned. For the quarry, the impact will inevitably be of medium duration.

An assessment grid is used to cross-reference the three assessment criteria in order to obtain the absolute significance, which can be major, medium or minor.

Tableau 68 / Method for determining the absolute significance of an impact

Intensity	Extent	Duration	Absolute Importance
Strong	Regional	Long	Major
		Medium	Major
		Short	Major
	Local	Long	Major
		Medium	Medium
		Short	Medium
	Occasional	Long	Major
		Medium	Medium
		Short	Minor
Medium	Regional	Long	Major
		Medium	Average
		Short	Medium
	Local	Long	Average
		Medium	Average
		Short	Average
	Occasional	Long	Average
		Medium	Average
		Short	Minor
Low	Regional	Long	Major
		Medium	Medium
		Short	Minor
	Local	Long	Medium
		Medium	Medium
		Short	Minor
	Occasional	Long	Minor
		Medium	Minor
		Short	Minor

8.1.2.2. Assessment of the relative significance of the impact

Relative significance is determined based on the absolute significance of the impact and the sensitivity of the environment.

Each component of the receiving environment has its own level of sensitivity. The sensitivity of the environment is considered low, medium or high based on the inherent characteristics of the environmental component, as follows:

- **The value is low** if the impact affects a resource that is abundant seasonally or throughout the year and is not threatened with extinction, or if the impact does not directly affect vulnerable people, affects an activity that is not of major importance to the income of the people affected and/or affects an essential service that is not under significant pressure.

- **The value is medium** if the impact affects a resource with a relatively long regeneration and mutation time (approximately five years); or if it affects an essential activity or service that is of major importance to the living conditions of the people affected but is easily replaceable by another activity or service.
- **The value is high** if it affects a resource with a long regeneration and mutation time (more than five years), a sensitive area or a resource threatened with permanent extinction; or if the impact is a major and recurring concern among the populations consulted, directly affects vulnerable people, destroys an activity that is the main source of income or an essential service that is of major importance to the living conditions of the people affected.

The interaction of absolute importance with the relative value of the affected component gives the relative importance according to the method described in the following table.

Tableau 69 : Method for determining the relative importance of an impact based on its absolute importance

Absolute importance	Sensitivity of the environment	Relative importance
Major	High	High
	Medium	Strong
	Low	Medium
Medium	Strong	Strong
	Average	Average
	Low	Medium
Minor	Strong	Average
	Medium	Average
	Low	Minor

8.1.3. Identification of impacts

The project's impacts are identified and classified according to Leopold's matrix. This matrix links the activities that cause impacts on the one hand and the affected environmental components on the other, with a list of activities that cause impacts. All of the activities listed will have both negative and positive impacts on the project's environment, which must be analysed in order to propose appropriate measures to either avoid, mitigate or compensate for them (in the case of negative impacts) or enhance them (in the case of positive impacts).

Tableau 70 Project phases and impact-generating activities

Preparation	Construction	Operation
Activity 1: ESIA, other preliminary studies (topographical and geotechnical studies) and obtaining permits Activity 2: Marking of rights-of-way, land acquisition and clearing of rights-of-way	Activity 3: Recruitment of workers and subcontractors for the construction of structures Activity 4: Transport of equipment and materials to sites, heavy vehicle traffic Activity 5: Carrying out preliminary work, including creating access roads where necessary on certain parts of the route, clearing rights-of-way, securing access points, constructing technical buildings and the base camp, and storage areas	Activity 9: Recruitment of workers and subcontractors for the operation and maintenance of the national road, engineering structures and toll stations Activity 10: Operation and maintenance of the national road, engineering structures and toll stations

Activity 7: Civil engineering works

A. For the road component:

- Earthworks (stripping, excavation and backfilling)
- Conducting a planimetric survey of the sub-bases
- Installation of the impregnation/bonding base layer
- Laying of asphalt concrete

B. For the engineering structure component:

- Dismantling of existing structures (if applicable)
- Construction of shallow foundations
- Construction of the reinforced concrete deck
- Additional superstructure work
- Finishing and fine-tuning
- Demobilisation: opening to traffic

While maintaining all relevant public and private services

Activity 8: Dismantling of the construction site (base camp, storage and depot areas, removal of equipment and construction machinery, etc.)

Impacts affecting groups that are vulnerable or potentially vulnerable to the project's impacts are not addressed in specific sections, and issues related to gender and vulnerability are dealt with directly in the sections identifying and assessing impacts, when these specifications are relevant to the impact assessment and the proposed measures.

Tableau 71 below presents the potential impacts identified and the components that may be affected in the project's area of influence.

	Components of the human environment										Components of the physical environment					Component of the biological environment		
	Employment and	Land and land use	Demographics and	Traffic, transport	Governance and	Health and safety	Access to essential	Ecosystem	Economic	Cultural heritage	Air	Noise	Soil and sediments	Water	Landscape	Habitats	Flora	Fauna
Preparatory phase																		
Activity 1: ESIA, other preliminary studies (geological and geotechnical studies) and obtaining permits																		
Activity 2: Marking of rights-of-way, land acquisition and clearing of rights-of-way																		
Construction phase																		
Activity 3: Recruitment of workers and subcontractors for the construction of structures																		
Activity 4: Transport of equipment and materials to sites, heavy vehicle traffic																		
Activity 5: Carrying out preliminary work, including creating access routes, clearing land, securing access points, constructing technical buildings and the site office, storage areas and auxiliary depots, etc. While maintaining all relevant public and private services.																		
Activity 6: Occupation and commissioning of the base camp/Installation of foreign workers																		

	Components of the human environment										Components of the physical environment					Component of the biological environment		
	Employment and	Land and land use	Demographics and	Traffic, transport	Governance and	Health and safety	Access to essential	Ecosystem	Economic	Cultural heritage	Air	Noise	Soil and sediments	Water	Landscape	Habitats	Flora	Fauna
Activity 7: Civil engineering works A. For the road component: - Earthworks (stripping, excavation and backfilling) - Conducting a planimetric survey of the sub-bases - Laying of the impregnation/bonding base layer - Laying of asphalt concrete B. For the engineering structure component: - Dismantling of existing structures (if applicable) - Construction of shallow foundations - Construction of the reinforced concrete deck - Additional superstructure works - Finishing and fine-tuning - Demobilisation: opening to traffic With all relevant public and private services maintained																		
Activity 8: Dismantling of the site (base camp, storage and depot areas, removal of equipment and construction machinery, etc.)																		
Operational phase																		
Activity 9: Recruitment of workers and subcontractors for the operation and maintenance of the national road, engineering structures and toll stations																		
Activity 10: Operation and maintenance of the national road network, engineering structures and toll stations																		

Tableau 71 : Identification of impacts – Leopold Matrix

8.2. Analysis of the project's potential impacts

8.2.1. Overview of impacts

Appendix 20 lists all of the impacts assessed and the measures taken to manage them.

Tableau 72 : Summary of potential impacts – Fecteau matrix (Affected components: A – RN32, engineering structures and toll stations / B – Base camp and temporary facilities / C – Granite quarry / D – Access road to the granite quarry)

Environmental component	Impact No.	Phase	Project component	Impact	Negative/Positive	Impact					
						Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance
Employment and working conditions	1	Construction	A, B, C and D	Job creation in construction	Positive	Strong	Regional	Average	Major	Strong	Positive Strong
Employment and working conditions	2	Construction	A, B, C and D	Development of SMEs linked to the influx of project workers	Positive	Average	Regional	Average	Average	Strong	Positive Strong
Employment and working conditions	3	Construction	A, B, C and D	Opportunities for local businesses	Positive	Average	Regional	Average	Average	Strong	Positive Strong

Environmental component	Impact No.	Phase	Project component	Impact	Negative/Positive	Impact					
						Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance
Employment and working conditions	4	Exploitation	A	Creation of jobs for maintenance of the RN32, engineering structures and toll station in	Positive	Low	Local	Medium	Medium	Strong	Positive High
Land and land use	5	Preparation	A	Disruption of development plans	Negative	Low	Occasional	Long	Medium	Strong	Medium
Land and land use	6	Preparation	A	Land inflation caused by land acquisition	Negative	Low	One-off	Average	Minor	Strong	Medium
Land and land use	7	Preparation	A, C and D	Permanent land loss	Negative	Average	One-off	Long	Average	Strong	Strong
Land and land use	8	Preparation	B	Temporary loss of land	Negative	Average	One-off	Average	Average	Strong	Strong

Environmental component	Impact No.	Phase	Project component	Impact	Negative/Positive	Impact					
						Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance
Land and land use	49	Construction	B and C	Return of temporarily acquired land	Positive	Average	Occasional	Long	Average	Strong	Positive Strong
Land and land use	9	Exploitation	A	Land inflation caused by proximity to the RN32 motorway	Negative	Average	Regional	Long	Major	Strong	Strong
Demographics and migration	10	Preparation	A, B, C and D	Displacement related to resettlement	Negative	Significant	Occasional	Long	Major	Strong	Strong
Demographics and migration	11	Preparation	A, B, C and D	Emigration of young people due to the payment of PAR compensation	Negative	Strong	Occasional	Long	Major	Strong	Strong

Environmental component	Impact No.	Phase	Project component	Impact	Negative/Positive	Impact					
						Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance
Demographics and migration	12	Construction	A, B, C and D	Influx of workers and opportunistic migration	Negative	Strong	Local	Medium	Medium	Average	Average
Demographics and migration	13	Construction	A, B, C and D	Increased workload for women hosting workers	Negative	Average	Occasional	Average	Average	Average	Average
Demographics and migration	14	Construction	A, B, C and D	Cultural mixing	Positive	Average	Local	Average	Average	Average	Positive Average
Demographics and migration	15	Exploitation	A and C	Attractiveness of newly accessible areas	Positive	Strong	Regional	Long	Major	Strong	Positive Strong
Traffic, circulation and mobility	16	Construction	A, B, C and D	Traffic disruption caused by construction activities, including the transport of	Negative	Average	Local	Average	Average	Average	Average

Environmental component	Impact No.	Phase	Project component	Impact	Negative/Positive	Impact					
						Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance
				machinery, materials and workers							
Traffic, circulation and mobility	17	Operation	A	Traffic disruption due to maintenance activities, including the transport of machinery, materials and workers.	Negative	Average	Occasional	Average	Average	Average	Average
Traffic, circulation and mobility	18	Operation	A	Improvement of traffic, circulation and mobility on the RN32	Positive	Average	Regional	Average	Average	Strong	Positive Strong
Traffic, circulation and mobility	19	Operation	D	Improvement of traffic, circulation and mobility on the track between	Positive	Average	Local	Average	Average	Strong	Positive Strong

Environmental component	Impact No.	Phase	Project component	Impact	Negative/Positive	Impact					
						Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance
				Norassoba and Kounkono							
Governance and social cohesion	20	Preparation	A, B, C and D	Exclusion of local authorities from decision-making processes and project stages	Negative	Strong	Occasional	Average	Average	Average	Average
Governance and social cohesion	21	Preparation	A, B, C and D	Disruptions related to the development of the ESIA and PAR	Negative	Strong	Local	Moderate	Medium	Average	Average
Governance and social cohesion	22	Construction	A, B, C and D	Recruitment tensions	Negative	Average	Local	Average	Average	Average	Average

Environmental component	Impact No.	Phase	Project component	Impact	Negative/Positive	Impact					
						Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance
Governance and social cohesion	23	Construction	A, B, C and D	Tensions with project workers	Negative	Average	Occasional	Average	Average	Average	Average
Governance and social cohesion	24	Exploitation	A	Recruitment tensions	Negative	Low	Local	Short	Minor	Medium	Medium
Governance and social cohesion	25	Operation	A	Tensions with project workers	Negative	Low	Occasional	Short	Minor	Medium	Medium
Community and worker health and safety	26	Construction	A, C and D	Road accidents and construction site accidents	Negative	High	Occasional	Average	Average	Strong	Strong
Health and safety of communities and workers	27	Construction	A, B, C and D	Health and safety risk behaviours among construction workers	Negative	Strong	Local	Average	Medium	Strong	Strong

Environmental component	Impact No.	Phase	Project component	Impact	Negative/Positive	Impact					
						Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance
Health and safety of communities and workers	28	Construction	A	Accidents and property damage in the event of poor flood management (rainwater runoff and flooding of the Niger River)	Negative	Low	Local	Short	Minor	Strong	Medium
Health and safety of communities and workers	29	Construction	A, B, C and D	Construction site nuisances (noise, dust, explosions, etc.)	Negative	Average	Local	Short	Average	Strong	Strong
Health and safety of communities and workers	30	Operations	A	Road accidents and construction site accidents	Negative	High	Occasional	Average	Average	Strong	Strong

Environmental component	Impact No.	Phase	Project component	Impact	Negative/Positive	Impact					
						Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance
Health and safety of communities and workers	31	Operations	A	Accidents and loss of property in the event of poor dimensioning of project structures leading to poor flood managements (rainwater runoff and flooding of the Niger River)	Negative	Low	Local	Short	Minor	Strong	Medium
Community and worker health and safety	32	Operations	A	Health and safety risk behaviours among project workers	Negative	Average	Occasional	Short	Minor	Strong	Medium
Access to essential services	33	Preparation	A	Loss of community infrastructure	Negative	High	One-off	Long	Major	Strong	Strong

Environmental component	Impact No.	Phase	Project component	Impact	Negative/Positive	Impact					
						Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance
				e due to land acquisition							
Access to essential services	34	Preparation	A	Disruption to water supply networks, power lines, fibre optics	Negative	Severe	Occasional	Long	Major	Strong	Strong
Access to essential services	35	Preparation	A, B, C and D	Pressure on essential services related to relocation	Negative	Average	Occasional	Long	Average	Strong	Strong
Access to essential services	36	Construction	A, B, C and D	Pressure on essential services related to project workers	Negative	Low	Occasional	Moderate	Minor	Strong	Medium
Access to essential services	37	Exploitation	A	Pressure on essential services linked to	Negative	Strong	Local	Long	Major	Strong	Strong

Environmental component	Impact No.	Phase	Project component	Impact	Negative/Positive	Impact					
						Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance
				migration due to improved accessibility							
Access to essential services	38	Exploitation	A, C and D	Opening up and improving access to basic services	Positive	Strong	Regional	Long	Major	Strong	Positive Strong
Ecosystem services	39	Preparation	A, B, C and D	Loss of ecosystem services related to land acquisition	Negative	Low	One-off	Long	Minor	Strong	Medium
Ecosystem services	40	Preparation	A, B, C and D	Pressure on ecosystem services related to resettlement	Negative	Low	Occasional	Long	Minor	Strong	Medium

Environmental component	Impact No.	Phase	Project component	Impact	Negative/Positive	Impact					
						Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance
Ecosystem services	41	Construction	A, B, C and D	Pressure on ecosystem services related to project workers	Negative	Low	Occasional	Moderate	Minor	Strong	Medium
Ecosystem services	42	Exploitation	A	Pressure on ecosystem services linked to migration due to improved access	Negative	High	Local	Long	Major	Strong	Strong
Economic activities	43	Preparation	A, B, C and D	Loss of economic activity related to land acquisition	Negative	Significant	One-off	Long	Major	Strong	Strong
Economic activities	44	Exploitation	A	Economic development of the region due	Positive	Strong	Regional	Long	Major	Strong	Positive Strong

Environmental component	Impact No.	Phase	Project component	Impact	Negative/Positive	Impact					
						Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance
				to improved accessibility							
Cultural heritage	45	Preparation	A, B, C and D	Displacement and destruction of socio-cultural heritage sites	Negative	Average	Occasional	Long	Average	Average	Average
Cultural heritage	46	Construction	A, B, C and D	Archaeological artefact discoveries	Negative	Average	Occasional	Long	Medium	Low	Average
Cultural heritage	47	Construction	A, B, C and D	Degradation of socio-cultural heritage sites	Negative	Average	Occasional	Long	Average	Average	Average
Cultural heritage	48	Exploitation	A	Degradation of socio-cultural heritage sites during	Negative	Average	Occasional	Long	Average	Average	Average

Environmental component	Impact No.	Phase	Project component	Impact	Negative/Positive	Impact					
						Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance
				construction activities on the RN32 and related structures							
Air	50	Preparation	A, B, C and D	PM10 & PM2.5 dust/particle emissions	Negative	Low	Occasional	Short	Minor	Medium	Medium
Air	51	Construction	A, B, C and D	Dust/PM10 & PM2.5 particle emissions	Negative	Average	Local	Average	Average	Average	Average
Air	52	Operation/Maintenance	A	Dust/PM10 & PM2.5 emissions	Negative	Low	Occasional	Long	Minor	Average	Medium
Air	53	Preparation	A, B, C and D	NOx, NO2 and SO2 emissions	Negative	Low	Occasional	Short	Minor	Medium	Medium
Air	54	Construction	A, B, C and D	NOx, NO2 and SO2 emissions	Negative	Average	Local	Average	Average	Average	Average

Environmental component	Impact No.	Phase	Project component	Impact	Negative/Positive	Impact					
						Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance
Air	55	Operation/Maintenance	A	gas emissions NOx, NO2 and SO2	Negative	Average	Local	Long	Average	Average	Average
Climate	56	Preparation	A, B, C and D	GHG emissions	Negative	Low	Occasional	Short	Minor	Strong	Medium
Climate	57	Construction	A, B, C and D	GHG emissions	Negative	Average	Local	Average	Average	Strong	Strong
Climate	58	Operation/Maintenance	A	GHG emissions	Negative	Average	Local	Long	Average	Strong	Strong
Climate	59	Preparation	A, B, C and D	Impacts on climate	Negative	Low	Occasional	Short	Minor	Average	Medium
Climate	60	Construction	A, B, C and D	Climate impacts	Negative	Low	Occasional	Medium	Minor	Average	Medium

Environmental component	Impact No.	Phase	Project component	Impact	Negative/Positive	Impact					
						Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance
Climate	61	Operation/Maintenance	A	Climate impacts	Negative	Low	Occasional	Long	Minor	Medium	Medium
Noise	62	Preparation	A, B, C and D	Change in noise levels	Negative	Low	Occasional	Short	Minor	Medium	Medium
Noise	63	Construction	A, B, C and D	Modification of noise levels	Negative	Average	Local	Average	Average	Average	Average
Noise	64	Operation/Maintenance	A	Modification of noise levels	Negative	Low	Occasional	Long	Minor	Medium	Medium
Ground	65	Preparation	A, B, C and D	Soil erosion and compaction linked to land clearing	Negative	Average	Occasional	Short	Minor	Average	Average
Ground	66	Construction	A, B, C and D	Soil erosion and compaction linked to land clearing	Negative	Average	Occasional	Average	Average	Average	Average

Environmental component	Impact No.	Phase	Project component	Impact	Negative/Positive	Impact					
						Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance
Soil	67	Operation/Maintenance	A	Soil erosion and compaction associated with land clearing	Negative	Low	Occasional	Long	Minor	Average	Medium
Ground	68	Construction	A, B, C and D	Increased erosion of hydromorphic soils and sloping areas	Negative	Significant	Occasional	Average	Moderate	Average	Average
Soil	69	Preparation	A, B, C and D	Change in soil composition due to backfill	Negative	Low	Occasional	Long	Minor	Low	Low
Ground	70	Construction	A, B, C and D	Change in soil composition due to backfill	Negative	Low	Occasional	Long	Minor	Low	Low

Environmental component	Impact No.	Phase	Project component	Impact	Negative/Positive	Impact					
						Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance
Ground	71	Preparation	A, B, C and D	Risk of soil quality degradation due to chemicals and waste	Negative	Low	Occasional	Long	Minor	Low	Low
Ground	72	Construction	A, B, C and D	Risk of soil quality degradation due to chemicals and waste	Negative	Average	Occasional	Long	Average	Low	Average
Soil	73	Operation/Maintenance	A	Risk of soil quality degradation due to chemicals and waste	Negative	Average	Occasional	Long	Medium	Low	Average
Water	74	Preparation	A, B, C and D	Risk of increased suspended solids in water due to erosion	Negative	Average	Occasional	Short	Minor	Average	Average

Environmental component	Impact No.	Phase	Project component	Impact	Negative/Positive	Impact					
						Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance
				decline in water quality							
Water	75	Construction	A, B, C and D	Risk of increased suspended solids in water due to erosion - decline in water quality	Negative	High	Local	Medium	Medium	Average	Average
Water	76	Operation/Maintenance	A	Risk of increased suspended solids in the water due to erosion - decline in water quality	Negative	Low	Occasional	Long	Minor	Average	Average
Water	77	Preparation	A, B, C and D	Degradation of water quality due to accidental spillage of	Negative	Low	Occasional	Long	Minor	Medium	Medium

Environmental component	Impact No.	Phase	Project component	Impact	Negative/Positive	Impact					
						Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance
				chemicals and waste							
Water	78	Construction	A, B, C and D	Degradation of water quality due to accidental spillage of chemicals and waste	Negative	Average	Local	Long	Average	Average	Average
Water	79	Operation/Maintenance	A	Degradation of water quality due to accidental spillage of chemicals and waste	Negative	Average	Occasional	Long	Average	Average	Average
Water	80	Preparation	A, B, C and D	Project consumption of water abstracted from local groundwater or surface	Negative	Low	Occasional	Short	Minor	Medium	Medium

Environmental component	Impact No.	Phase	Project component	Impact	Negative/Positive	Impact					
						Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance
				water resources							
Water	81	Construction	A, B, C and D	Project consumption of water extracted from local groundwater or surface water resources	Negative	Average	Occasional	Average	Average	Average	Average
Water	82	Operation/Maintenance	A	Project consumption of water withdrawn from local groundwater or surface water resources	Negative	Low	Occasional	Long	Minor	Average	Medium
Water	83	Construction	A, B, C and D	Improvement of water flow in rivers	Positive	Average	Local	Long	Average	Average	Average

Environmental component	Impact No.	Phase	Project component	Impact	Negative/Positive	Impact					
						Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance
				crossed by the installation of new bridges and culverts							
Landscape	84	Preparation	A, B, C and D	Modification of landscape views	Negative	Low	Local	Short	Minor	Low	Medium
Landscape	85	Construction	A, B, C and D	Modification of landscape views	Negative	Average	Local	Long	Average	Low	Average
Landscape	86	Operation/Maintenance	A	Modification of landscape views	Negative	Average	Local	Long	Average	Low	Average
Habitats	87	Preparation	A, B, C and D	Degradation and loss of natural terrestrial habitat	Negative	Average	Occasional	Short	Minor	Average	Average

Environmental component	Impact No.	Phase	Project component	Impact	Negative/Positive	Impact					
						Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance
Habitats	88	Construction	A, B, C and D	Degradation and loss of natural terrestrial habitat	Negative	High	Local	Long	Major	Medium	Strong
Habitats	89	Exploitation/Maintenance	A	Degradation and loss of natural terrestrial habitat	Negative	Average	Local	Long	Average	Average	Average
Habitats	90	Preparation	A, B, C and D	Fragmentation of terrestrial habitats and disruption of connectivity	Negative	Low	Local	Short	Minor	Medium	Medium
Habitats	91	Construction	A, B, C and D	Fragmentation of terrestrial habitats and disruption of connectivity	Negative	High	Local	Long	Major	Medium	Strong

Environmental component	Impact No.	Phase	Project component	Impact	Negative/Positive	Impact					
						Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance
Habitats	92	Exploitation/Maintenance	A	Fragmentation of terrestrial habitats and disruption of connectivity	Negative	Average	Local	Long	Average	Average	Average
Habitats	93	Preparation	A, B, C and D	Degradation and loss of aquatic habitats	Negative	Low	Local	Short	Minor	Medium	Medium
Habitats	94	Construction	A, B, C and D	Degradation and loss of aquatic habitats	Negative	High	Local	Long	Major	Medium	Strong
Habitats	95	Exploitation/Maintenance	A	Degradation and loss of aquatic habitats	Negative	Average	Local	Long	Average	Average	Average
Habitats	96	Preparation	A, B, C and D	Fragmentation of aquatic habitats and disruption of connectivity	Negative	Low	Occasional	Short	Minor	Medium	Medium

Environmental component	Impact No.	Phase	Project component	Impact	Negative/Positive	Impact					
						Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance
Habitats	97	Construction	A, B, C and D	Fragmentation of aquatic habitats and disruption of connectivity	Negative	High	Local	Moderate	Medium	Average	Average
Habitats	98	Operation/Maintenance	A	Fragmentation of aquatic habitats and disruption of connectivity	Positive	High	Local	Long	Major	Average	Strong
Flora	99	Preparation	A, B, C and D	Loss of plant specimens of conservation interest	Negative	Low	Occasional	Short	Minor	Strong	Medium
Flora	100	Construction	A, B, C and D	Loss of plant specimens of conservation interest	Negative	Significant	Local	Long	Major	Strong	Strong
Flora	101	Operation/Maintenance	A	Loss of plant specimens of	Negative	Average	Local	Long	Average	Strong	Strong

Environmental component	Impact No.	Phase	Project component	Impact	Negative/Positive	Impact					
						Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance
				conservation interest							
Wildlife	102	Preparation	A, B, C and D	Localised disturbance of terrestrial fauna and risk of mortality	Negative	Low	Local	Short	Minor	Medium	Medium
Wildlife	103	Construction	A, B, C and D	Localised disturbance to terrestrial fauna and risk of mortality	Negative	High	Local	Moderate	Medium	Average	Average
Wildlife	104	Operation/Maintenance	A	Localised disturbance to terrestrial fauna and risk of mortality	Negative	Average	Local	Long	Average	Average	Average

Environmental component	Impact No.	Phase	Project component	Impact	Negative/Positive	Impact					
						Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance
Wildlife	105	Preparation	A, B, C and D	Impacts on animals of conservation interest	Negative	Low	Occasional	Short	Minor	Strong	Medium
Wildlife	106	Construction	A, B, C and D	Impacts on animals of conservation interest	Negative	Average	Local	Average	Average	Strong	Strong
Wildlife	107	Exploitation/Maintenance	A	Impacts on animals of conservation interest	Negative	Average	Local	Long	Average	Strong	Strong
Exotic and/or invasive species	108	Preparation	A, B, C and D	Risk of dispersal of exotic and/or invasive species	Negative	Low	Occasional	Short	Minor	Low	Medium
Exotic and/or invasive species	109	Construction	A, B, C and D	Risk of dispersal of exotic and/or invasive species	Negative	High	Occasional	Medium	Medium	Low	Average

Environmental component	Impact No.	Phase	Project component	Impact	Negative/Positive	Impact					
						Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance
Exotic and/or invasive species	110	Exploitation/Maintenance	A	Risk of dispersal of exotic and/or invasive species	Negative	Medium	Occasional	Long	Medium	Low	Average
Areas protected or recognised for their biodiversity	111	Preparation	A, B and D	Impacts on an area recognised for its biodiversity	Negative	Low	Occasional	Short	Minor	Medium	Medium
Areas protected or recognised for their biodiversity	112	Construction	A, B and D	Impacts on an area recognised for its biodiversity	Negative	Significant	Local	Moderate	Moderate	Average	Average
Areas protected or recognised for their biodiversity	113	Exploitation/Maintenance	A	Impacts on an area recognised for its biodiversity	Positive	Significant	Local	Long	Major	Average	Strong

8.2.2. Impacts on the physical environment

8.2.2.1. Impacts on air quality

■ Emissions of PM10 & PM2.5 dust/particles

Tableau 73 : PM10 & PM2.5 dust/particle emissions

IMPACT <i>Dust/particulate emissions PM₁₀ & PM_{2.5}</i>								
Affected phases ☒ Preparation ☒ Construction ☒ Operation								
Affected components ☒ A - RN32, engineering structures and toll stations ☒ B - Base camp and temporary facilities ☒ C - Granite quarry ☒ D – Access road to the granite quarry								
Impact analysis based on affected phases and components								
Phase	Component	Nature	Intensity	Extent	Duration	Absolute importance	Sensitivity of the environment ^{t*}	Relative importance
Preparation	A, B, C and D	Negative	Low	Occasional	Short	Minor	Medium	Medium
Construction	A, B, C and D	Negative	Strong	Local	Average	Medium	Average	Average
Operation	A	Negative	Low	Occasional	Long	Minor	Average	Average

** The sensitivity of the environment to dust emissions is usually considered to be High, but in the context of this road rehabilitation project, we are adapting the sensitivity to the specific nature of the project and considering it to be Medium (remembering that this value must remain constant and cannot be changed from one phase to another).*

General impacts

Land clearing, construction and closure activities can result in significant dust emissions, increasing levels of PM₁₀ and PM_{2.5} particles in the air. These activities can be particularly problematic during the dry season with Harmattan winds, when dust is more likely to be stirred up and dispersed. The increase in traffic during the operation of the upgraded RN32 will not completely eliminate significant dust emissions, due to the development of roadside activities (anthropisation, parked vehicles, vehicle speed on the road and increased traffic causing dust movement at the roadside, especially during the dry season, etc.). Increased exposure to these fine particles may affect the respiratory health of local populations, as well as nearby fauna, flora and ecosystems.

Impact assessment for the preparatory phase

The impact during the preparatory phase is considered to have:

- low intensity, as clearing and earthworks will be relatively limited during the preparatory phase;
- a limited scope, as it is confined to the areas of the base camps and temporary facilities;
- a short duration, as it is limited to the preparatory phase.

The absolute significance of the impact will therefore be moderate at the sites concerned. With regard to air quality, the relative value of the component is estimated to be high, as air quality is generally considered to be a key component influencing the health of residents, plants and animals. In addition, measurements taken in the project area during the dry and rainy seasons show that PM₁₀ and PM_{2.5} values are below the thresholds recommended by the WHO, so outside of any construction activity, air quality in the area is good. However, the relative importance of the impact for the preparatory phase will be considered Medium for this phase in view of the actual actions carried out.

Assessment of impacts for the construction phase

During the construction phase, the impact relating to dust/particle emissions will be characterised by:

- an average overall intensity, as it is rather low or even zero during the rainy season, but may be moderate to high during the dry season,
- a local extent, as dust in the dry season and in windy conditions can disperse outside the area of direct impact, into the area of indirect impact,
- a temporary and average duration at the quarry, but short for the road and engineering structures built as the project progresses along the route.

Furthermore, these emissions will cease at the end of the works.

The absolute significance of the impact will therefore be moderate and, considering the reasons mentioned above, with a moderate value assigned to the affected component, the relative significance of the impact will be moderate on the sites and work areas.

Assessment of impacts for the operational phase

During the operational phase, the future situation must be compared with the current situation. A 20% increase in traffic is assumed following improvements to the road surface. On the other hand, a significant reduction in dust emissions must also be assumed for an asphalt road surface compared to an unpaved road surface. The reduction will not be 100%, as there will always be dust that falls on the road surface carried by the wind, and traffic will put this dust back into circulation. The impact will therefore be considered low, occasional but long-lasting, with a minor absolute importance and a medium relative importance.

■ NO_x , NO₂ and SO₂gas emissions

Table74 . NO_x, NO₂ and SO₂gas emissions

IMPACT NO _x , NO ₂ and SO ₂ gas emissions								
Affected phases ☒ Preparation ☒ Construction ☒ Operation								
Affected components ☒ A - RN32, engineering structures and toll stations ☒ B - Base camp and temporary facilities ☒ C - Granite quarry ☒ D – Access road to the granite quarry								
Impact analysis based on affected phases and components								
Phase	Component	Nature	Intensity	Extent	Duration	Absolute importance	Sensitivity of the environment*	Relative importance
Preparation	A, B, C and D	Negative	Low	Occasional	Short	Minor	Medium	Medium
Construction	A, B, C and D	Negative	Average	Local	Average	Average	Average	Average
Exploitation	A	Negative	Average	Local	Long	Average	Average	Average

* The sensitivity of the environment to gas emissions is usually considered to be High, but in the context of this road rehabilitation project, we are adapting the sensitivity to the specific nature of the project and considering it to be Medium (remembering that this value must remain constant and cannot be changed from one phase to another).

General impacts

Vehicles and machinery used during construction and closure (e.g., bulldozers, excavators, transport trucks) emit exhaust gases containing carbon dioxide (CO₂) and nitrogen oxides (NO_x). The use of fuel can also cause emissions of sulphur dioxide (SO₂). In addition, VOCs, which are volatile chemicals, could be released into the atmosphere during the application of paints or solvents. These emissions can cause a significant but very temporary deterioration in air quality in the area. During operation, vehicles (cars and lorries) using the road will also be sources of gas emissions

In the project area, these emissions could contribute to local air quality degradation, affecting both surrounding aquatic and terrestrial ecosystems. VOCs can have significant effects on the health of workers and local communities. Inhalation of these substances can cause respiratory irritation, headaches, and, in the long term, increased risks of chronic diseases.

Impact assessment for the preparatory phase

The impact during the preparatory phase is considered to be:

- low intensity, as clearing and earthworks activities will be relatively limited during the preparatory phase;
- a limited scope, as it is confined to the base camp and temporary facilities;
- a short duration, as it is limited to the preparatory phase.

The absolute significance of the impact will therefore be minor. With regard to air quality, the relative value of this component is estimated to be moderate at this stage, even though air quality is considered a key factor influencing the health of residents, plants and animals, as it will be very localised to the sites concerned. In addition, measurements taken in the project area during the dry and rainy seasons show that the values of these substances are generally below the thresholds recommended by the WHO. The relative significance of the impact for the preparatory phase will be Medium.

Assessment of impacts for the construction phase

During the construction phase, the impact will be characterised as follows:

- medium overall intensity,
- a local extent, as emissions may disperse outside the direct impact area, into the indirect impact area,
- a temporary and average duration, as these emissions cease at the end of the works.

The absolute significance of the impact will therefore be average and, considering the reasons mentioned above, an affected component of average value, the relative significance of the impact will be average.

Impact assessment for the operational phase

The operational phase will be quite different from the situation for dust. There will be no reduction in emissions related to the presence of bitumen. On the contrary, bitumen itself, especially in hot weather, will become a source of VOC emissions. In this case, the impact of traffic emissions is reduced as the project only accounts for a 20% increase in current traffic. There will therefore be at least average intensity, local extent and long duration for at least average absolute significance, and medium relative significance.

8.2.2.2. Climate impacts – greenhouse gases (GHGs)

■ Greenhouse gas (GHG) emissions

Table 75. GHG emissions

IMPACT		GHG emissions						
Affected phases ☒ Preparation ☒ Construction ☒ Operation ☒ Closure								
Affected components ☒ A - RN32, engineering structures and toll stations ☒ B - Base camp and temporary facilities ☒ C - Granite quarry ☒ D – Access road to the granite quarry								
Impact analysis based on affected phases and components								
Phase	Component	Nature	Intensity	Extent	Duration	Absolute importance	Sensitivity of the environment	Relative importance
Preparation,	A, B, C and D	Negative	Low	Occasional	Short	Minor	Strong	Medium
Construction	A, B, C and D	Negative	Average	Local	Average	Average	Strong	Strong
Exploitation	A	Negative	Average	Local	Long	Average	Strong	Strong

Approaches to impact assessment

In accordance with the GHG Protocol and the Equator Principles, Type 1 and Type 2 emissions from the project are quantified and reported in the ESIA.

In accordance with international guidelines, detailed quantification of Type 3 emissions (including carbon embodied in materials used) is not necessary to determine the significance of the project's impact. Given the current level of project design, it would not be possible to carry out a complete quantification of Type 3 emissions. Nevertheless, for the sake of completeness, a simplified analysis for Type 3 emissions was therefore carried out.

It should be noted that the IFC acknowledges that for thresholds below 10,000 tonnes CO_{2eq} per year (as is the case for this project), there is no need to conduct a GHG inventory (CAO, 2024. New CAO Advisory Report on Strengthening Greenhouse Gas Mitigation in IFC-Financed Projects. 30 Oct. 2024. <https://www.cao-ombudsman.org/resources/strengthening-greenhouse-gas-mitigation-ifc-financed-projects>).

ADEME method for assessing GHG emissions

The method used to assess the project's greenhouse gas emissions is the *Bilan Carbone®* method. The *Bilan Carbone®* method was developed by the French agency ADEME to enable any industrial or tertiary activity to estimate the order of magnitude of greenhouse gas (GHG) emissions resulting from the physical processes necessary for its existence. The carbon method is not limited to the physical site, but covers all processes, regardless of where they take place, as long as they are included in the designated scope. It is an "inventory that puts all emissions made on behalf of the entity under review on an equal footing,

regardless of location, as long as their existence is the counterpart of a process that benefits the entity in question".

As greenhouse gas emissions cannot be measured directly, emissions are estimated on the basis of activity data (mass of raw materials).

These data are then converted into *carbon equivalent* (C eq) or *carbon dioxide equivalent* (CO₂eq) using average emission factors specified by the method²³. An example of emission factors for different materials is provided in the following figure.

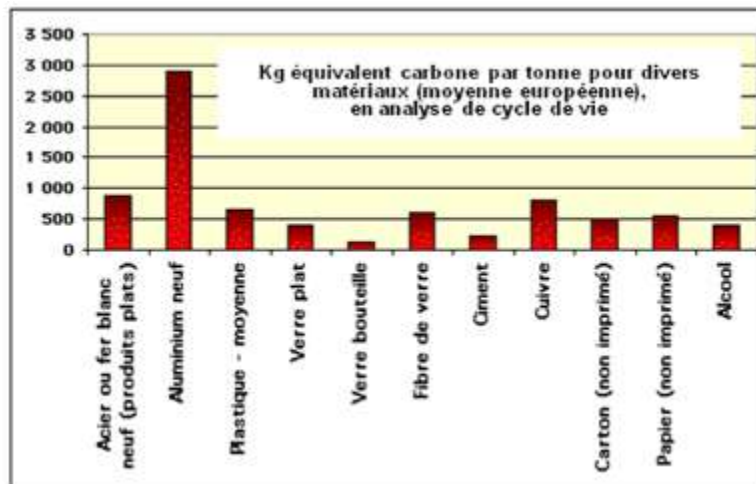


Figure62 . Emission factors for different materials

This assessment method is intended to provide orders of magnitude.

Greenhouse gases considered

The *Bilan Carbone®* method takes six GHGs into account:

- carbon dioxide: CO₂;
- methane: CH₄ ;
- nitrous oxide: N₂O;
- hydrofluorocarbons: HFC;
- perfluorocarbons: PFC;
- sulphur hexafluoride: SF₆.

As the impact of emitting one tonne of greenhouse gas into the atmosphere varies from one gas to another (gas lifetime, radiative forcing), the impact is defined in terms of Global Warming Potential (GWP) over 100 years. The GWP is converted to a standard: carbon dioxide equivalent (eCO₂).

For example, over a period of 100 years, methane has a global warming potential 25 times greater than CO₂ and nitrous oxide has a global warming potential 298 times greater than CO₂.

However, in addition to CO₂ equivalent or GWP, the other common unit of measurement for greenhouse gases is carbon equivalent. This amounts to counting the weight of carbon alone in the CO₂ compound. As a result, one kilogram of CO₂ is equal to 12/44ths of a carbon equivalent, or 0.273.

All the results in this paragraph are in CO₂ equivalent. To obtain the results in carbon equivalent, simply divide them by 3.667.

Definition of the scope of the study

²³ These factors come from various bibliographic sources and are subject to uncertainty, as specified in the methodology.

The term "scope of the study" refers to the activities that have been taken into account for the calculation of carbon equivalents. Defining the scope of the study is an essential step in the Bilan Carbone® process.

This **is because** the results obtained are only valid for the defined scope. The results can only be used if the scope within which they were obtained is specified.

The aim is to define a scope of study that is large enough to take into account the main emissions without being too large, which would be very time-consuming for minimal gains in accuracy.

The following elements may be included in the scope of the project study:

- manufacture of raw materials for the construction of various elements (asphalt, bridges and culverts, site facilities, etc.),
- transport of raw materials to the construction site,
- preparation of the various sites (deforested areas, etc.)
- operation of the road (increase in traffic following improvement of the road surface, taking into account the different types of vehicles and fuel),
- end of life of materials (base camp only – although the road surface has a limited lifespan).

At this stage of the study, there is insufficient information available to make a conservative assessment of GHG emissions for the entire project as described above. We could potentially have accurate values for a few aspects, which would give the impression of erroneous overall accuracy.

Attempt at simplified estimates

Deforestation

Total deforestation of forest and wooded habitats includes losses due to:

- The base camp and other temporary structures
- Widening of the access road to the quarry
- The quarry
- Widening of the RN 32

It is not possible at this stage to determine the losses accurately, but for the moment we are assuming a total loss of around 40 ha. This clearing represents a loss of carbon sinks. Wooded habitats store around 1 tonne of dry matter/ha/year, or 2 tonnes of CO₂/ha/year. We are assuming a road surface lifespan of 40 years. During this period, 3,200 tonnes of CO₂ will therefore not be stored. (Note: the lifespan of the road surface is much shorter, but the work for this project includes longer-term modifications (engineering structures, road widening, route modifications) and therefore a longer lifespan is assumed here and for other aspects).

Construction

For this estimate, we take the average lifetime for this type of road (RN32) of 880 tonnes of CO₂eq per kilometre, which includes most of the elements considered here, including raw materials (600 tonnes of CO₂eq per kilometre), raw material transport (100 tonnes of CO₂eq per kilometre) and construction (30 tonnes of CO₂eq per kilometre). It is clear that this estimate rises considerably when there are many large bridges or tunnels to be built (2 per km), and construction (30 tonnes of CO₂eq per km). It is clear that this estimate rises considerably when there are many large bridges or tunnels to take into account, but this estimate appears reasonable for the construction of an existing road.

Operation

The operation calculation assumes that only the increase in traffic linked to the improvement of the road surface should be attributed to the project's GHG balance. The project assumed that the increase would be around 20% of current traffic. According to current traffic estimates on the RN 32, the Road Data Bank (BDR) of the Ministry of Public Works shows that the average daily traffic for cars and HGVs from 2016 to 2020 is 547 vehicles per day, but with significant annual variations. For this calculation, it will be assumed that traffic is in the order of 500 vehicles/day. This represents additional traffic of around 100 vehicles. It will be assumed that the percentage will be 50% lorries and 50% cars. Using standard emission quantities for cars and lorries, we arrive at an estimate of approximately 1,888 tonnes per year of CO₂eq.

This is in the same order of magnitude as general estimates given for two-lane roads: 1,122 tonnes per year of CO₂ eq (taking 20% of the average estimates).

The average of the two is 1,500 tonnes per year of CO₂ eq, which will be the annual estimate during operation. This figure does not include maintenance activities, but the estimate for traffic remains very conservative.

Project GHG emissions balance

The rough GHG balance for the project can be summarised in the table below:

Table 76. GHG balance related to the project

Impact phase	GHG (tonnes CO ₂ eq) over 40 years
Deforestation	3,200
Construction	74,800
Exploitation	60,000
Total	138,000
Total per year over 40 years	3,450

Over a 40-year lifespan, the project's GHG emissions are approximately 3,382 tonnes CO₂eq/year.

Impact assessment for the preparatory phase

The impact during the preparatory phase is considered to be:

- low intensity, as clearing and earthworks will be relatively limited during the preparatory phase;
- a limited scope, as it is confined to the areas of the base camps and temporary facilities;
- a short duration, as it is limited to the preparatory phase.

The absolute significance of the impact will therefore be minor. With regard to climate, the relative value of this component is estimated to be high, as GHGs and climate are key factors influencing the lives of residents, plants and animals. The relative significance of the impact for the preparatory phase will be moderate.

Assessment of impacts for the construction phase

Typically for a road, the construction phase is the most significant phase in terms of GHG emissions, even though it is relatively short compared to the operational phase.

During the construction phase, the impact in terms of GHG emissions will be characterised by:

- average overall intensity,
- a local extent, as emissions can disperse outside the direct impact zone, into the indirect impact zone,
- a temporary and average duration, as these emissions cease at the end of the works.

The absolute significance of the impact will therefore be average and, considering the reasons mentioned above, the relative significance of the impact will be high.

Impact assessment for the operational phase

The operational phase is the second most significant phase, given its long duration and traffic-related emissions. In this case, GHG emissions are reduced as the project only accounts for a 20% increase in current traffic.

As with air quality emissions, there will therefore be at least medium intensity, local extent and long duration for at least medium absolute significance, and high relative significance.

■ Impact on the climate

Table77 . Impact on climate

IMPACT <i>Impact on the climate</i>								
Affected phases ☒ Preparation ☒ Construction ☒ Operation								
Affected components ☒ A - RN32, engineering structures and toll stations ☒ B - Base camp and temporary facilities ☒ C - Granite quarry ☒ D – Access road to the granite quarry								
Impact analysis based on affected phases and components								
Phase	Component	Nature	Intensity	Extent	Duration	Absolute importance	Sensitivity of the environment*	Relative importance
Preparation,	A, B, C and D	Negative	Low	Occasional	Short	Minor	Medium	Medium
Construction	A, B, C and D	Negative	Low	Occasional	Average	Minor	Average	Medium
Exploitation	A	Negative	Low	Occasional	Long	Minor	Medium	Medium

* The sensitivity of the environment to climate is usually considered to be high, but in the context of this road rehabilitation project, we are adapting the sensitivity to the specific nature of the project and considering it to be medium (bearing in mind that this value must remain constant and cannot be changed from one phase to another).

General impacts

Based on the above calculations and considering that over 40 years, GHG emissions related to the project amount to 3,382 tonnes CO₂ /year over 40 years, which will not have a significant impact on the climate change that Guinea could experience over the next 70 years and is therefore negligible, even if at the project level itself, the Fecteau matrix considers the impact to be Medium overall

As a reminder, the country's CO₂ emissions in 2022 were 3.802 megatonnes, making Guinea the 45th country in the ranking of countries by CO₂ emissions (comprising 184 countries), in which countries are ranked from least to most polluting. The project will account for approximately 0.09% of Guinea's annual CO₂ emissions.

8.2.2.3. Noise impacts

■ Noise pollution

Table78 . Changes in noise levels

IMPACT <i>Noise pollution</i>								
Affected phases ☒ Preparation ☒ Construction ☒ Operation								
Affected components ☒ A - RN32, engineering structures and toll stations ☒ B - Base camp and temporary facilities ☒ C - Granite quarry ☒ D – Access road to the granite quarry								
Impact analysis based on affected phases and components								
Phase	Component	Nature	Intensity	Scope	Duration	Absolute importance	Sensitivity of the environment	Relative importance
Preparation	A, B, C and D	Negative	Low	Occasional	Short	Minor	Medium	Medium
Construction	A, B, C and D	Negative	Average	Local	Average	Average	Average	Average

Exploitation	A	Negative	Low	Occasional	Long	Minor	Average	Medium

Impacts in general

Work during the preparatory phase, construction phase and closure phase will result in increased noise levels. During operation, increased traffic and traffic speeds will also result in increased noise levels. Noise pollution will mainly affect project workers, residents and animals in the vicinity of the project elements (base camp, quarry, access road to the quarry and the RN32). Outside the immediate project area, additional noise will be generated by transport trucks. The perceived nuisance will depend, among other things, on the condition of the vehicles, their maintenance and traffic speeds.

Impact assessment for the preparatory phase

The impact during the preparatory phase is considered to be:

- low intensity, as field activities will be relatively limited during the preparatory phase;
- a limited scope, as it is confined to the areas of the base camps and temporary facilities;
- a short duration, as it is limited to the preparatory phase.

The absolute significance of the impact will therefore be minor. With regard to noise levels, the relative value of this component is estimated to be medium, as the impacts are mainly nuisances affecting the lives of residents and animals. The relative significance of the impact for the preparatory phase will be medium at the sites concerned.

Assessment of impacts for the construction phase

During the construction phase, noise pollution will be greater due to the use of lorries, concrete mixers, mechanical diggers, compressors, generators, pumps, winches, jackhammers, etc. Clearing work (tree felling, brush cutting), soil excavation and the movement of heavy machinery (bulldozers, mechanical diggers, lorries) generate noise that may exceed the permissible thresholds for residential or ecologically sensitive areas. The noise emissions of some machines can reach 120 dB(A) at the source, which corresponds to the pain threshold.

The construction phase is the most significant phase in terms of noise levels, even though it is relatively short compared to the operational phase.

During the construction phase, the impact in terms of noise levels will be characterised by:

- an average overall intensity,
- a localised extent, as sounds can disperse outside the area of direct impact, into the area of indirect impact,
- a temporary and average duration, as construction noise stops when the work is completed.

The absolute significance of the impact will therefore be average and, considering the reasons mentioned above, an affected component of average value, the relative significance of the impact will be average.

Impact assessment for the operational phase

The operational phase is the second most significant phase, given its long duration and the increase in noise associated with increased traffic and traffic speed. In this case, the increase in noise will be reduced as the project only accounts for a 20% increase in current traffic.

There will therefore be at least medium intensity, a limited extent and a long duration for a minor absolute significance and a medium relative significance.

8.2.2.4. Impacts on soil

Table 79 . Soil erosion and compaction associated with land clearing

IMPACT	<i>Soil erosion and compaction linked to land clearing and the movement of heavy machinery</i>
Affected phases ☒ Preparation ☒ Construction ☒ Operation	
Components affected ☒ A - RN32, engineering structures and toll stations ☒ B - Base camp and temporary facilities ☒ C - Granite quarry ☒ D - Access road to the granite quarry	
Impact analysis based on affected phases and components	

Phase	Component	Nature	Intensity	Extent	Duration	Absolute importance	Sensitivity of the environment	Relative importance
Preparation	A, B, C and D	Negative	Average	Occasional	Short	Minor	Average	Average
Construction	A, B, C and D	Negative	Average	Occasional	Average	Average	Average	Average
Operation	A	Negative	Low	Occasional	Long	Minor	Average	Medium

Impacts in general

Some areas of land will need to be cleared to accommodate the various components of the project (quarry, borrow pit, site facilities and future storage areas), the demolition/construction of engineering structures and the widening of the RN32 and the access road to the quarry. These activities may compact the soil, altering its structure and reducing its ability to infiltrate water. This compaction promotes surface runoff, thereby increasing the risk of water erosion, especially on slopes.

In addition, land clearing will remove the vegetation cover that naturally protects the soil from erosion. Plant roots play a crucial role in maintaining soil cohesion. Their removal makes the soil more vulnerable to erosive agents such as rain and wind.

Impact assessment for the preparatory phase

In general, the preparatory phase activities described below will have a greater impact on steep, dense areas and riverbanks. The impact of activities on these erosion-prone areas will be:

- Be of medium intensity, as the areas will be relatively limited and the vegetation around the base camp and temporary facilities (e.g. storage areas) will be preserved as much as possible;
- A limited scope, as the impact will only be felt within the direct impact area of the project;
- A short duration (the preparatory phase will only last a few months).

The absolute significance of the impact will therefore be minor. The relative value of the affected component is estimated to be moderate, as the existing soils are classified as ordinary, relatively unpolluted soils. The relative significance of the impact will therefore be moderate.

Impact assessment for the construction phase

The construction phase will see the most significant impacts relating to the passage of heavy machinery, the widening of the RN32, the access road to the quarry, and the development of the quarry and borrow pits. This process may have significant effects on the soil, particularly in terms of compaction and erosion.

Soil compaction, which is mainly linked to the repeated passage of heavy machinery, can lead to:

- A reduction in permeability: less porosity means less space for water, which reduces infiltration and increases surface runoff.
- A decrease in water retention capacity: compacted soils retain less water, affecting local vegetation and dependent ecosystems.
- Increased erosion: compaction can make soils more susceptible to erosion by water and wind.

The impact of construction activities on these areas will be:

- A medium intensity, given the scale of the actions,
- A limited scope, as erosion only occurs within the project perimeter,
- An average duration, as the impact will occur during the construction phase and mainly during the rainy season.

The absolute significance of the impact will therefore be minor. The relative value of the affected component is estimated to be moderate for the reasons mentioned above. The relative significance of the impact will therefore be moderate.

Impact assessment for the operational phase

Impacts during the operational phase will be limited to potential maintenance and repair work, but even though this will only affect limited areas, these areas will still be impacted in the same way as during the construction phase.

The impacts will therefore be low in intensity, limited in scope and long in duration, with a minor absolute significance and a medium relative significance.

■ **Acceleration of soil erosion and associated consequences on hydromorphic soils and sloping areas**

Table 80 . Increased erosion of hydromorphic soils and sloping areas

IMPACT <i>Increased erosion of hydromorphic soils and sloping areas</i>								
Phases affected ☐ Preparation ☒ Construction ☐ Operation								
Components affected ☒ A - RN32, engineering structures and toll stations ☒ B - Base camp and temporary facilities ☒ C - Granite quarry ☒ D – Access road to the granite quarry								
Impact analysis based on affected phases and components								
Phase	Component	Nature	Intensity	Extent	Duration	Absolute importance	Sensitivity of the environment	Relative importance
Construction	A, B, C and D	Negative	High	Occasional	Average	Average	Average	Average

* The sensitivity of the environment to erosion is usually considered to be high, but in the context of this road rehabilitation project, we are adapting the sensitivity to the specific nature of the project and considering it to be medium (bearing in mind that this value must remain constant and cannot be changed from one phase to another).

General impacts

Natural embankments, wetlands and riverbanks where hydromorphic soils predominate are areas vulnerable to erosion in the event of environmental destabilisation. Steep slopes that will be exposed are also considered vulnerable areas. In this case, the areas concerned will mainly be the river crossings on the RN32 and the access road to the quarry, as well as the floodplain areas crossed by the project. Other areas may also be impacted (quarry, borrow pit, base camp). The construction of new bridges and culverts will be the most significant activities in terms of these impacts.

Hydromorphic soils, characterised by prolonged water saturation, are particularly sensitive to physical disturbance, which can lead to increased erosion and negative environmental impacts. They form under waterlogged conditions, often in low-lying areas near rivers, marshes or in poorly drained regions²⁴. These soils are generally poorly drained, with a clayey or silty texture, and can be prone to compaction- when disturbed²⁵. Their structure is therefore often fragile, making the soils particularly vulnerable to erosion during construction work.

Impact assessment for the construction phase

During the construction phase, workers and machinery will need to make numerous trips to access the construction sites. The areas where machinery passes are also potentially exposed to soil degradation.

In addition, land clearing and stump removal are the main causes of land destabilisation. This could be the case in areas that will be deforested, particularly along watercourses.

The impact of project activities on areas vulnerable to erosion will be:

- A high intensity,
- A limited extent, as erosion only occurs in sensitive areas crossed by the project,

²⁴ M. Gérard, C. Lamouroux, J.-P. Chery: "Hydromorphic soils: characteristics and environmental issues" Revue Française de Pédologie, 2015, vol. 10, pp. 35-48.

²⁵ L. Fiedler: "Hydromorphic Soils and Environmental Impact"; Journal of Soil Science and Environmental Management, 2013, vol. 4(2), pp. 72-79.

- An average duration.

The absolute significance of the impact will therefore be moderate. The relative value of the affected component is considered moderate due to the high erodibility of these soils. The relative significance of the impact will therefore be moderate.

■ Change in soil composition due to embankments

Table81 . Change in soil composition due to embankments

IMPACT <i>Change in soil composition due to fill</i>								
Affected phases ☒ Preparation ☒ Construction ☐ Operation								
Affected components ☒ A - RN32, engineering structures and toll stations ☒ B - Base camp and temporary facilities ☒ C - Granite quarry ☒ D – Access road to the granite quarry								
Impact analysis based on affected phases and components								
Phase	Component	Nature	Intensity	Extent	Duration	Absolute importance	Sensitivity of the environment	Relative importance
Preparation	A, B, C and D	Negative	Low	Occasional	Long	Minor	Low	Low
Construction	A, B, C and D	Negative	Low	Occasional	Long	Minor	Low	Low

Impacts in general

Embankments may be used during the installation of temporary bases and facilities, and during construction activities on the RN 32 and the access road to the quarry. Embankments can be used to stabilise the ground and create a solid foundation. This operation may have significant impacts on the composition of the local soil, particularly during the construction phase.

Impact assessment for the preparatory and construction phases

In general, activities here will be limited and will have:

- Low intensity, as the areas covered will be relatively limited;
- A limited scope, as the impact will only be felt within the direct impact zone of the project;
- A long duration, as the nature of the soil will be altered.

The absolute significance of the impact will therefore be minor. The relative value of the affected component is estimated to be low, as the existing soils are classified as ordinary soils. The relative significance of the impact will therefore be low.

■ Risk of soil quality degradation due to chemicals and waste

Table82 . Risk of soil quality degradation due to chemicals and waste

IMPACT <i>Risk of soil quality degradation due to chemicals and waste</i>								
Affected phases ☒ Preparation ☒ Construction ☒ Operation								
Components affected ☒ A - RN32, engineering structures and toll stations ☒ B - Base camp and temporary facilities ☒ C - Granite quarry ☒ D - Access road to the granite quarry								
Impact analysis based on affected phases and components								
Phase	Component	Nature	Intensity	Extent	Duration	Absolute importance	Sensitivity of the environment	Relative importance
Preparation	A, B, C and D	Negative	Low	Occasional	Long	Minor	Low	Low

Construction	A, B, C and D	Negative	Average	Occasional	Long	Average	Low	Average
Exploitation	A	Negative	Average	Occasional	Long	Average	Low	Average

Impacts in general

Soil contamination could be caused accidentally by the use of environmentally hazardous substances (mainly hydrocarbons). This could lead to a risk of surface water and groundwater pollution. This issue will be particularly sensitive in areas where watercourses pass through, but working during dry periods when these watercourses are dry will limit the effects in this regard. Construction waste (welding waste, used oil, etc.) can also be a source of soil pollution. Wastewater production at the base camp and construction site may also cause soil pollution. Their level of toxicity varies depending on the type of waste.

Impact assessment for the preparatory phase

The impact during the preparatory phase is considered to be:

- low intensity, as field activities will be relatively limited during the preparatory phase;
- a limited scope, as it is confined to the base camp and temporary facilities;
- a long duration due to certain contaminants and waste that are not readily biodegradable.

The absolute significance of the impact will therefore be minor. With regard to impacts on soil, the relative value of this component is estimated to be low in terms of sensitivity for this project, as the impacts are those related to soil; impacts on surface water and groundwater are considered elsewhere. The relative significance of the impact for the preparatory phase will be low.

Assessment of impacts for the construction phase

During the construction phase, the risks of contamination will be greater with the use of heavy machinery and trucks. In addition, the operational base camp will be accompanied by all the risks associated with waste and wastewater from a large population of workers.

During the construction phase, the impact in terms of levels will be characterised by:

- an overall intensity of at least average,
- a limited scope, as it is confined to the project areas,
- a long duration given the potential for contaminants and waste to persist.

The absolute significance of the impact will therefore be medium and, considering the reasons mentioned above, a low-value affected component in terms of sensitivity for this project, the relative significance of the impact will be medium.

Impact assessment for the operational phase

The operational phase is the second most important phase, given its long duration and the increase in traffic on the RN32. The risks arise from both the increased normal traffic on the RN32 and maintenance activities.

There will therefore be at least medium intensity, occasional extent and long duration for medium absolute importance and medium relative importance.

8.2.2.5. Impacts on water

■ Risk of increased suspended solids in water due to erosion - decline in water quality

Table83 . Increase in suspended solids in water and decline in water quality

IMPACT	<i>Increase in suspended solids in water and decline in water quality</i>
Affected phases ☒ Preparation ☒ Construction ☒ Operation	
Components affected ☒ A - RN32, engineering structures and toll stations ☒ B - Base camp and temporary facilities ☒ C - Granite quarry ☒ D - Access road to the granite quarry	

Impact analysis based on affected phases and components								
Phase	Component	Nature	Intensity	Extent	Duration	Absolute importance	Sensitivity of the environment*	Relative importance
Preparation	A, B, C and D	Negative	Low	Occasional	Short	Minor	Medium	Medium
Construction	A, B, C and D	Negative	Strong	Local	Average	Medium	Average	Average
Exploitation	A	Negative	Low	Occasional	Long	Minor	Average	Medium

* The sensitivity of the environment to water is usually considered to be high, but in the context of this road rehabilitation project, we are adapting the sensitivity to the specific nature of the project and considering it to be Medium (bearing in mind that this value must remain constant and cannot be changed from one phase to another), particularly as QGMI plans to carry out work on engineering structures during the dry season when watercourses are dry.

General impacts

In areas close to watercourses or on sloping terrain, almost all activities expose the soil to erosion by wind and rain, causing sediment to run off into surrounding watercourses or water bodies. This could cause an increase in suspended solids (SS) in the water (= increased water turbidity), which would affect water transparency and overall water quality. In addition, if contaminants are present in the soil, they could be transported with the sediments into watercourses, exacerbating the negative impacts.

Impact assessment for the preparatory phase

In general, preparatory phase activities will have a greater impact on steep, dense areas and riverbanks. The impact of these activities on watercourses will be:

- Be low in intensity, as the areas will be relatively limited and the vegetation around the base camp and temporary facilities (e.g., storage areas) will be preserved as much as possible;
- A limited scope, as the impact will only be felt within the direct impact area of the project;
- A short duration (the preparatory phase will only last a few months).

The absolute significance of the impact will therefore be minor. The relative value of the affected component is estimated to be of medium sensitivity, given the importance of surface water for residents and the aquatic biological environment. The relative significance of the impact will therefore be medium.

Impact assessment for the construction phase

The construction phase will see the most significant impacts in terms of heavy vehicle traffic, the widening of the RN 32, the access road to the quarry, and the development of the quarry and borrow pits. This process may have significant effects on watercourse crossings. This will be particularly the case for the construction of bridges and culverts.

The impact of construction activities on these sensitive areas will be:

- A high intensity, given the potential significance of actions in and along watercourses,
- A local scope, as the impacts may extend beyond the project perimeter,
- At least medium duration, as the impact will occur during the construction phase and mainly during the rainy season.

The absolute significance of the impact will therefore be moderate. The relative value of the affected component is estimated to be high. The relative significance of the impact will therefore be high.

Assessment of impacts during the operational phase

Impacts during the operational phase will be limited to potential maintenance measures and accompanying works that will have a local impact on sites, as during the construction phase. The increase in traffic is not expected to have an impact on MES

There will therefore be low intensity, limited scope and long duration for minor absolute importance and medium relative importance.

■ Degradation of water quality due to accidental spillage of chemicals and waste

Table 84. Degradation of water quality due to accidental spills of chemicals and waste

IMPACT <i>Degradation of water quality due to accidental spillage of chemicals and waste</i>								
Phases affected ☑ Preparation ☑ Construction ☑ Operation								
Affected components ☑ A - RN32, engineering structures and toll stations ☑ B - Base camp and temporary facilities ☑ C - Granite quarry ☑ D - Access road to the granite quarry								
Impact analysis based on phases and affected components								
Phase	Component	Nature	Intensity	Extent	Duration	Absolute importance	Sensitivity of the environment*	Relative importance
Construction	A, B, C and D	Negative	Low	Occasional	Long	Minor	Average	Medium
Construction	A, B, C and D	Negative	Average	Local	Long	Average	Average	Average
Exploitation	A	Negative	Average	Occasional	Long	Average	Average	Average

* The sensitivity of the environment to water is usually considered to be high, but in the context of this road rehabilitation project, we are adapting the sensitivity to the specific nature of the project and considering it to be Medium (bearing in mind that this value must remain constant and cannot be changed from one phase to another), particularly as QGMI plans to carry out work on engineering structures during the dry season when watercourses are dry.

General impacts

The study area has significant water resources, mainly through its hydrographic network. The RN32 crosses seven watercourses requiring bridge replacements. In addition, soil permeability can be high, facilitating the transfer of pollutants from the soil to water resources. Work on the crossing areas will be carried out during the dry season when the watercourses are dry in order to limit these risks.

Accidental spills of chemicals (oils, fuels, solvents) can directly pollute surface water and aquifers, leading to a deterioration in their quality.

Impact assessment for the preparatory phase

The impact during the preparatory phase is considered to be:

- low intensity, as field activities will be relatively limited during the preparatory phase;
- a limited scope, as it is confined to the base camps and temporary facilities;
- a long duration due to certain contaminants and waste that are not readily biodegradable.

The absolute significance of the impact will therefore be minor. With regard to impacts on water, the relative value of this component is estimated in this case to be of medium sensitivity, as surface water and groundwater are considered essential for residents and the biological environment. The relative significance of the impact for the preparatory phase will be medium.

Assessment of impacts for the construction phase

During the construction phase, the risks of contamination will be greater with the use of heavy machinery and trucks. In addition, the operational base camp will be accompanied by all the risks associated with waste and wastewater from a large population of workers.

During the construction phase, the impact in terms of levels will be characterised by:

- at least medium overall intensity,
- a local extent, as it is possible that contaminants in surface water may exceed the project areas,
- a long duration given the potential for contaminants and waste to persist.

The absolute significance of the impact will therefore be medium and, considering the reasons mentioned above, an affected component of medium value in terms of sensitivity in this case, the relative significance of the impact will be Medium.

Assessment of impacts for the operational phase

The operational phase, given its long duration and the increase in traffic on the RN 32, is the second most important phase. The risks arise from both the increased normal traffic on the RN 32 and maintenance activities.

There will therefore be medium intensity, limited scope and long duration for medium absolute importance, and medium relative importance.

■ Project consumption of water abstracted from local groundwater or surface water resources

Table85 . Project consumption of water abstracted from local groundwater or surface water resources

IMPACT Project consumption of water abstracted from local groundwater or surface water resources								
Affected phases ☒ Preparation ☒ Construction ☒ Operation								
Components affected ☒ A - RN32, engineering structures and toll stations ☒ B - Base camp and temporary facilities ☒ C - Granite quarry ☒ D - Access road to the granite quarry								
Impact analysis based on affected phases and components								
Phase	Component	Nature	Intensity	Extent	Duration	Absolute importance	Sensitivity of the environment	Relative importance
Construction	A, B, C and D	Negative	Low	Occasional	Short	Minor	Medium	Medium
Construction	A, B, C and D	Negative	Average	Occasional	Average	Average	Average	Average
Operation	A	Negative	Low	Occasional	Long	Minor	Medium	Medium

** The sensitivity of the environment to water resources is usually considered to be high, but in the context of this road rehabilitation project, we are adapting the sensitivity to the specific nature of the project and considering it to be medium (bearing in mind that this value must remain constant and cannot be changed from one phase to another).*

General impacts

Although Niger is an important water resource, most of the water flowing through the study area comes from southern areas with higher rainfall. In the study area, rainfall is lower and many of the local watercourses are not permanent. Future forecasts following climate change indicate a significant decline in flow rates. The situation regarding groundwater is not well known, but there are concerns about declines in water levels and flow in wells.

The project will consume a significant amount of water. For example, it is estimated that during the preparation and construction phase, the project plans to use 340 000 m³ of water from rivers or ad hoc boreholes built at the base camp, depending on local availability. There is a risk that the project's demands will compete with the needs of residents, plants and animals.

Impact assessment for the preparatory phase

The impact during the preparatory phase is considered to be:

- low intensity, as field activities will be relatively limited during the preparatory phase;
- a limited scope, as it is confined to the base camp areas and temporary facilities;
- a short duration.

The absolute significance of the impact will therefore be minor. The relative value of the component is estimated to be Medium in terms of sensitivity, and therefore the relative significance of the impact for the preparatory phase will be medium.

Impact assessment for the construction phase

During the construction phase, water requirements will be highest, particularly for cement and concrete production. There may also be a need to reduce dust during work on uncovered roads and tracks. In

addition, the operational base camp will have all the requirements associated with a large population of workers.

During the construction phase, the impact in terms of levels will be characterised by:

- at least average overall intensity,
- a limited scope, as it will be confined to the project areas,
- an average duration.

The absolute significance of the impact will therefore be medium and, considering the reasons mentioned above, an affected component of medium value in terms of sensitivity, the relative significance of the impact will be medium.

Impact assessment for the operational phase

The operational phase is not expected to see significant demand. There may be potential needs during maintenance work.

There will therefore be low intensity, limited scope and long duration for an average absolute significance and average relative significance.

■ Improvement of water flow in rivers crossed by the construction of new bridges and culverts

Table 86. Improving the flow of waterways crossed by installing new bridges and culverts

IMPACT		Improvement of water flow across watercourses through the installation of new bridges and culverts						
Affected phases ☐ Preparation ☒ Construction ☐ Operation ☐ Closure								
Affected components ☒ A - RN32, engineering structures and toll stations ☐ B - Base camp and temporary facilities ☐ C - Granite quarry ☒ D – Access road to the granite quarry								
Impact analysis based on affected phases and components								
Phase	Component	Nature	Intensity	Extent	Duration	Absolute importance	Sensitivity of the environment	Relative importance
Construction	A, B, C and D	Positive	Average	Local	Long	Average	Strong	Strong

Impacts in general

The current bridges and culverts on the RN 32 are not adequate to ensure unimpeded flow of watercourses during high flows or floods. Although long-term forecasts suggest a decrease in average flows, this does not mean that the risk of flooding will be reduced. On the contrary, forecasts indicate an increase in extreme weather events.

If properly sized, the new bridges and culverts will help water flow without creating retention and flood zones upstream of the structures.

Impact assessment for the construction phase

During the construction phase, the positive impact of the new bridges and culverts will be characterised by:

- at least average overall intensity,
- a local extent, as the reduction in retention may extend beyond the specific area,
- a long duration.

The absolute positive significance of the impact will therefore be average and the affected component will be of high value, meaning that the relative significance of the impact will be high.

8.2.2.6. Impacts on the landscape

■ Changes to landscape views

Table 87. Changes to landscape views

IMPACT <i>Changes to landscape views</i>								
Affected phases ☑ Preparation ☑ Construction ☑ Operation ☑ Closure								
Components affected ☑ A - RN32, engineering structures and toll stations ☑ B - Base camp and temporary facilities ☑ C - Granite quarry ☑ D – Access road to the granite quarry								
Impact analysis based on affected phases and components								
Phase	Component	Nature	Intensity	Extent	Duration	Absolute importance	Sensitivity of the environment	Relative importance
Preparation	A, B, C and D	Negative	Low	Local	Short	Minor	Low	Medium
Construction	A, B, C and D	Negative	Average	Local	Long	Average	Low	Average
Exploitation	A	Negative	Average	Local	Long	Average	Low	Average

Impacts in general

Landscape impacts will be reduced by the relatively flat nature of the study area, apart from the quarry site, which will limit the visibility of project-related activities and structures. During the preparation and construction phases, the construction sites will be visually impaired areas. The landscape will be particularly degraded by land clearing, resulting in an alteration of the natural landscape. The closure and rehabilitation of the base camp site and the rehabilitation of construction areas along the roads will reduce the visual impact. Long-term impacts will be related to the appearance of the RN 32, but as there was already a road in poor condition on the same route, the impact will be minor and some may even consider it a positive impact. There will also potentially be secondary impacts related to an increase in the number of residences and the intensity of agriculture induced by the improvement of the RN 32, but the change in the landscape may be seen as positive or negative depending on the observer's preferences.

Impact assessment for the preparatory phase

The impact during the preparatory phase is considered to be:

- low intensity, as field activities will be relatively limited during the preparatory phase;
- a local scope, as the view may extend beyond the boundaries of the specific area;
- a short duration, given the closure of the base camp and the rehabilitation works.

The absolute significance of the impact will therefore be minor. With regard to landscape impacts, the relative value of this component is estimated to be medium, as the terrain is fairly flat, which reduces visibility. The relative significance of the impact for the preparatory phase will be medium.

Assessment of impacts for the construction phase

During the construction phase, activities will be more significant with land clearing and the use of heavy machinery and lorries.

During the construction phase, the impact on levels will be characterised by:

- an overall intensity of at least medium,
- a local extent,
- a long duration given the long-term changes, including to the road surface itself.

The absolute significance of the impact will therefore be average and, considering the reasons mentioned above, an affected component of average value, the relative significance of the impact will be average.

Assessment of impacts for the operational phase

The operational phase will have a significant impact on the landscape, as the arrival of the asphalt road will promote trade, the development of villages along the route and the economic development of the area in general (increased construction, deforestation, agriculture, etc.).

There will therefore be medium intensity, local extent and long duration for medium absolute importance and medium relative importance.

8.2.3. Impacts on the biological environment

8.2.3.1. Impacts on habitats

■ Degradation and loss of natural terrestrial habitat

Table 88. Loss of natural terrestrial habitat

IMPACT <i>Loss of natural terrestrial habitat</i>								
Affected phases ☑ Preparation ☑ Construction ☑ Operation ☑ Closure								
Affected components ☑ A - RN32, engineering structures and toll stations ☑ B - Base camp and temporary facilities ☑ C - Granite quarry ☑ D – Access road to the granite quarry								
Impact analysis based on affected phases and components								
Phase	Component	Nature	Intensity	Extent	Duration	Absolute importance	Sensitivity of the environment	Relative importance
Preparation	A, B, C and D	Negative	Average	Occasional	Short	Minor	Average	Average
Construction	A, B, C and D	Negative	Strong	Local	Long	Major	Medium	Strong
Exploitation	A	Negative	Average	Local	Long	Average	Average	Average

Impacts in general

Based on the critical habitat analysis (Section 7), it appears that there is no critical habitat in the project's impact zone. The habitats present are classified as natural habitats and modified habitats. Critical habitats would have been identified as a high-stakes issue if they had been present. Natural habitats will be identified as having medium stakes.

The various natural terrestrial habitats have been identified in the project study area, particularly in the context of the Critical Habitat Analysis (Section 7). These are:

- Dense forest (including riparian forests)
- Open forest (including savannahs)
- Wooded grasslands
- Grassy formations on bowal and meadows
- Gallery forests and riparian zones of watercourses and wetlands present in the terrestrial area
- Alluvial areas

It is estimated that up to 40 ha of these habitats will be eliminated due to the project by the activities and land clearing required for work on the RN 32 and the access road to the quarry, the quarry itself, the borrow pits and the base camp.

Natural habitats in the project's indirect area of influence could also be damaged if no measures are taken, due to the presence of numerous workers (illegal logging and bush meat consumption, for example).

Finally, natural habitats in the local area could be impacted at a later stage if the improvement of the road leads to an increase in population, which will have a negative impact on natural habitats (agricultural pressure, residential pressure, etc.).

Impact assessment for the preparatory phase

The impact during the preparatory phase is considered to be:

- low intensity, as field activities will be relatively limited during the preparatory phase;
- a limited scope;
- a short duration, given the closure of the base camp and the rehabilitation work.

The absolute significance of the impact will therefore be minor. The relative value of the natural habitats component is estimated to be medium, as the high value is reserved for critical habitats. The relative significance of the impact for the preparatory phase will be medium.

Assessment of impacts for the construction phase

During the construction phase, activities will be more significant with land clearing and the presence of a large population of workers, which will inevitably put additional pressure on natural habitats through the temptation to purchase bush meat, non-timber forest products, medicinal plants, charcoal and wood, etc., and develop small-scale trade.

During the construction phase, the relative impact at this level will be characterised by:

- high overall intensity,
- a local extent given the potential impacts of workers,
- a long duration given the long-term changes, including to the roadside itself.

The absolute significance of the impact will therefore be major and, considering the reasons mentioned above, an affected component of medium value, the relative significance of the impact will be high.

Assessment of impacts for the operational phase

The operational phase will be particularly significant in terms of its impacts on biodiversity due to the existence of the road and the increase in population and human activity that it will entail. These impacts will occur at a later stage, but will be significant for the ecosystems in the area, particularly natural habitats.

There will therefore be medium intensity, local extent and long duration for medium absolute importance and medium relative importance.

■ Fragmentation of terrestrial habitats and disruption of connectivity

Table 89. Fragmentation of terrestrial habitats and disruption of connectivity

IMPACT <i>Fragmentation of terrestrial habitats and disruption of connectivity</i>								
Affected phases ☒ Preparation ☒ Construction ☒ Operation								
Components affected ☒ A - RN32, engineering structures and toll stations ☒ B - Base camp and temporary facilities ☒ C - Granite quarry ☒ D – Access road to the granite quarry								
Impact analysis based on affected phases and components								
Phase	Component	Nature	Intensity	Extent	Duration	Absolute importance	Sensitivity of the environment	Relative importance
Preparation	A, B, C and D	Negative	Low	Local	Short	Minor	Medium	Medium
Construction	A, B, C and D	Negative	Strong	Local	Long	Major	Medium	Strong
Exploitation	A	Negative	Average	Local	Long	Average	Average	Average

Impacts in general

One of the most significant impacts on biodiversity of linear structures such as roads is the fragmentation of natural habitats and problems with connectivity between these fragments. The subdivision of large areas of natural habitat into increasingly smaller fragments reduces habitat quality for many species. Some species require a large territory, while others need conditions that can only be found within a sufficiently large block of habitat.

In this case, the impacts are fairly limited to certain areas on an ad hoc basis during the works, but are permanent at the quarry during the construction period. This is not a new road; the road already exists. This is also the case for the access road to the quarry. There will be a certain increase in the barrier effect of the roads as a result of the widening of the carriageway and, in , the increase in traffic, but also in the speed of vehicles. The quarry itself will have a significant effect in driving wildlife out of certain corridors located in its buffer zone. There is also a possible long-term impact related to induced impacts.

Impact assessment for the preparatory phase

The impact during the preparatory phase is considered to be:

- low intensity, as field activities will be relatively limited during the preparatory phase;
- a local scope by definition, as the impacts are outside the specific area;
- a short duration given the closure of the base camp and the rehabilitation work.

The absolute significance of the impact will therefore be minor. The relative value of the natural habitats component is estimated to be medium, as the high value is reserved for critical habitats. The relative significance of the impact for the preparatory phase will be medium.

Assessment of impacts for the construction phase

During the construction phase, activities will be more significant, with more land clearing and the presence of a large population of workers.

During the construction phase, the impact in terms of levels will be characterised by:

- high overall intensity,
- a local extent,
- a long duration given the long-term changes to the roadside itself.

The absolute significance of the impact will therefore be major and, considering the reasons mentioned above, an affected component of average value, the relative significance of the impact will be high.

Assessment of impacts during the operational phase

The operational phase will be particularly significant in terms of its impact on biodiversity as a whole, both in terms of biodiversity loss and habitat fragmentation.

There will therefore be medium intensity, local extent and long duration for medium absolute significance and medium relative significance.

■ Degradation and loss of aquatic habitats

Table90 . Degradation and loss of aquatic habitats

IMPACT <i>Degradation and loss of aquatic habitats</i>								
Affected phases ☒ Preparation ☒ Construction ☒ Operation								
Components affected ☒ A - RN32, engineering structures and toll stations ☒ B - Base camp and temporary facilities ☒ C - Granite quarry ☒ D – Access road to the granite quarry								
Impact analysis based on affected phases and components								
Phase	Component	Nature	Intensity	Extent	Duration	Absolute importance	Sensitivity of the environment	Relative importance
Preparation	A, B, C and D	Negative	Low	Local	Short	Minor	Medium	Medium
Construction	A, B, C and D	Negative	Strong	Local	Short	Major	Medium	Strong
Exploitation	A	Negative	Average	Local	Long	Average	Average	Average

Impacts in general

Impacts on the aquatic environment will result from several project-related activities:

- Destruction of aquatic habitats during the demolition of old bridges and the construction of new bridges and culverts.
- Changes in hydrological parameters following the construction of new bridges and culverts,

- Degradation of the aquatic environment due to suspended solids (SS) released into watercourses (these can impact spawning grounds and aquatic plants) (see Section 8.2.2),
- Degradation of the aquatic environment due to accidental spills of hazardous materials with negative environmental effects,
- Water intake by the project, which could have an impact on small watercourses during low water periods by reducing water levels too significantly, which could impact aquatic species and water availability for local residents,
- Temporary presence of workers who could put pressure on local aquatic resources,
- Long-term impacts resulting from the improvement of the RN32 (in particular, increased agriculture and increased pressure on aquatic resources).

As with terrestrial habitats, the component has an average value, as no critical habitats within the meaning of NP6 have been identified for small watercourses and this section of the Niger.

Impact assessment for the preparatory phase

The impact during the preparatory phase is considered to have:

- low intensity, as field activities will be relatively limited during the preparatory phase;
- a local scope;
- a short duration given the closure of the base camp and the rehabilitation works.

The absolute significance of the impact will therefore be minor. The relative value of the natural habitats component is estimated to be medium, as the high value is reserved for critical habitats. The relative significance of the impact for the preparatory phase will be medium.

Assessment of impacts for the construction phase

During the construction phase, activities will be more significant with the construction of new bridges and culverts and the presence of a large population of workers. Work carried out on dry watercourses will not pose any particular problems. However, work carried out on permanent watercourses will require more attention in terms of the risk of impact on the aquatic environment.

During the construction phase, the impact on water levels will be characterised by:

- high overall intensity,
- a localised extent,
- a long duration given the long-term modifications to bridges and culverts.

Concerning only permanent watercourses, which represent a risk here, the absolute significance of the impact will therefore be major and, considering the reasons mentioned above, an affected component of medium value, the relative significance of the impact will be high.

Assessment of impacts for the operational phase

The operational phase will be particularly significant in terms of its impacts on the aquatic environment.

There will therefore be a medium intensity, local extent and long duration for a medium absolute significance and a medium relative significance.

■ Fragmentation of aquatic habitats and disruption of connectivity

Table 91. Fragmentation of aquatic habitats and disruption of connectivity

IMPACT		<i>Fragmentation of aquatic habitats and disruption of connectivity</i>							
Affected phases ☒ Preparation ☒ Construction ☒ Operation									
Components affected ☒ A - RN32, engineering structures and toll stations ☒ B - Base camp and temporary facilities ☒ C - Granite quarry ☒ D – Access road to the granite quarry									
Impact analysis based on affected phases and components									
Phase	Component	Nature	Intensity	Extent	Duration	Absolute importance	Sensitivity of the environment*	Relative importance	

Preparation	A, B, C and D	Negative	Low	Occasional	Short	Minor	Medium	Medium
Construction	A, B, C and D	Negative	Average	Local	Average	Average	Average	Average
Exploitation	A	Positive	Strong	Local	Long	Major	Average	Strong

* The sensitivity of the environment to aquatic habitat connectivity is usually considered High, but in the context of this road rehabilitation project, we are adapting the sensitivity to the specific nature of the project and considering it to be Medium (bearing in mind that this value must remain constant and cannot be changed from one phase to another), especially since QGMI will be carrying out the work on the engineering structures when the watercourses are dry.

Impacts in general

As with terrestrial habitats, one of the most important aspects of linear structures such as roads on the aquatic environment is fragmentation and connectivity. Many aquatic species occupy a large area of watercourses and some participate in actual migrations. The passage of a road can create obstacles to movement.

In this case, the negative impacts are rather limited. This is not a new road; the road already exists, as do the bridges and culverts. This is also the case for the access road to the quarry. Most of the bridges and culverts on the RN 32 will be replaced because they are considered undersized. Replacing them with larger bridges and culverts will have a positive long-term impact on the aquatic environment. On the other hand, there will be a negative short-term impact during the replacement of the bridges and culverts.

Impact assessment for the preparatory phase

The impact during the preparatory phase is considered to be:

- low intensity, as field activities will be relatively limited during the preparatory phase;
- a limited scope;
- a short duration due to the closure of the base camp and the rehabilitation work.

The absolute significance of the impact will therefore be minor. The relative value of the natural habitats component is estimated to be low, as high value is reserved for critical habitats. The relative significance of the impact for the preparatory phase will be medium.

Assessment of impacts for the construction phase

During the construction phase, activities will be much more significant, particularly with the replacement of the old bridges and culverts on the RN 32. In the long term, this replacement will be positive for the movement of aquatic species, but in the context of the construction phase, the impact will be negative.

During the construction phase, the impact on water levels will be characterised by:

- high overall intensity,
- a local extent,
- an average duration.

The absolute significance of the impact will therefore be moderate and, considering the reasons mentioned above, with a low sensitivity value for the affected component, the relative significance of the impact will be moderate.

Impact assessment for the operational phase

The operational phase will be particularly important for the long-term positive effects of the new bridges and culverts.

There will therefore be a high intensity, local scope and long duration for a major absolute significance, and a medium but positive relative significance.

8.2.3.2. Impacts on flora

■ Loss of plant specimens of conservation interest

Table 92. Loss of plant specimens of conservation interest

IMPACT <i>Loss of plant specimens of conservation interest</i>								
Phases affected ☒ Preparation ☒ Construction ☒ Operation								
Components affected ☒ A - RN32, engineering structures and toll stations ☒ B - Base camp and temporary facilities ☒ C - Granite quarry ☒ D – Access road to the granite quarry								
Impact analysis based on affected phases and components								
Phase	Component	Nature	Intensity	Extent	Duration	Absolute importance	Sensitivity of the environment	Relative importance
Preparation	A, B, C and D	Negative	Low	Occasional	Short	Minor	Strong	Medium
Construction	A, B, C and D	Negative	Strong	Local	Long	Major	Strong	Strong
Exploitation	A	Negative	Average	Local	Long	Average	Strong	Strong

Impacts in general

According to IUCN status, several globally threatened plant species are present in the study area. These are *Pterocarpus erinaceus* (EN), *Azelia africana* (VU), *Khaya senegalensis* (VU) and *Vitellaria paradoxa* (VU), which are present both along the RN32 and in the quarry area and its access road. In addition, many nationally protected species are present.

Although these species do not trigger critical habitat according to NP6, they remain important at the global and national levels and are nevertheless species of conservation interest. For this reason, the component is assessed as having high value.

The impacts will mainly be due to destruction during land clearing. Potential impacts are also linked to dust, spills of harmful substances, potential tree cutting by project workers even though this will be prohibited, and impacts resulting from an increase in the local population. Indeed, the development of the area during the works (local employment, services for workers, etc.) and the economic development promoted by smoother traffic flow on the RN32 will inevitably lead to a significant increase in the population along the road. This increase in population will increase the population along the road. etc.) and then due to the economic development promoted by smoother traffic flow on the RN32, will inevitably cause a significant increase in the population along the road. This increase in population will increase pressure on tree species in the area (agriculture, livestock, firewood, timber, etc.).

Impact assessment for the preparatory phase

The impact during the preparatory phase is considered to be:

- low intensity, as field activities will be relatively limited during the preparatory phase;
- a limited scope;
- a short duration given the closure of the base camp and the rehabilitation work.

The absolute significance of the impact will therefore be minor. The relative value of the component is estimated to be high. The relative significance of the impact for the preparatory phase will be medium.

Assessment of impacts for the construction phase

During the construction phase, activities will be more significant with land clearing and the presence of a large population of workers.

During the construction phase, the impact in terms of levels will be characterised by:

- a high overall intensity,
- a local extent given the potential impacts of workers,
- a long duration given the long-term changes, including to the roadside itself.

The absolute significance of the impact will therefore be major and, considering the reasons mentioned above, a component with a high value will be affected, meaning that the relative significance of the impact will be high.

Assessment of impacts for the operational phase

The operational phase will be particularly significant in terms of its impact on biodiversity, as the economic development promoted by smoother traffic flow on the RN32 will inevitably lead to a significant increase in the population along the road. This increase in population will increase pressure on tree species in the area (agriculture, livestock farming, firewood, timber, etc.).

There will therefore be medium intensity, local extent and long duration for medium absolute importance and high relative importance.

8.2.3.3. Impacts on wildlife

■ Localised disturbance to terrestrial fauna and risk of mortality

Table 93. Localised disturbance to terrestrial fauna and risk of mortality

IMPACT Localised disturbance to terrestrial fauna and risk of mortality								
Affected phases ☒ Preparation ☒ Construction ☒ Operation								
Affected components ☒ A - RN32, engineering structures and toll stations ☒ B - Base camp and temporary facilities ☒ C - Granite quarry ☒ D - Access road to the granite quarry								
Impact analysis based on phases and affected components								
Phase	Component	Nature	Intensity	Extent	Duration	Absolute importance	Sensitivity of the environment	Relative importance
Preparation	A, B, C and D	Negative	Low	Local	Short	Minor	Medium	Medium
Construction	A, B, C and D	Negative	Strong	Local	Average	Medium	Average	Average
Operation	A	Negative	Average	Local	Long	Average	Average	Average

Impacts in general

Disturbance and mortality risks to terrestrial fauna are a direct consequence of:

- the loss of natural habitats and habitat fragmentation (impact described above),
- increased risks of poaching during the construction phase,
- increased noise,
- increased human presence,
- increased road traffic (increasing the barrier effect and the risk of collision),
- increased road traffic speed (increasing the risk of collision),
- long-term impacts linked to an increase in the local population.

These impacts will disrupt the animals' way of life:

- disruption of reproductive activities,
- disruption of feeding habits,
- flight and search for new habitats.

Some impacts will potentially result in the direct death of individuals (crushing during land clearing, collisions on roads), while others will potentially result in the temporary (during preparation or construction) or long-term avoidance of the impact area. Avoidance does not mean that animals are not affected. When animals

are forced to leave an area they occupy, alternative habitats are often either of poorer quality or already occupied.

The sensitivity of this component is considered moderate given the range of potential impacts and the importance of local animals to residents and the terrestrial environment.

Impact assessment for the preparatory phase

The impact during the preparatory phase is considered to be:

- low intensity, as field activities will be relatively limited during the preparatory phase;
- a local scope;
- a short duration, given the closure of the base camp and the rehabilitation work.

The absolute significance of the impact will therefore be minor. The relative value of the component is estimated to be high. The relative significance of the impact for the preparatory phase will be medium.

Assessment of impacts for the construction phase

During the construction phase, activities will be more significant with land clearing and the presence of a large population of workers.

During the construction phase, the impact in terms of levels will be characterised by:

- a high overall intensity,
- a local scope given the potential impacts of workers,
- an average duration.

The absolute significance of the impact will therefore be major and, considering the reasons mentioned above, an affected component of average value, the relative significance of the impact will be average.

Impact assessment for the operational phase

The operational phase will be particularly significant in terms of noise impacts, collisions and changes to biodiversity (agricultural pressure and population increase).

There will therefore be an average intensity, local extent and long duration for an average absolute importance and average relative importance.

■ Impacts on animals of conservation interest

Table 94. Impacts on animals of conservation interest

IMPACT <i>Impacts on animals of conservation interest</i>								
Affected phases ☒ Preparation ☒ Construction ☒ Operation								
Components affected ☒ A - RN32, engineering structures and toll stations ☒ B - Base camp and temporary facilities ☒ C - Granite quarry ☒ D - Access road to the granite quarry								
Impact analysis based on affected phases and components								
Phase	Component	Nature	Intensity	Extent	Duration	Absolute importance	Sensitivity of the environment	Relative importance
Preparation	A, B, C and D	Negative	Low	Occasional	Short	Minor	Strong	Medium
Construction	A, B, C and D	Negative	Average	Local	Average	Average	Strong	Strong
Exploitation	A	Negative	Average	Local	Long	Average	Strong	Strong

Impacts in general

The following discussion covers species observed along the route and in neighbouring areas. Other potential species not found during field studies are described in the section on critical habitats (Section 7).

None of the mammal species inventoried during this study are highly endangered according to IUCN criteria. One species is Vulnerable, namely the hippopotamus, but this species is only present in the Niger River and does not cross the road, according to consultations with local communities. Two species are Near Threatened: the Patas monkey and the Yellow-backed duiker, whose populations are constrained by hunting pressure, forest habitat destruction and agriculture. Among the terrestrial mammal species inventoried during this initial biodiversity assessment, five are fully protected by Guinean legislation under Decree A/2020/1591/MEEF/CAB/SGG of 19 May 2020: the red-flanked duiker, the yellow-backed duiker, the bushbuck, the red river hog and the serval. The following species are partially protected under the same decree: the green monkey, the patas monkey, Maxwell's duiker, the African warthog, the striped jackal, the African civet, the savannah hare, and the crested porcupine.

It should be noted that all investigations concerning chimpanzees have confirmed their absence from the project area.

For birds, according to IUCN criteria, two species observed are considered threatened: the Black-backed Vulture (*Necrosyrtes monachus*) and the African Vulture (*Gyps africanus*), both classified as Critically Endangered (CR), and the Savannah Hawk (*Terathopius ecaudatus*), classified as Endangered (EN). Nine species of birds of prey are fully protected under national legislation and nine other bird species are under partial protection.

As for reptiles and amphibians, one species of frog has an undetermined IUCN status (*Hylarana cf. fonensis*), the Nile monitor (*Varanus niloticus*) is fully protected at the national level, and two species of reptiles, *Chamaeleo gracilis* and *Bitis arietans*, are partially protected.

As for fish, none of the species found during fieldwork are threatened according to the IUCN or have protected status in Guinea.

Although these species do not trigger critical habitat according to NP6, they remain important at the global and national levels and are nevertheless species of conservation interest. For this reason, the component is assessed as having high value.

The potential impacts are those described in the previous section.

Impact assessment for the preparatory phase

The impact during the preparatory phase is considered to be:

- low intensity, as field activities will be relatively limited during the preparatory phase;
- a limited scope;
- a short duration given the closure of the base camp and the rehabilitation work.

The absolute significance of the impact will therefore be minor. The relative value of the component is estimated to be high. The relative significance of the impact for the preparatory phase will be medium.

Assessment of impacts for the construction phase

During the construction phase, activities will be more significant with land clearing and the presence of a large population of workers.

During the construction phase, the impact in terms of levels will be characterised by:

- a high overall intensity,
- a local extent given the potential impacts of workers,
- an average duration.

The absolute significance of the impact will therefore be moderate and, considering the reasons mentioned above, the relative significance of the impact will be high.

Impact assessment for the operational phase

The operational phase will be particularly significant in terms of its impacts on biodiversity.

There will therefore be an average intensity, a local scope and a long duration for an average absolute importance, and a high relative importance.

8.2.3.4. Invasive alien species

Table 95. Risk of dispersal of invasive plant species

IMPACT <i>Risk of dispersal of invasive plant species</i>								
Affected phases ☒ Preparation ☒ Construction ☒ Operation								
Affected components ☒ A - RN32, engineering structures and toll stations ☒ B - Base camp and temporary facilities ☒ C - Granite quarry ☒ D - Access road to the granite quarry								
Impact analysis based on affected phases and components								
Phase	Component	Nature	Intensity	Extent	Duration	Absolute importance	Sensitivity of the environment	Relative importance
Preparation	A, B, C and D	Negative	Average	Occasional	Long	Average	Low	Average
Construction	A, B, C and D	Negative	Average	Occasional	Long	Average	Low	Average
Exploitation	A	Negative	Average	Occasional	Long	Average	Low	Average

Impacts in general

Invasive species are considered one of the global causes of biodiversity loss. Roads under construction and in operation can contribute to the spread of invasive plant species.

As part of the project, two invasive species were identified in the study area: *Imperata cylindrica* grass and *Tectona grandis* trees.

Imperata cylindrica was observed four times in the quarry area and along the RN 32 road, in a heavily degraded wooded grassland formation, a degraded open forest, a lowland area and an anthropogenic formation. Native to Asia, it has spread widely throughout the world's hot tropical zones and is now considered one of the 10 worst invasive herbaceous plants.

Teak, *Tectona grandis*, is a fast-growing tree with broad deciduous leaves, whose wood is highly prized. Native to Southeast Asia (India, Malaysia, Laos, Thailand), this species is used by local environmental authorities to reforest degraded habitats because of its rapid growth, without taking into account its invasive nature. Today, it is dangerously affecting the biodiversity of native plant formations due to its invasive nature. Teak has been observed three times along the RN 32.

The study area is therefore already affected by the presence of these invasive species, and the movement of machinery during the construction phase in particular could facilitate the spread of invasive plants in the project area. Invasive plant species are known to thrive in degraded, anthropised areas. Increased traffic and the associated impacts will also tend to promote invasive plants.

This component is considered to be of medium value given the presence of invasive species and the degraded state of the vegetation cover.

Impact assessment for the preparatory phase

The impact during the preparatory phase is considered to be:

- low intensity, as field activities will be relatively limited during the preparatory phase;
- a limited scope, as it will mainly be felt within the project boundaries;
- a short duration, given the closure of the base camp and the rehabilitation work.

The absolute significance of the impact will therefore be minor. The relative value of the component is estimated to be medium. The relative significance of the impact for the preparatory phase will be medium.

Impact assessment for the construction phase

During the construction phase, activities will be more significant with land clearing and the arrival of machinery and lorries from other parts of Guinea. These could bring new invasive species.

During the construction phase, the relative impact will be characterised by:

- an average overall intensity,
- a limited scope,
- an average duration.

The absolute significance of the impact will therefore be moderate and, considering the reasons mentioned above, an affected component of moderate value, the relative significance of the impact will be moderate.

Impact assessment for the operational phase

The operational phase will be particularly significant in terms of increased traffic, thereby proportionally increasing the possibility of transporting new invasive species and the resulting impacts on biodiversity.

There will therefore be an average intensity, a specific scope and a long duration for an average absolute importance and an average relative importance.

8.2.3.5. Impacts on protected areas or areas recognised for their biodiversity

12.2.3.5. Impacts on protected areas or areas recognised for their biodiversity

Table 96. Impacts on protected areas or areas recognised for their biodiversity

IMPACT <i>Impacts on protected areas or areas recognised for their biodiversity</i>								
Affected phases ☒ Preparation ☒ Construction ☒ Operation								
Components affected ☒ A - RN32, engineering structures and toll stations ☒ B - Base camp and temporary facilities ☐ C - Granite quarry ☒ D – Access road to the granite quarry								
Impact analysis based on affected phases and components								
Phase	Component	Nature	Intensity	Extent	Duration	Absolute importance	Sensitivity of the environment	Relative importance
Preparation	A, B, C and D	Negative	Low	Occasional	Short	Minor	Medium	Medium
Construction	A, B, C and D	Negative	Strong	Local	Average	Medium	Average	Average
Exploitation	A	Positive	Strong	Local	Long	Major	Average	Strong

Impacts in general

Protected areas and areas recognised for their biodiversity deserve additional consideration.

The study area does not include any protected areas for biodiversity, but it is largely located within a wetland recognised as important for biodiversity conservation under the RAMSAR Convention.

The study area is partly located within the Niger-Niandan-Milo Ramsar site. Covering an area of 13,990 km² of plains, this area is dotted with a rich hydrographic network intersecting the watersheds of three major rivers: the Milo, Niandan and Niger. Ramsar sites are internationally important sites for wetlands and their biodiversity.

The importance of this area for biodiversity is reflected in its rich fish fauna and the permanent or temporary presence of waterbirds. Certain parts of the area are also of folkloric importance, such as the Baro pond (FDR of the site, 2017).

In Guinea, a signatory to the Ramsar Convention, Ramsar sites are recognised as wetlands of importance for conservation, but are not currently integrated into Guinean legislation. Thus, all socio-economic activities are permitted there, in accordance with regulations, with priority given to those aimed at conservation.

This component therefore assesses the impact of the project in the specific context of the recognised area, i.e. with an emphasis on wetlands and the impacts on these environments and their species. As the Ramsar

site has no official protection, the value of the component is medium rather than high, which is reserved for protected sites.

The RN32 runs through the Ramsar site for 63 km, and the track connecting the Kounkono quarry site to Norassoba is also included for a distance of 21 km. The study areas overlap with the Ramsar site over an area of 122 km² for the RN32 and 43 km² for the access road to the quarry area, approximately 1% of the Ramsar site. The quarry is outside the Ramsar site.

Impact assessment for the preparatory phase

The impact during the preparatory phase is considered to be:

- low intensity, as field activities will be relatively limited during the preparatory phase and appear to avoid wetlands;
- a limited scope;
- a short duration given the closure of the base camp and the rehabilitation work.

The absolute significance of the impact will therefore be minor. The relative value of the component is estimated to be medium. The relative significance of the impact for the preparatory phase will be medium.

Assessment of impacts for construction phase I

During the construction phase, activities will be much more significant, particularly with the replacement of old bridges and culverts on the RN 32. In the long term, this replacement will be positive for the movement of aquatic species, but in the context of the construction phase, the impact will be negative. In any case, the RAMSAR area will be only slightly affected, the impacts will not be significant and will be short-lived, lasting only for the duration of the works.

During the construction phase, the impact on water levels will be characterised by:

- high overall intensity,
- a local extent,
- an average duration.

The absolute significance of the impact will therefore be moderate and, considering the reasons mentioned above, with an affected component of moderate value, the relative significance of the impact will be moderate.

Impact assessment for the operational phase

The operational phase will be particularly important for the long-term positive effects of the new bridges and culverts. The new bridges will protect watercourses and facilitate flow, which will improve connectivity between the Niger River and its tributaries, and thus the movement of aquatic species. Water quality will also be improved.

There will therefore be high intensity, local extent and long duration for major absolute importance and high relative importance, but positive.

8.2.4. Impact on the human environment

8.2.4.1. Impact on employment and working conditions

Table 97 : Job creation and use of subcontractors for goods and services

IMPACT Job creation and use of subcontractors for goods and services									
Affected phases ☐ Preparation ☒ Construction ☒ Operation									
Components affected ☒ A - RN32, engineering structures and toll stations ☒ B - Base camp and temporary facilities ☒ C - Granite quarry ☒ D – Access road to the granite quarry									
Impact analysis based on affected phases and components									
Phase	Component	No. and description	Nature	Intensity	Scope	Duration	Absolute importance	Sensitivity of the environment	Relative importance
Construction	A, B, C and D	1 – Job creation in construction	Positive	Strong	Regional	Moderate	Major	Strong	Positive Strong
Construction	A, B, C and D	2 – Development of SMEs linked to the influx of project workers	Positive	Average	Regional	Average	Average	Strong	Positive Strong
Construction	A, B, C and D	3 – Opportunities for local businesses	Positive	Average	Regional	Average	Average	Strong	Positive Strong
Exploitation	A	4 – Job creation for maintenance of the RN32, engineering structures and toll stations	Positive	Low	Local	Medium	Medium	Strong	Positive High

During the **construction phase**, numerous impacts can be cited:

- The employment of 818 workers during the peak period (30 months of construction in total), hiring people locally and regionally;
- Business opportunities may also arise for local companies that could be contracted as subcontractors, contributing to economic development;
- Finally, the project will generate informal employment and income-generating activities in commerce and catering for construction workers.

During the **operational phase**, the number of project workers, recruited mainly for the maintenance and upkeep of the RN 32, but also for bridges and toll stations, should be significantly reduced compared to the construction phase and spread over the entire operational period (approximately 15 years).

With regard to environmental sensitivity and in a context of limited resources from AGRs practised by local communities, as presented in the section 6.3.3, employment is seen as the main asset and positive impact of the project, with the future opening up of the study area that the project will bring, as perceived by the local communities consulted. Local employment is therefore at the heart of expectations and concerns regarding this project, and young people are particularly interested in this economic opportunity. Small businesses and small catering establishments near the construction site are of particular interest to women. In order to maximise the positive impact of job creation, the PGES will propose measures to promote local recruitment on the basis of equal skills, ensuring decent working conditions and guaranteeing non-discrimination against women and vulnerable groups in employment and in the workplace. Information on job opportunities must be disseminated sufficiently in advance so that communities from neighbouring localities who are not residing in the study area at the time of recruitment (such as gold miners or those residing in Conakry or Kankan) can apply in time.

8.2.4.2. Impact on land and land use

Table98 : Temporary and permanent land loss

IMPACT Temporary and permanent land losses									
Phases affected ☒ Preparation ☐ Construction ☐ Operation									
Components affected ☒ A - RN32, engineering structures and toll stations ☐ B - Base camp and temporary facilities ☒ C - Granite quarry ☒ D – Access road to the granite quarry									
Impact analysis based on affected phases and components									
Phase	Component	No. and description	Nature	Intensity	Scope	Duration	Absolute importance	Sensitivity of the environment	Relative importance
Preparation	A	5 – Disruption of urban development plans	Negative	Low	Occasional	Long	Minor	Strong	Medium
Preparation	A, C and D	7 – Permanent loss of land	Negative	Average	Local	Long	Long	Strong	Strong
Preparation	B	8 – Temporary loss of land	Negative	Low	One-off	Short	Minor	Strong	Medium

From the **preparation phase** onwards, land acquisition for the project will disrupt housing development plans in localities such as Norassoba, which, due to its growth, has such plans designed with the expertise of decentralised and devolved services. The permanent acquisition of land by the project in the additional right-of-way area of the RN 32 and in the right-of-way area of toll stations and other permanent facilities associated with the RN 32 will result in a long-term loss of land resources for local communities. and the temporary acquisition of land in the right-of-way of the base camp and temporary facilities will result in a loss of land resources for a period of approximately 30 months (the duration of the construction phase for an approximate temporary acquisition area of at least 5.5 ha), although this loss will be mitigated by the income derived from the rental of this land to the project.

It should be noted that the loss of these land resources certainly affects landowners (those holding land titles issued by decentralised technical services as well as landowners holding rights under customary law, at the household, lineages and villages), but also their agricultural operators, particularly women, whose access to land as owners is very limited or even unthinkable in the study area at present, making them dependent on the authority of their husband, brother, father or lineage chief for access to these resources, thus exacerbating their vulnerability to the impacts of the project. It should be noted that the area, like many other regions in Guinea, is characterised by demographic pressure and increasing pressure on land (see 6.3.2.3).

Table99 : Inflation in land values, land speculation and land conflicts

IMPACT Land value inflation, land speculation and land conflicts									
Phases affected ☒ Preparation ☐ Construction ☒ Operation									
Components affected ☒ A - RN32, engineering structures and toll stations ☒ B - Base camp and temporary facilities ☒ C - Granite quarry ☐ D – Access road to the granite quarry									
Impact analysis based on affected phases and components									
Phase	Component	No. and description	Nature	Intensity	Scope	Duration	Absolute importance	Sensitivity of the environment	Relative importance
Preparation	A, B and C	6 – Land inflation caused by land acquisition	Negative	Low	One-off	Moderate	Minor	Strong	Medium

Exploitation	D	9 – Land inflation caused by proximity to the RN32	Negative	Average	Regional	Long	Major	Strong	Strong

The permanent acquisition of land by the project in the additional right-of-way area of the RN 32 and in the right-of-way area of toll stations and other associated permanent facilities, and the temporary acquisition of land in the right-of-way area of the base camp, quarries and temporary facilities during **the preparation phase** will lead to low-intensity land inflation, in a very localised manner (especially in inhabited areas) and over a period of several years.

However, during **the operational phase**, it is highly likely that the direct proximity of neighbouring localities to the upgraded RN 32 and the influence that this road will have on neighbouring regions will lead to long-term land price inflation. It should be noted that this inflation will have a negative impact on buyers and tenants/sharecroppers, but will be considered a positive impact for sellers and owners.

Table100 : Land restitution

IMPACT Land restitution								
Phases affected ☐ Preparation ☒ Construction ☐ Operation								
Affected components ☐ A - RN32, engineering structures and toll stations ☒ B - Base camp and temporary facilities ☒ C - Granite quarry ☐ D – Access road to the granite quarry								
Impact analysis based on phases and affected components								
Phase	No. and description	Nature	Intensity	Scope	Duration	Absolute importance	Sensitivity of the environment	Relative importance
Exploitation	49 – Return of temporarily acquired land	Positive	Average	Occasional	Long	Average	Strong	Positive High

At the end of the construction phase/beginning of the operational phase, the return of land temporarily acquired by the project (area occupied by the base camp and temporary facilities covering at least 5.5 ha) will enable local communities to recover these land resources and invest in them (agriculture, livestock farming, land reserves, other AGRs, construction, etc.). However, this impact is limited in scope to the few hectares affected by these infrastructures.

For negative impacts related to land use and occupation, the PAR-PRMS will need to communicate the final design of the project to stakeholders, municipalities and PAPs as soon as possible, set up a resettlement committee with the participation of all stakeholders, ensure their commitment, particularly that of the technical urban planning services and the town hall, and communicate the compensation strategy for those affected by involuntary resettlement as soon as possible.

Ultimately, the implementation of this plan should ensure that all physically displaced persons have received replacement land and that all PAPs have restored their livelihoods.

With regard to the specific impact of local land inflation during the preparation phase, the project developer's additional development of a CSR plan for the localities bordering the project's indirect area of influence will compensate for any adverse effects that remain after the implementation of the PAR-PRMS.

8.2.4.3. Impact on demographics and migration

Table101 : Resettlement and influx of people attracted by the appeal of the area

IMPACT	Resettlement and influx of people attracted by the appeal of the area

Phases affected ☒ Preparation ☒ Construction ☒ Operation

Components affected ☒ A - RN32, engineering structures and toll stations ☒ B - Base camp and temporary facilities
☒ C - Granite quarry ☒ D – Access road to the granite quarry

Impact analysis based on affected phases and components

Phase	Component	No. and description	Nature	Intensity	Scope	Duration	Absolute importance	Sensitivity of the environment	Relative importance
Preparation	A, B, C and D	10 – Relocation-related travel	Negative	High	Occasional	Long	Major	Strong	Strong
Construction	A, B, C and D	12 – Influx of workers and opportunistic migration	Negative	Strong	Local	Average	Average	Average	Average
Construction	A, B, C and D	13 – Increased workload for women hosting workers	Negative	Average	Occasional	Average	Average	Average	Average
Construction	A, B, C and D	14 – Cultural diversity	Negative	Average	Local	Average	Average	Average	Positive Average
Exploitation	A and C	15 – Attractiveness of newly opened-up areas	Negative	Strong	Regional	Long	Major	Strong	Positive Strong

During the **preparation phase**, the project's permanent acquisition of land in the additional right-of-way area of the RN 32 will result in the involuntary displacement and resettlement of physically displaced persons to host communities. Physical resettlement will only take place in the context of permanent land acquisition and will affect a maximum of 250 households, according to initial estimates made during the CPR field mission, which ran parallel to the field mission for this study (Insuco, April-May 2025). These households will be given priority for relocation within their community (which the PAR will strongly recommend).

For the **construction phase**, the Project plans to employ 818 workers during the peak period (30 months of construction in total), including non-local workers, which could lead to an influx of labour from other regions of Guinea to the project site.

During the recruitment process, the project plans to set up a local recruitment office. This is likely to attract candidates seeking economic opportunities, mainly people looking for work on the construction site. This influx will consist mainly of young adults who are unskilled, unemployed or in precarious employment. It is also possible that young people currently preparing for long-term migration to the Guinean coastal regions () or abroad, who originate from the affected sub-prefectures, or those migrating temporarily to the region's gold mining areas (see section **Erreur ! Source du renvoi introuvable.** 6.3.1), may consider returning as soon as work begins, in the hope of finding employment.

This may also involve opportunistic migration by various economic operators: service providers in the construction industry and small traders (catering, street trading, etc.). The hope is to sign subcontracting agreements with the main company in charge of the project, or to be able to set up shop near the project site or the base camp for the local communities of Fandia and Norassoba. Indeed, the presence of several hundred workers during the peak phase will create demand for goods and services that exceeds the existing supply in most of the project areas, which are rural areas where the current supply is relatively limited.

However, the proximity of large rural centres such as Norassoba and Niandankoro should help to limit this influx and instead generate movement between the towns and the project areas. The arrival of workers from outside the localities and neighbourhoods directly affected by the project has emerged as a concern among the communities consulted. For these reasons, the impact is considered to be of medium relative importance given the number of jobs created locally in relation to the population of the study area.

Directly linked to the influx of workers and opportunistic migration, and although the base camp will provide accommodation for non-Guinean workers and those from other regions of Guinea, it is likely that the project will have an impact on women who host relatives from the study area but who do not reside permanently on their property, for whom the workload will increase. However, the presence of a base camp for non-local workers limits the intensity of the impact, classifying it as moderate in a host community with equally moderate sensitivity.

Although the influx of non-local workers into the localities affected by the project during the construction phase and the opening up of the area during the operational phase may generate many fears, this arrival will also bring about a beneficial cultural mix for local communities, with increased social and cultural exchanges between the population centres of the two prefectures and between the migrant workforce and these communities.

During the **operational phase**, a significant reduction in the number of workers is expected for the operation of the project facilities. Nevertheless, the creation of a paved road will open up neighbouring communities and will certainly attract new resident households and economic operators. If poorly managed, this influx will increase the risk of conflict with local communities.

The development of a migration management plan, a PAR-PRMS and a PEPP will greatly limit these impacts, in particular by consulting and informing stakeholders, and by allowing the choice and validation of resettlement sites with displaced and host communities. the inclusion of E&S clauses in the construction contract requiring a human resources policy that promotes the recruitment of local people and women and ensures decent working conditions, and the establishment and dissemination of a complaints management mechanism.

Table102 : Departure of people due to the region's lack of attractiveness

IMPACT Departure of people due to the region's lack of attractiveness									
Phases affected ☒ Preparation ☐ Construction ☐ Operation									
Components affected ☒ A - RN32, engineering structures and toll stations ☒ B - Base camp and temporary facilities ☒ C - Granite quarry ☒ D - Access road to the granite quarry									
Impact analysis based on affected phases and components									
Phase	Component	No. and description	Nature	Intensity	Scope	Duration	Absolute importance	Sensitivity of the environment	Relative importance
Preparation	A, B, C and D	11 – Emigration of young people due to the payment of PAR compensation	Negative	Strong	Occasional	Long	Major	Strong	Strong

During the **preparation phase**, the payment of monetary compensation for the loss of assets and activities within the project's area of influence will most likely contribute to the migration of members (mainly young people) of the affected communities to other regions of Guinea, to countries in the sub-region (Senegal, Côte d'Ivoire, etc.) or to Europe.

However, as this impact is part of a receiving environment that is highly sensitive to migration issues, its extent is limited due to the appeal of the construction of a paved road, which promises local economic development for many localities in the study area.

As with the management of the influx of foreign workers, the implementation of the migration management plan will also minimise the impact of emigration on local communities, and the PEPP will enable stakeholders to be consulted and informed about employment opportunities and related AGR opportunities linked to the project.

8.2.4.4. Impact on traffic, circulation and mobility

Table103 : Traffic disruption due to project activities

IMPACT Traffic disruption caused by Project activities									
Affected phases ☐ Preparation ☒ Construction ☒ Operation									
Components affected ☒ A - RN32, engineering structures and toll stations ☒ B - Base camp and temporary facilities ☒ C - Granite quarry ☒ D – Access road to the granite quarry									
Impact analysis based on affected phases and components									
Phase	Component	No. and description	Nature	Intensity	Scope	Duration	Absolute importance	Sensitivity of the environment	Relative importance
Construction	A, B, C and D	16 – Traffic disruption caused by construction activities, including the transport of machinery, materials and workers	Negative	Average	Local	Average	Average	Average	Average
Operation	A	17 – Traffic disruption due to maintenance activities, including the transport of machinery, materials and workers	Negative	Average	Occasional	Average	Average	Average	Average

The **construction phase** and, to a lesser extent, the **operational phase** will involve the transport of materials and equipment to and from the project site, as well as construction, operation and maintenance activities on the project site. During the construction phase, the transport of materials and equipment will involve, during peak periods, the movement of approximately 100 dump trucks for earthworks and the transport of materials, and 64 heavy goods vehicles in the project area (RN 32 and track to the quarry). Materials and equipment that cannot be sourced locally or regionally will be imported and will arrive at the port of Conakry or by air freight and then transported by road to the project site. These activities will disrupt traffic and mobility for residents and users of the RN 32 and the access road to the granite quarry, and to a lesser extent for residents and users of the roads between Conakry and Koumana. Similarly, during the operational phase, operation and maintenance activities will involve the movement of machinery that will disrupt traffic and mobility for local residents and users of the RN 32.

However, these two impacts will be greatly limited by keeping one side of the road open to traffic at all times during construction, whenever technically and safely possible, or by implementing short-term diversions, signposted and accompanied by temporary traffic management measures to ensure safety and minimise disruption. The development of traffic management measures included in a Road Safety Action Plan (PASR) during the construction phase and similar measures included in the operation and maintenance management plan will significantly limit these impacts.

Table104 : Improvement of traffic, circulation and mobility

IMPACT Improvement of traffic, circulation and mobility	
Affected phases ☐ Preparation ☐ Construction ☒ Operation	

Components affected ☒ A - RN32, engineering structures and toll stations ☐ B - Base camp and temporary facilities ☐ C - Granite quarry ☒ D – Access road to the granite quarry

Impact analysis based on affected phases and components									
Phase	Component	No. and description	Nature	Intensity	Scope	Duration	Absolute importance	Sensitivity of the environment	Relative importance
Exploitation	A	18 – Improvement of traffic, circulation and mobility on the RN32	Negative	Average	Regional	Average	Average	Strong	Positive Strong
Exploitation	D	19 – Improvement in traffic, circulation and mobility on the track between Norassoba and Kounkono	Negative	Average	Local	Average	Average	Strong	Positive Strong

During the **operational phase**, the construction of permanent project components along the RN 32 and the rehabilitation of the track linking Norassoba to the Kounkono granite quarry will improve the movement of goods and people by reducing travel time and increasing the traffic capacity of these facilities, which is a major development issue in the study area.

These positive impacts will be reinforced by the continued construction of the RN32 and its engineering structures at the end of the project's 15-year lifespan, and by coordination within the MITP to integrate the rehabilitation of the track linking Norassoba to Kounkono into a long-term sustainable plan. Otherwise, without the integration of a sustainable policy to open up the area by the state or municipal administration, the impact on improving traffic, circulation and mobility on the track between Norassoba and the Kounkono granite quarry will remain limited to the maintenance and upkeep of the track during the construction phase in order to access the granite for the construction site.

8.2.4.5. Impact on local governance and social cohesion

Table105 : Social tensions and disruption of local governance due to population displacement

IMPACT Social tensions and disruption of local governance due to population displacement									
Phases affected ☒ Preparation ☒ Construction ☒ Operation									
Components affected ☒ A - RN32, engineering structures and toll stations ☒ B - Base camp and temporary facilities ☒ C - Granite quarry ☒ D - Access road to the granite quarry									
Impact analysis based on affected phases and components									
Phase	Component	No. and description	Nature	Intensity	Scope	Duration	Absolute importance	Sensitivity of the environment	Relative importance
Preparation	A, B, C and D	20 – Exclusion of local authorities from decision-making processes and project stages	Negative	High	Occasional	Average	Average	Average	Average
Preparation	A, B, C and D	21 – Disruptions related to the development of the ESIA and PAR	Negative	High	Local	Moderate	Medium	Average	Average

Construction	A, B, C and D	22 Recruitment-related tensions	– Negative	Average	Local	Average	Average	Average	Average
Construction	A, B, C and D	23 Tensions with project workers	– Negative	Average	Occasional	Average	Average	Average	Average
Operation	A	24 Recruitment-related tensions	– Negative	Low	Local	Short	Minor	Medium	Medium
Exploitation	A	25 Tensions with project workers	– Negative	Low	Occasional	Short	Minor	Medium	Medium

The issue of involuntary resettlement is significant in the study area: projects declared to be in the public interest, particularly large-scale mining projects, are present in these prefectures. Although not directly affecting the sub-prefectures in the project's indirect area of influence, the implementation of these projects often generates frustration among local communities, which are related to the communities in the study area, and the fact that some populations have already experienced involuntary displacement, which they consider difficult, means that the receiving environment is quite sensitive to this issue.

Thus, during the **preparation phase**, the release of land and the economic and physical displacement of local populations will also impact governance and social cohesion. The resettlement of displaced persons in other localities, or the lack of involvement of local authorities in the project implementation stages, will disrupt the governance of village chiefdoms and municipal and sub-prefectural authorities. The PAR will therefore recommend prioritising economic and physical resettlement within the same village territory, and this ESIA will recommend effective and proactive engagement by stakeholders. Resettlement reshuffles the cards in terms of local power distribution with potentially reducing the power held by the village affected by the displaced PAPs. The resettlement process can also create tensions between displaced populations and host populations, a loss of socio-cultural identity and the alteration of social networks, as new arrivals place additional pressure on local livelihoods and essential services. This is all the more true in the case of the present project, where although the assets impacted are not comparable to those impacted by a mining project, the number of PAPs will be (projects with a linear footprint affect more people for relatively less impact than projects with a more concentrated footprint covering a smaller number of territories). Finally, tensions may arise within the displaced populations themselves if the new location has a different layout from the original, with more concentrated housing, changes in neighbourly relations, etc. This is not a major concern that has emerged at this stage of the consultations, but these are significant impacts that are often underestimated in a resettlement process, especially in a context of increasing land pressure (real or perceived) in the study area.

Furthermore, if the project's footprint is not clearly defined in advance and before any PAR is implemented, there is a significant risk of tensions and conflicts with those who have rights to the territory's resources (holders of land administration rights, property titles, rights to use natural resources, farmers, livestock breeders, etc.) and the authorities. Characterising the customary rights system and its recognition in positive law will provide an overview of the study area from the perspective of the administration and use of its resources. Various aspects will need to be examined:

- Description of the principles governing the organisation of the distribution of rights and obligations over resources;
- Establishing a general typology of land rights in the project area;
- Description of the nature and organisation of the institutions that ensure compliance with these principles;
- The description of the structure of the territory and the establishment of a map representing the configuration of rights over resources and the boundaries of territories.

During the **construction phase**, the worker recruitment process will be a source of tension, as it will bring applicants from other regions to the project area. However, the hiring of local workers is one of the main

concerns of local communities, and the employment of workers from elsewhere could create misunderstandings and potentially tensions. Once recruitment is finalised, interactions between non-local workers and local communities could also fuel conflicts due to non-compliance with local customs and traditions, non-repayment of debts incurred by workers, degradation of cultural heritage, creation of social imbalances (increase in divorces, etc.), pressure on natural resources and community infrastructure providing essential services, etc.

During the **operational phase**, to a lesser extent than during the construction phase when the need for labour is much greater, tensions could arise between non-local workers recruited for project maintenance and local communities.

Local communities and authorities have expressed significant concerns about conflicts between non-locals and locals, conflicts that arise in a context of low household resources (see section 6.3.3).

The effective implementation of a PEPP and a complaint management mechanism will make it possible to anticipate most of the conflicts that may arise in connection with the project.

8.2.4.6. Impact on the health and safety of communities and workers

Table106 : Increase in insecurity, violence and STIs due to the influx of workers

IMPACT Increased insecurity, violence and STIs due to the influx of workers									
Phases affected ☐ Preparation ☒ Construction ☒ Operation									
Components affected ☒ A - RN32, engineering structures and toll stations ☒ B - Base camp and temporary facilities ☒ C - Granite quarry ☒ D - Access road to the granite quarry									
Impact analysis based on affected phases and components									
Phase	Component	No. and description	Nature	Intensity	Scope	Duration	Absolute importance	Sensitivity of the environment	Relative importance
Construction	A, B, C and D	27 – Health and safety risk behaviours among construction workers	Negative	High	Local	Average	Medium	Strong	Strong
Exploitation	A	32 – Health and safety risk behaviours among project workers	Negative	Average	Occasional	Short	Minor	Strong	Medium

The construction and operational phases will lead to an influx of workers from the construction sector.

Construction workers are mainly young men who travel to find employment opportunities. They are generally separated from their families and operate outside their usual sphere of social control, which can lead to inappropriate behaviour in the communities where they work. Thus, the influx of workers, their settlement in the base camp for a significant period of time, and their interactions with the communities surrounding the project could lead to the following impacts, which would be high in intensity during the construction phase and medium in intensity during the operational phase (due to the reduced number of maintenance workers):

- Actual and/or perceived increase in the number of crimes such as theft and violence;
- Increase in sexually transmitted infections (STIs) and early or unwanted pregnancies due to risky sexual behaviour between project workers and the local population;
- Increase in gender-based violence (GBV), sexual exploitation and abuse – and sexual harassment (SEA-SH) and violence against children (VAC), including sexual harassment of women and girls, exploitative sexual relations, and illicit sexual relations with minors from the local community.

These impacts mainly affect children, women in the communities and those recruited as part of the project. These are groups that are vulnerable to the impacts of the project (see section) and are all the more significant when the recipient communities are rural, have limited economic resources and, in some cases,

are unaccustomed to interacting with foreigners, which is the case in the project area²⁶. In addition, the communities consulted considered that insecurity and violence, particularly against women, which could result from the arrival of workers, was one of their greatest concerns.

The relative importance of these impacts will be greatly reduced by the inclusion in the Site and Operation and Maintenance ESMPs of the mandatory implementation of a punitive code of conduct for workers, coupled with awareness-raising on risky practices and the effective implementation and dissemination of a complaint management mechanism including a specific section for complaints of GBV/EAS-HS/VCE/IST.

Table 107: Generation of environmental nuisances impacting the health of communities and workers

IMPACT Generation of environmental hazards impacting the health of communities and workers									
Phases affected ☐ Preparation ☒ Construction ☒ Operation									
Components affected ☒ A - RN32, engineering structures and toll stations ☒ B - Base camp and temporary facilities ☒ C - Granite quarry ☒ D – Access road to the granite quarry									
Impact analysis based on affected phases and components									
Phase	Component	No. and description	Nature	Intensity	Scope	Duration	Absolute importance	Sensitivity of the environment	Relative importance
Construction	A, B, C and D	29 – Construction site nuisances (noise, dust, explosions, etc.)	Negative	Average	Local	Short	Medium	Strong	Strong

Temporary deterioration in air and water quality.

As detailed in the section on the project's impacts on the physical environment, environmental nuisances for workers and neighbouring communities will mainly occur during the **construction phase**. The potential impacts will be as follows:

- Vibrations caused by construction work and heavy vehicle traffic may damage nearby buildings;
- Noise from the construction site in the event of potential night-time work may disturb sleep and affect the physical and mental health of workers and communities living or working near the project;
- Dust and gases emitted by construction machinery and vehicles may aggravate acute respiratory infections and other diseases (allergies, eye conditions, meningitis, asthma, etc.);
- Liquid and solid waste from the construction site can impact public health if not managed properly;
- Explosions caused by the use of explosives during blasting activities at the Kounkono granite quarry can specifically cause several types of combined nuisances/accidents:
 - Noise pollution that can cause stress, fear and sleep disorders;
 - Vibrations that can damage nearby buildings, as well as sacred sites (such as the residence of the chief engineer of the Kounkono locality);
 - Rock dust emissions that can cause respiratory problems (asthma and bronchitis) or aggravate existing illnesses;
 - Accidents if safety measures are not followed or if local communities are not sufficiently aware of the risks.

During the ESIA consultations, local communities expressed concerns about the impact of dust and noise emissions on their health, particularly that of children and the elderly. Furthermore, given the current level of saturation of health services and the health system's limited capacity to absorb additional patients, the sensitivity of the environment is considered to be high.

The PEPP and the PGES Chantier will detail the measures to be taken to limit these impacts, such as including E&S clauses in the construction contract with requirements in terms of working hours, information on blasting periods, humidification of roads and earthworks areas, communication, consultation and

²⁶ Bumgarner, K.M. (2016). Managing Risk of Adverse Impact from Project Labour Influx. World Bank Operations Policy and Country Services (OPCS). <https://thedocs.worldbank.org/en/doc/497851495202591233-0290022017/Managing-Risk-of-Adverse-impact-from-project-labor-influx>

awareness-raising among local residents, and the establishment and promotion of a complaint management mechanism.

Table 108 : Increased risk of accidents and natural damage among workers and communities

IMPACT Increased risk of accidents and natural damage among workers and communities								
Phases affected ☐ Preparation ☒ Construction ☒ Operation								
Components affected ☒ A - RN32, engineering structures and toll stations ☒ B - Base camp and temporary facilities ☐ C - Granite quarry ☒ D - Access road to the granite quarry								
Impact analysis based on affected phases and components								
Phase	No. and description	Nature	Intensity	Scope	Duration	Absolute importance	Sensitivity of the environment	Relative importance
Construction	26 – Road accidents and construction site accidents	Negative	High	Occasional	Average	Average	Strong	Strong
Construction	28 – Accidents and loss of property in the event of poor flood management (rainwater runoff and flooding of the Niger River)	Negative	Low	Local	Short	Minor	Strong	Medium
Exploitation	30 – Road accidents and construction site accidents	Negative	High	Punctual	Average	Average	Strong	Strong
Exploitation	31 – Accidents and loss of property in the event of poor design of project structures leading to poor flood management (rainwater runoff and flooding of the Niger River)	Negative	Low	Local	Short	Minor	Strong	Medium

During the **construction phase**, the project could lead to an increase in the following accidents:

- The stakeholders consulted indicated that one of their main concerns is the increased risk of road accidents during the construction and operation phases of the project, particularly accidents involving children, who are vulnerable to such impacts.

Across all components, the transport of materials and machinery involves heavy vehicles travelling on the roads between Conakry and Koumana, as well as along the RN 32. Earthworks and road surfacing, the construction of bridges and toll areas, and the transport of raw materials (laterite, sand, gravel, etc.) from borrow pits and quarries to the construction site will also involve frequent truck traffic. Section 3 provides an estimate of the traffic generated by the project. This will lead to an increase in traffic accidents (which could be fatal) in the areas surrounding the project and on the roads used to transport materials locally, particularly from Conakry for equipment coming from abroad. It should be noted that this risk was often mentioned during consultations. The receiving environment is therefore particularly sensitive to road accidents.

- In construction areas, uncontrolled or poorly controlled access to work sites (temporary facilities or work areas) may expose the population and workers to potentially fatal accidents (falls, burns, electrocution, crushing, etc.), particularly in areas close to excavations or around heavy equipment and vehicles. Communities living or working near the planned construction sites are highly sensitive to this impact.
- Poor management of water flow from rivers and rainfall may exacerbate the widespread flooding in the study area, increasing the risk of accidents, loss of property (particularly infrastructure and agricultural areas) and limiting the mobility of users of the RN 32. This risk was frequently mentioned during consultations with stakeholders from local communities.

During the **operational phase**, the risk of construction site accidents should decrease to negligible levels. However, in the absence of traffic management measures, the increase in vehicle speed on the newly paved road and the presence of machinery during operation and maintenance activities will increase the risk of traffic accidents involving vehicles and pedestrians.

Similar to the impact during the construction phase, the poor design of the project's structures may lead to poor management of water flow from the rivers and rainfall, which may exacerbate the widespread flooding in the study area, increasing the risk of accidents, loss of property (particularly infrastructure and agricultural areas) and limited mobility for users of the RN 32. This risk was also frequently mentioned during consultations with stakeholders from local communities.

The PASR, the Chantier and O&M PGES and the PEPP will include measures to manage the risk of road accidents and construction site accidents.

The implementation and dissemination of the MGP and the involvement of the National Agency for Emergency and Humanitarian Disaster Management (ANGUCH) in flood risk management will help to limit the damage and harm caused. However, the main measure for managing such disasters remains the appropriate sizing of the project in view of the flash floods that occur during the rainy season in this region, thereby improving the resilience of local communities to flooding (positive impact).

8.2.4.7. Impact on access to essential services

Table 109 : Destruction or creation of essential services

IMPACT		Destruction or creation of essential services							
Affected phases ☒ Preparation ☐ Construction ☒ Operation									
Components affected ☒ A - RN32, engineering structures and toll stations ☐ B - Base camp and temporary facilities ☒ C - Granite quarry ☒ D – Access road to the granite quarry									
Impact analysis based on affected phases and components									
Phase	Component	No. and description	Nature	Intensity	Scope	Duration	Absolute importance	Sensitivity of the environment	Relative importance

Preparation	A	33 – Loss of community infrastructure related to land acquisition	Negative	High	One-off	Long	Major	Strong	Strong
Preparation	A	34 – Disruption to water supply networks, power lines and fibre optic cables	Negative	Severe	Occasional	Long	Major	Strong	Strong
Exploitation	A, C and D	38 – Opening up and improving access to basic services	Negative	Strong	Regional	Long	Major	Strong	Positive Strong

During the **preparation phase**, the ongoing acquisition of land along the RN 32 and its engineering structures and toll stations may result in the loss of community infrastructure in these areas, particularly where the right-of-way is close to or crosses residential areas, and may impact communities' access to essential services. These services may include drinking water access points (wells, boreholes or water sources) or economic structures (storage facilities, mills, etc.). The issues surrounding access to these types of essential services for local communities are very important, particularly with regard to poor access to quality drinking water throughout the year, the low number of boreholes per capita, and the economic isolation of communities living in rural areas far from urban centres. The sensitivity of the receiving environment is therefore assessed as high.

In relation to the loss of essential services, i) the water supply networks crossing or bordering the RN 32 or the access road to the Kounkono quarry; ii) the electricity networks such as the one under construction as part of the implementation of lot 1 of the 225 kV Guinea-Mali electricity interconnection project (PIEGM) bordering the RN 32 at the time of the study; iii) or the fibre optic network along the RN 32 laid in 2015, but which does not provide high-speed internet service to the localities in the study area, will most certainly be impacted by the right-of-way clearing and earthworks activities.

In consultation with stakeholders, particularly state stakeholders (at national, regional and prefectural level), it would be desirable to minimise the project's footprint in order to limit the impact on these infrastructures and services, communicate the final project design to stakeholders and PAPs as early as possible, and inventory and rebuild lost community infrastructure in close collaboration with decentralised/deconcentrated technical services so that the new structures are appropriate and correctly sized.

Although the project may impact services essential to local communities during this phase, it will have a strong positive impact during the **operational phase** for the study area, the region and the country, which will benefit from the region's economic opening up.

Table 110 : Increased pressure on existing essential services due to population displacement and influx of non-locals

IMPACT Increased pressure on existing essential services due to population displacement and influx of non-locals									
Phases affected ☒ Preparation ☒ Construction ☒ Operation									
Components affected ☒ A - RN32, engineering structures and toll stations ☒ B - Base camp and temporary facilities ☒ C - Granite quarry ☒ D - Access road to the granite quarry									
Impact analysis based on affected phases and components									
Phase	Component	No. and description	Nature	Intensity	Scope	Duration	Absolute importance	Sensitivity of the environment	Relative importance
Preparation	A, B, C and D	35 – Pressure on essential services related to resettlement	Negative	Average	Occasional	Long	Average	Strong	Strong
Construction	A, B, C and D	36 – Pressure on essential services related to project workers	Negative	Low	Occasional	Moderate	Minor	Strong	Medium

Exploitation	A	37 – Pressure on essential services linked to migration due to improved accessibility	Negative	High	Local	Long	Major	Strong	Strong

During the **preparation phase**, economic operators and resident households affected by involuntary resettlement will place additional pressure on basic services in the host area (access to water, healthcare, etc.). However, although this impact is coupled with the potential loss of essential services located within the project area, optimising the project area in inhabited areas means that its impact will be temporary. The PAR-PRMS will also recommend the preferential resettlement of PAPs in their locality of origin and compensation for lost or altered services, limiting the relative importance of this impact.

To minimise this impact, the project will need to communicate the final project design to stakeholders and PAPs as early as possible, collaborate closely with decentralised/deconcentrated technical services for the potential reorientation of resettled users, choose these resettlement sites with the displaced communities, and consult with host communities as early as possible in the process.

During the **construction phase**, migration linked to the influx of local non-resident workers into their communities of origin will lead to a relative increase in the use of community infrastructure (particularly water and sanitation access infrastructure and health infrastructure). For non-local workers, the project plans to provide accommodation in the base camp, which will include all essential services (water and sanitation infrastructure and a clinic). This low-intensity impact will be temporary in nature, mainly affecting the temporary residences of local workers who are not year-round residents.

The implementation of the migration management plan measures will reduce this impact.

During the **operational phase**, opening up the area will lead to economic development in the areas concerned and potential migration of populations from outside the project area. The influx of these people, linked to the attractiveness of the area, will lead to greater pressure on community infrastructure that is already under pressure in the host areas (water and sanitation infrastructure, health, education and civil registry infrastructure, to name but a few).

Access to these basic social services is a crucial issue for the study area (see relevant sections in the chapter on the socio-economic profile of the study area's populations), and the sensitivity of the receiving environment is significant.

8.2.4.8. Impact on ecosystem services

Table 111 : Loss and/or disruption of ecosystem services

IMPACT Loss and/or disruption of ecosystem services									
Phases affected ☒ Preparation ☐ Construction ☐ Operation									
Components affected ☒ A - RN32, engineering structures and toll stations ☒ B - Base camp and temporary facilities ☒ C - Granite quarry ☒ D – Access road to the granite quarry									
Impact analysis based on affected phases and components									
Phase	Component	No. and description	Nature	Intensity	Scope	Duration	Absolute importance	Sensitivity of the environment	Relative importance
Preparation	A, B, C and D	39 – Loss of ecosystem services related to land acquisition	Negative	Low	One-off	Long	Minor	Strong	Medium

The acquisition of land by the project (permanent for the RN 32, its engineering structures, toll stations and access road to the granite quarry, and temporary for the base camp, temporary facilities and granite quarry) within the project right-of-way during the **preparation phase** will result in the loss of ecosystem services located there:

- Supply services:

- Agricultural land and grazing areas;
- Non-timber forest products (NTFPs) (nééré, shea, kansi, sagba, etc.), the collection of which is mainly a female activity with significant social, economic, symbolic and traditional importance in the villages of the sub-region, generating considerable income during the harvest, although not comparable to that generated by market gardening and other activities practised by women;
- Medicinal plants, collected by traditional healers, but also by local communities in general, particularly when their access to public or private conventional healthcare services is limited (in terms of cost and travel time);
- Firewood, which is mainly collected by women, girls and boys within households;
- Timber, mainly harvested on a small scale;
- Hunting resources;
- Genetic resources.
- Sociocultural services;
- Regulatory services;
- Support services.

Although the impact of the loss of these services or the disruption of their functioning is local in scope, as they are very present within the project area, it is nevertheless low in intensity, as the size of the impacted areas is proportionally very small compared to the local and regional resource areas that provide these services. This is all the more so as these disruptions will be counterbalanced by the partial regeneration of some of these services within the temporary acquisition area at the end of the project's construction phase.

112 table: Pressure on ecosystem services due to population displacement and influx of workers

IMPACT Pressure on ecosystem services due to population displacement and influx of workers									
Affected phases ☒ Preparation ☒ Construction ☒ Operation									
Components affected ☒ A - RN32, engineering structures and toll stations ☒ B - Base camp and temporary facilities ☒ C - Granite quarry ☒ D - Access road to the granite quarry									
Impact analysis based on affected phases and components									
Phase	Component	No. and description	Nature	Intensity	Scope	Duration	Absolute importance	Sensitivity of the environment	Relative importance
Preparation	A, B, C and D	40 – Pressure on ecosystem services related to resettlement	Negative	Low	One-off	Long	Minor	Strong	Medium
Construction	A, B, C and D	41 – Pressure on ecosystem services related to project workers	Negative	Low	Occasional	Moderate	Minor	Strong	Medium
Exploitation	A	42 – Pressure on ecosystem services linked to migration due to improved accessibility	Negative	Strong	Local	Long	Major	Strong	Strong

During the **preparation phase**, economic operators and resident households affected by land acquisition for the project will be resettled, leading to increased demand for ecosystem services in the host area. However, although this impact is coupled with the loss of ecosystem services located within the project area, the optimisation of the project area in inhabited areas makes its scale temporary. The PAR-PRMS will also recommend the preferential resettlement of PAPs in their locality of origin and compensation for lost or altered services, limiting the relative importance of this impact.

During the **construction phase**, migration linked to the influx of non-resident workers into their localities of origin will lead to increased use of ecosystem services (particularly water and wood supplies). For non-local workers, the project plans to provide accommodation in the base camp, which will include a canteen, water and sanitation facilities, etc., thereby significantly limiting the pressure on ecosystem services. This impact will be low in intensity and limited in scope, mainly affecting the temporary residences of local workers who are not year-round residents.

The implementation of the migration management plan measures will reduce this impact.

During the **operational phase**, opening up the area will lead to economic development in the areas concerned and potential migration of populations from outside the project area. The influx of these people, linked to the attractiveness of the area, will lead to greater pressure on the ecosystem services already under pressure in the host areas (particularly the supply of wood, hunting resources, the fertility cycle, etc.).

Whether in terms of the impact of the loss or disruption of ecosystem services or the increased pressure on these services, the sensitivity of the receiving environment is significant: these ecosystem services, including provisioning services, are of great socio-economic importance to households in the study area, including women, a group that is vulnerable to the impacts of the project. However, the resilience of these services tends to be increasingly weak.

8.2.4.9. Impact on economic activities

Table113 : Changes relating to local economic activities

IMPACT Changes relating to local economic activities									
Affected phases ☒ Preparation ☐ Construction ☒ Operation									
Components affected ☒ A - RN32, engineering structures and toll stations ☒ B - Base camp and temporary facilities ☒ C - Granite quarry ☒ D – Access road to the granite quarry									
Impact analysis based on affected phases and components									
Phase	Component	No. and description	Nature	Intensity	Scope	Duration	Absolute importance	Sensitivity of the environment	Relative importance
Preparation	A, B, C and D	43 – Loss of economic activity related to land acquisition	Negative	High	One-off	Long	Major	Strong	Strong
Exploitation	A	44 – Economic development of the region due to improved accessibility	Positive	Strong	Regional	Long	Major	Strong	Positive Strong

During the **preparation phase**, the impact on economic activities will be due to permanent land acquisition (RN 32, engineering structures, toll stations and access road to the granite quarry) and temporary land acquisition (base camp, temporary facilities and granite quarry) by the project and will result in the temporary or permanent loss of assets and resources for certain economic operators, over a limited area. These will mainly be farmers who own or farm agricultural plots and users of natural resources such as gold miners and those involved in gold mining sites (*tomboloma*, *dozo*, etc.) and collectors of NTFPs (wild fruits and medicinal plants) and timber or services. Certain sectors will also be affected in a more localised manner in inhabited areas (less significant in terms of the size of the areas affected and the number of PAPs concerned), such as trade (warehouses and small traders' shops) and crafts (workshops in particular). Consultations have revealed that many participants are concerned about the risk of artisans working in workshops they do not own along the RN 32 road not being taken into account in the PAR-PRMS compensation strategy.

Landowners (under customary and/or positive law) will also be affected in terms of their land rents for leased plots within the right-of-way.

Land acquisition will have a significant impact on women and young people in their livelihood activities: women are the main actors involved in collecting non-timber forest products, market gardening and small-

scale trade. If this impact is not properly managed (avoided, reduced and/or compensated for), it could lead to food insecurity for the most vulnerable households. The partial or total loss of economic activities affecting young people, particularly young gold miners, will exacerbate migration in the absence of new opportunities and prospects locally.

The project will compensate and support all of these PAPs affected in their AGRs in restoring their livelihoods.

The **operational phase** will be marked by a potentially significant regional impact, namely the economic opening up of localities in the study area, whose access will be improved. This opening up will result in better integration of local communities into the regional and national economy. This economic development will affect all types of sectors: agriculture, mining such as industrial, semi-mechanised or manual gold panning, which are levers for development if properly regulated, industrial construction, other industries, trade, crafts, etc.

The receiving environment is highly sensitive to the impacts of economic activities: access to a paved and maintained RN 32 road underpins the economic development of a region, both for the industrial and craft sectors, which will see their costs reduced and gain in competitiveness, and for local populations and local authorities. This access remains a major challenge in the study area and throughout Guinea.

8.2.4.10. Impact on cultural heritage

114 table: Loss and/or disruption of cultural heritage

IMPACT Loss and/or disruption of cultural heritage									
Affected phases ☒ Preparation ☒ Construction ☒ Operation									
Components affected ☒ A - RN32, engineering structures and toll stations ☒ B - Base camp and temporary facilities ☒ C - Granite quarry ☒ D – Access road to the granite quarry									
Impact analysis based on affected phases and components									
Phase	Component	No. and description	Nature	Intensity	Scope	Duration	Absolute importance	Sensitivity of the environment	Relative importance
Preparation	A, B, C and D	Displacement and destruction of socio-cultural heritage sites	Negative	Average	Occasional	Long	Average	Average	Average
Construction	A, B, C and D	Archaeological artefact discoveries	Negative	Average	Occasional	Long	Medium	Low	Average
Construction	A, B, C and D	Degradation of socio-cultural heritage sites	Negative	Average	Occasional	Long	Average	Average	Average
Operation	A	Degradation of socio-cultural heritage sites during rehabilitation work on the RN32 and structures	Negative	Average	Occasional	Long	Average	Average	Average

The stakeholders consulted as part of this ESIA and its scoping mission indicated the presence of sites of socio-cultural importance within the project's right-of-way and indirect area of influence (see Given the socio-cultural history of the study area, other cultural heritage sites (engineering sites, sacred forests, initiation sites, archaeological sites, cemeteries, etc.) are very likely to be located within the project's right-of-way and indirect zone of influence. These sites will be identified, characterised and located exhaustively as part of the PAR in each locality affected by the project's right-of-way.

In all cases, traditional and religious authorities must be systematically involved in order to define the procedures for dealing with each identified site.

During the **preparation phase**, the release of the right-of-way will involve the relocation of socio-cultural heritage sites and the performance of associated procedures (e.g. relocation ceremonies). If socio-cultural

heritage sites are located close to the project's right-of-way (temporary or permanent), access to them must be guaranteed to communities throughout the duration of the Project. It should be noted that at the stage of this study, an engineering site located within the Kounkono granite quarry right-of-way has been identified. Other sites could potentially be located within the project right-of-way and the PAR will enable them to be identified.

During **the construction phase**, when work is carried out on site, particularly excavation and earthworks, there is a non-zero probability of discovering archaeological artefacts and damaging them and other socio-cultural heritage sites. No archaeological sites have been identified to date within the project's footprint. Nevertheless, the potential for archaeological discoveries in the project area and more broadly in the sub-region is considerable, and research in this field is still in its infancy. If the project were to accidentally discover such sites during the construction of the various (temporary or permanent) components of the project, it would have to implement an accidental discovery procedure to avoid damaging or destroying the artefacts during the works or handling by construction workers.

During **the operational phase**, socio-cultural heritage sites located on the periphery of the areas affected by the various permanent components of the project are likely to be damaged by project workers during operation and maintenance activities.

8.3. Residual impacts

Once the positive and negative impacts have been measured in a scenario prior to the implementation of mitigation measures (see section 13.1), these impacts are then measured using the same assessment method, taking into account the commitments to implement mitigation measures and then compensation measures. The impacts remaining after these measures have been implemented are referred to as "residual" impacts.

The Table 115 details the assessment of these residual impacts.

If the impact assessment is conclusive, the relative significance of most residual impacts should not exceed a moderate level.

Residual impacts whose relative importance remains high are partly induced impacts, resulting from other activities that are not part of the project and would occur as a consequence rather than as part of the project. Their causality is multiple and involves social, migratory, meso- and macroeconomic mechanisms at the level of the administrative region of Kankan, Guinea and its neighbouring countries, and is far from being solely linked to the project's activities. The management of these induced impacts therefore goes beyond the scope of managing the E&S impacts of the project under study and must be integrated into regional and national sectoral policies related to migration, land management, agricultural support, management of extreme weather events, etc.

Some of the residual negative impacts can and must be managed through compensation measures, such as increasing GHG emissions (tree planting) and measures to achieve a neutral impact on biodiversity according to NP6 (positive measures to promote natural habitat).

One residual impact remains relatively significant and is not easily offset: the increase in emissions of certain gases (NO_x, NO₂ and SO₂) linked to the increase in traffic on the RN 32.

Table 115: Summary of residual impacts – Fecteau Matrix (Affected components: A – RN32, engineering structures and toll stations / B – Base camp and temporary facilities / C – Granite quarry / D – Access road to the granite quarry)

Environmental component	No.	Phase	Project component	Impact	Impact	Residual impact after adoption of avoidance, reduction and compensation measures						and compensation measures
					Relative importance	Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance	Relative importance
Employment and working conditions	1	Construction	A, B, C and D	Job creation in construction	Positive Strong	Strong	Regional	Average	Major	Strong	Positive Strong	
Employment and working conditions	2	Construction	A, B, C and D	Development of SMEs linked to the influx of project workers	Positive Strong	Average	Regional	Average	Average	Strong	Positive Strong	
Employment and working conditions	3	Construction	A, B, C and D	Opportunities for local businesses	Positive Strong	Average	Regional	Average	Average	Strong	Positive Strong	
Employment and working conditions	4	Exploitation	A	Creation of jobs for maintenance of the RN32, engineering structures and toll stations	Positive Strong	Low	Local	Medium	Medium	Strong	Positive High	

Environmental component	No	Phase	Project component	Impact	Impact	Residual impact after adoption of avoidance, reduction and compensation measures							and compensation measures
					Relative importance	Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance	Relative importance	
Land and land use	5	Preparation	A	Disruption of development plans	Average	Low	Occasional	Long	Minor	Medium	Medium	Low	
Land and land use	6	Preparation	A	Land inflation caused by land acquisition	Average	Low	One-off	Short	Minor	High	Medium	Low	
Land and land use	7	Preparation	A, C and D	Permanent land loss	Average	Average	Occasional	Long	Minor	Strong	Medium	Low	
Land and land use	8	Preparation	B	Temporary land losses	Strong	Moderate	Occasional	Average	Average	Strong	Strong	Low	
Land and land use	49	Construction	B and C	Return of temporarily acquired land	Positive Strong	Average	Occasional	Long	Average	Strong	Positive Strong		
Land and land use	9	Exploitation	A	Land inflation caused by proximity to	High	Average	Regional	Long	Major	Strong	Strong Positive and		

Environmental component	No.	Phase	Project component	Impact	Impact	Residual impact after adoption of avoidance, reduction and compensation measures						and compensation measures
					Relative importance	Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance	Relative importance
				the RN32 motorway							negative impact	
Demographics and migration	10	Preparation	A, B, and D	Displacement related to resettlement	High	Medium	Occasional	Long	Medium	Strong	Strong	Low
Demographics and migration	11	Preparation	A, B, and D	Emigration of young people due to PAR compensation payments	High	Average	Occasional	Long	Medium	Strong	Strong	Low
Demographics and migration	12	Construction	A, B, and D	Inflow of workers and opportunistic migration	Average	Low	Occasional	Average	Minor	Low	Low	
Demographics and migration	13	Construction	A, B, and D	Increased workload for women hosting workers	Average	Low	Occasional	Average	Minor	Low	Low	

Environmental component	No	Phase	Project component	Impact	Impact	Residual impact after adoption of avoidance, reduction and compensation measures						and compensation measures
					Relative importance	Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance	Relative importance
Demographics and migration	14	Construction	A, B, C and D	Cultural diversity	Positive Average	Average	Local	Average	Average	Average	Positive Average	
Demographics and migration	15	Exploitation	A and C	Attractiveness of newly accessible areas	Positive Strong	Strong	Regional	Long	Major	Strong	Positive Strong	
Traffic, circulation and mobility	16	Construction	A, B, C and D	Traffic disruption caused by construction activities, including the transport of machinery, materials and workers	Average	Low	Occasional	Moderate	Minor	Low	Low	
Traffic, circulation and mobility	17	Operation	A	Traffic disruption caused by maintenance activities, including the transport of	Average	Low	Occasional	Medium	Minor	Low	Low	

Environmental component	No	Phase	Project component	Impact	Impact	Residual impact after adoption of avoidance, reduction and compensation measures						and compensation measures
					Relative importance	Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance	Relative importance
				machinery, materials and workers								
Traffic, circulation and mobility	18	Operation	A	Improvement of traffic, circulation and mobility on the RN32	Positive Strong	Average	Regional	Long	Major	Strong	Positive Strong	
Traffic, circulation and mobility	19	Operation	D	Improvement of traffic, circulation, and mobility on the track between Norassoba and Kounkono	Positive Strong	Average	Local	Long	Average	Strong	Positive Strong	
Governance and social cohesion	20	Preparation	A, B, C and D	Exclusion of local authorities from decision-making processes	Average	Strong	Occasional	Short	Minor	Weak	Weak	

Environmental component	No	Phase	Project component	Impact	Impact	Residual impact after adoption of avoidance, reduction and compensation measures						and compensation measures
					Relative importance	Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance	Relative importance
				and project stages								
Governance and social cohesion	21	Preparation	A, B, and D	Disruptions related to the development of the ESIA and PAR	Average	Average	Local	Average	Average	Average	Average	Low
Governance and social cohesion	22	Construction	A, B, and D	Recruitment tensions	Average	Low	Local	Average	Average	Low	Medium	
Governance and social cohesion	23	Construction	A, B, and D	Tensions with project workers	Average	Low	Punctual	Average	Average	Low	Low	
Governance and social cohesion	24	Exploitation	A	Recruitment tensions	Average	Low	Occasional	Average	Average	Low	Low	
Governance and social cohesion	25	Exploitation	A	Tensions with project workers	Average	Low	Occasional	Average	Minor	Low	Low	

Environmental component	No	Phase	Project component	Impact	Impact	Residual impact after adoption of avoidance, reduction and compensation measures						and compensation measures
					Relative importance	Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance	Relative importance
Community and worker health and safety	26	Construction	A, C and D	Road accidents and construction site accidents	High	Low	Occasional	Medium	Minor	Low	Low	
Community and worker health and safety	27	Construction	A, B, C and D	Risky behaviours among construction workers	High	Low	Occasional	Average	Minor	Low	Low	
Health and safety of communities and workers	28	Construction	A	Accidents and loss of property in the event of poor flood management (rainwater runoff and flooding of the Niger River)	Medium	Low	Local	Short	Minor	Medium	Medium	Low

Environmental component	No	Phase	Project component	Impact	Impact	Residual impact after adoption of avoidance, reduction and compensation measures						and compensation measures
					Relative importance	Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance	Relative importance
Community and worker health and safety	29	Construction	A, B, C and D	Construction site nuisances (noise, dust, explosions, etc.)	High	Low	Local	Short	Minor	Weak	Low	
Community and worker health and safety	30	Operations	A	Road accidents and construction site accidents	High	Low	Occasional	Average	Minor	Low	Low	
Community and worker health and safety	31	Operations	A	Accidents and loss of property in the event of poor design of project structures leading to poor flood management (rainwater runoff and flooding of	Strong	Weak	Local	Short	Minor	Medium	Medium	

Environmental component	No	Phase	Project component	Impact	Impact	Residual impact after adoption of avoidance, reduction and compensation measures						and compensation measures
					Relative importance	Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance	Relative importance
				the Niger River)								
Community and worker health and safety	32	Operations	A	Health and safety risk behaviours among project workers	Average	Low	Occasional	Short	Minor	Low	Low	
Access to essential services	33	Preparation	A	Loss of community infrastructure due to land acquisition	High	Medium	Occasional	Long	Medium	Strong	Strong	Low
Access to essential services	34	Preparedness	A	Disruption to water supply networks, power lines, fibre optics	Severe	Medium	Occasional	Long	Medium	Strong	Strong	Low
Access to essential services	35	Preparedness	A, B, C and D	Pressure on essential services	High	Low	Occasional	Long	Minor	Weak	Low	

Environmental component	No	Phase	Project component	Impact	Impact	Residual impact after adoption of avoidance, reduction and compensation measures						and compensation measures
					Relative importance	Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance	Relative importance
				related to resettlement								
Access to essential services	36	Construction	A, B, C and D	Pressure on essential services related to project workers	High	Low	Occasional	Medium	Minor	Low	Low	
Access to essential services	37	Exploitation	A	Pressure on essential services linked to migration due to improved accessibility	High	Medium	Local	Long	Medium	Strong	Strong	
Access to essential services	38	Exploitation	A, C and D	Opening up and improving access to basic services	Positive Strong	Strong	Regional	Long	Major	Strong	Positive Strong	

Environmental component	No	Phase	Project component	Impact	Impact	Residual impact after adoption of avoidance, reduction and compensation measures							and compensation measures
					Relative importance	Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance	Relative importance	
Ecosystem services	39	Preparation	A, B, C and D	Loss of ecosystem services related to land acquisition	Average	Low	Punctual	Long	Minor	Average	Medium	Low	
Ecosystem services	40	Preparation	A, B, C and D	Pressure on ecosystem services related to resettlement	Average	Low	Occasional	Long	Minor	Low	Low		
-ecosystem services	41	Construction	A, B, C and D	Pressure on ecosystem services related to project workers	Average	Low	Occasional	Average	Minor	Low	Low		
Ecosystem services	42	Exploitation	A	Pressure on ecosystem services linked to migration due to	High	High	Local	Long	Major	Strong	Strong		

Environmental component	No.	Phase	Project component	Impact	Impact	Residual impact after adoption of avoidance, reduction and compensation measures						and compensation measures
					Relative importance	Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance	Relative importance
				improved access								
Economic activities	43	Preparation	A, B, C and D	Loss of economic activity linked to land acquisition	High	Medium	One-off	Long	Medium	Strong	Strong	Weak
Economic activities	44	Exploitation	A	Economic development of the region due to improved accessibility	Positive Strong	Strong	Regional	Long	Major	Strong	Positive Strong	
Cultural heritage	45	Preparation	A, B, C and D	Displacement and destruction of socio-cultural heritage sites	Average	Low	Occasional	Long	Minor	Low	Low	

Environmental component	No	Phase	Project component	Impact	Impact	Residual impact after adoption of avoidance, reduction and compensation measures						and compensation measures
					Relative importance	Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance	Relative importance
Cultural heritage	46	Construction	A, B, C and D	Archaeological artefact discoveries	Average	Low	Occasional	Long	Minor	Low	Low	
Cultural heritage	47	Construction	A, B, C and D	Degradation of socio-cultural heritage sites	Average	Low	Occasional	Long	Minor	Low	Low	
Cultural heritage	48	Exploitation	A	Degradation of socio-cultural heritage sites during rehabilitation activities on the RN32 and structures	Average	Low	Occasional	Long	Minor	Low	Low	
Air	50	Preparation	A, B, C and D	Dust/PM10 & PM2.5 particle emissions	Average	Low	Occasional	Short	Minor	Medium	Medium	

Environmental component	No	Phase	Project component	Impact	Impact	Residual impact after adoption of avoidance, reduction and compensation measures						and compensation measures
					Relative importance	Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance	Relative importance
Air	51	Construction	A, B, C and D	Dust/PM10 & PM2.5 emissions	Average	Low	Occasional	Average	Minor	Average	Medium	
Air	52	Operation/Maintenance	A	Dust/particle emissions & PM10 & PM2.5	Average	Low	Occasional	Long	Minor	Medium	Medium	
Air	53	Preparation	A, B, C and D	NOx, NO2 and SO2 emissions	Average	Low	Occasional	Short	Minor	Medium	Medium	
Air	54	Construction	A, B, C and D	NOx, NO2 and SO2 emissions	Average	Low	Occasional	Average	Minor	Average	Medium	
Air	55	Operation/Maintenance	A	NOx, NO2 and SO2 emissions	Average	Average	Local	Long	Average	Average	Average	
Climate	56	Preparation	A, B, C and D	GHG emissions	Average	Low	Occasional	Short	Minor	High	Medium	

Environmental component	No	Phase	Project component	Impact	Impact	Residual impact after adoption of avoidance, reduction and compensation measures						and compensation measures
					Relative importance	Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance	Relative importance
Climate	57	Construction	A, B, C and D	GHG emissions	High	Medium	Local	Average	Average	Strong	Strong	Weak
Climate	58	Operation/Maintenance	A	GHG emissions	High	Medium	Local	Long	Medium	Strong	Strong	Weak
Climate	59	Preparation	A, B, C and D	Climate impacts	Average	Low	Occasional	Short	Minor	Medium	Average	
Climate	60	Construction	A, B, C and D	Climate impacts	Average	Low	Occasional	Medium	Minor	Average	Medium	
Climate	61	Operation/Maintenance	A	Climate impacts	Average	Low	Occasional	Long	Minor	Medium	Medium	
Noise	62	Preparation	A, B, C and D	Modification of noise levels	Average	Low	Occasional	Short	Minor	Medium	Medium	

Environmental component	No	Phase	Project component	Impact	Impact	Residual impact after adoption of avoidance, reduction and compensation measures							and compensation measures
					Relative importance	Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance	Relative importance	
Noise	63	Construction	A, B, C and D	Modification of noise levels	Average	Low	Occasional	Average	Minor	Average	Medium		
Noise	64	Operation/Maintenance	A	Modification of noise levels	Average	Low	Occasional	Long	Minor	Medium	Medium		
Ground	65	Preparation	A, B, C and D	Soil erosion and compaction linked to land clearing	Average	Low	Occasional	Short	Minor	Medium	Medium		
Ground	66	Construction	A, B, C and D	Soil erosion and compaction linked to land clearing	Average	Low	Occasional	Average	Minor	Average	Medium		
Ground	67	Operation/Maintenance	A	Soil erosion and compaction linked to land clearing	Average	Low	Occasional	Long	Minor	Medium	Medium		

Environmental component	No	Phase	Project component	Impact	Impact	Residual impact after adoption of avoidance, reduction and compensation measures							and compensation measures
					Relative importance	Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance	Relative importance	
Ground	68	Construction	A, B, and D	Increased erosion of hydromorphic soils and sloping areas	Average	Low	Occasional	Average	Minor	Average	Medium		
Ground	69	Preparation	A, B, and D	Change in soil composition due to backfill	Low	Low	Occasional	Long	Minor	Low	Low		
Ground	70	Construction	A, B, and D	Change in soil composition due to backfill	Low	Low	Occasional	Long	Minor	Low	Low		
Ground	71	Preparation	A, B, and D	Risk of soil quality degradation by chemical products and waste	Low	Low	Occasional	Long	Minor	Low	Low		

Environmental component	No	Phase	Project component	Impact	Impact	Residual impact after adoption of avoidance, reduction and compensation measures						and compensation measures
					Relative importance	Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance	Relative importance
Ground	72	Construction	A, B, C and D	Risk of soil quality degradation due to chemicals and waste	Average	Average	Occasional	Long	Medium	Low	Average	
Soil	73	Operation/Maintenance	A	Risk of soil quality degradation due to chemicals and waste	Average	Average	Occasional	Long	Medium	Low	Average	
Water	74	Preparation	A, B, C and D	Risk of increased suspended solids in water due to erosion - decline in water quality	Average	Low	Occasional	Short	Minor	Medium	Medium	
Water	75	Construction	A, B, C and D	Risk of increased suspended solids in	Average	Low	Occasional	Average	Minor	Average	Medium	

Environmental component	No	Phase	Project component	Impact	Impact	Residual impact after adoption of avoidance, reduction and compensation measures						and compensation measures
					Relative importance	Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance	Relative importance
				water due to erosion - decline in water quality								
Water	76	Operation/Maintenance	A	Risk of increased suspended solids in water due to erosion - decline in water quality	Average	Low	Occasional	Long	Minor	Medium	Medium	
Water	77	Preparation	A, B, C and D	Degradation of water quality due to accidental spillage of chemicals and waste	Average	Low	Occasional	Long	Minor	Medium	Medium	
Water	78	Construction	A, B, C and D	Degradation of water quality due to accidental spills of	Average	Low	Occasional	Long	Minor	Medium	Medium	

Environmental component	No	Phase	Project component	Impact	Impact	Residual impact after adoption of avoidance, reduction and compensation measures						and compensation measures
					Relative importance	Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance	Relative importance
				chemicals and waste								
Water	79	Operation/Maintenance	A	Degradation of water quality due to accidental spillage of chemicals and waste	Average	Low	Occasional	Long	Minor	Medium	Medium	
Water	80	Preparation	A, B, C and D	Project consumption of water abstracted from local groundwater or surface water resources	Average	Low	Occasional	Short	Minor	Medium	Medium	
Water	81	Construction	A, B, C and D	Project consumption of water abstracted from local	Average	Low	Occasional	Average	Minor	Average	Medium	

Environmental component	No.	Phase	Project component	Impact	Impact	Residual impact after adoption of avoidance, reduction and compensation measures						and compensation measures
					Relative importance	Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance	Relative importance
				groundwater or surface water resources								
Water	82	Operation/Maintenance	A	Project consumption of water withdrawn from local groundwater or surface water resources	Average	Low	Occasional	Long	Minor	Medium	Medium	
Water	83	Construction	A, B, C and D	Improvement of water flow in watercourse crossed by the installation of new bridges and culverts	Average	Strong	Local	Long	Major	Strong	Strong	

Environmental component	No	Phase	Project component	Impact	Impact	Residual impact after adoption of avoidance, reduction and compensation measures						and compensation measures
					Relative importance	Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance	Relative importance
Landscape	84	Preparation	A, B, and D	Modification of landscape views	Average	Low	Local	Short	Minor	Low	Low	
Landscape	85	Construction	A, B, and D	Modification of landscape views	Average	Average	Local	Long	Medium	Low	Average	
Landscape	86	Operation/Maintenance	A	Modification of landscape views	Average	Average	Local	Long	Medium	Low	Average	
Habitats	87	Preparation	A, B, and D	Degradation and loss of natural terrestrial habitat	Average	Low	Occasional	Short	Minor	Medium	Medium	Low
Habitats	88	Construction	A, B, and D	Degradation and loss of natural terrestrial habitat	High	Moderate	Local	Long	Medium	Medium	Average	Low

Environmental component	No	Phase	Project component	Impact	Impact	Residual impact after adoption of avoidance, reduction and compensation measures						and compensation measures
					Relative importance	Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance	Relative importance
Habitats	89	Exploitation/Maintenance	A	Habitat degradation and loss of natural terrestrial	Medium	Low	Local	Long	Medium	Average	Medium	Low
Habitats	90	Preparation	A, B, C and D	Fragmentation of terrestrial habitats and disruption of connectivity	Average	Low	Local	Short	Minor	Medium	Medium	Low
Habitats	91	Construction	A, B, C and D	Fragmentation of terrestrial habitats and disruption of connectivity	High	Moderate	Local	Long	Medium	Average	Average	Low
Habitats	2	Exploitation/Maintenance	A	Fragmentation of terrestrial habitats and disruption of connectivity	Average	Low	Local	Long	Medium	Average	Medium	Low

Environmental component	No	Phase	Project component	Impact	Impact	Residual impact after adoption of avoidance, reduction and compensation measures							and compensation measures
					Relative importance	Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance	Relative importance	
Habitats	93	Preparation	A, B, and D	Degradation and loss of aquatic habitats	Average	Low	Local	Short	Minor	Medium	Medium	Low	
Habitats	94	Construction	A, B, and D	Degradation and loss of aquatic habitats	High	Moderate	Local	Long	Medium	Medium	Average	Low	
Habitats	95	Exploitation/Maintenance	A	Degradation and loss of aquatic habitats	Average	Low	Local	Long	Medium	Average	Medium	Low	
Habitats	96	Preparation	A, B, and D	Fragmentation of aquatic habitats and disruption of connectivity	Average	Low	Occasional	Short	Minor	Medium	Medium		
Habitats	97	Construction	A, B, and D	Fragmentation of aquatic habitats and disruption of connectivity	Average	High	Local	Average	Average	Average	Average		

Environmental component	No.	Phase	Project component	Impact	Impact	Residual impact after adoption of avoidance, reduction and compensation measures						and compensation measures
					Relative importance	Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance	Relative importance
Habitats	98	Operation/Maintenance	A	Fragmentation of aquatic habitats and disruption of connectivity	High	High	Local	Long	Major	Medium	Strong	
Flora	99	Preparation	A, B, C and D	Loss of plant specimens of conservation interest	Average	Low	Occasional	Short	Minor	High	Medium	Weak
Flora	100	Construction	A, B, C and D	Loss of plant specimens of conservation interest	High	Moderate	Occasional	Long	Medium	Strong	Strong	Weak
Flora	101	Operation/Maintenance	A	Loss of plant specimens of conservation interest	High	Low	Occasional	Long	Minor	Strong	Medium	Weak
Fauna	102	Preparation	A, B, C and D	Localised disturbance to terrestrial fauna and	Average	Low	Local	Short	Minor	Medium	Medium	Low

Environmental component	No	Phase	Project component	Impact	Impact	Residual impact after adoption of avoidance, reduction and compensation measures						and compensation measures
					Relative importance	Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance	Relative importance
				risk of mortality								
Fauna	103	Construction	A, B, C and D	Localised disturbance to terrestrial fauna and risk of mortality	Medium	Low	Occasional	Medium	Minor	Average	Medium	Low
Fauna	104	Exploitation/Maintenance	A	Localised disturbance to terrestrial fauna and risk of mortality	Medium	Low	Occasional	Long	Minor	Medium	Medium	Low
Fauna	105	Preparation	A, B, C and D	Impacts on animals of conservation interest	Average	Low	Occasional	Short	Minor	High	Medium	Weak
Fauna	106	Construction	A, B, C and D	Impacts on animals	Significant	Low	Occasional	Medium	Minor	Strong	Medium	Low

Environmental component	No.	Phase	Project component	Impact	Impact	Residual impact after adoption of avoidance, reduction and compensation measures						and compensation measures
					Relative importance	Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance	Relative importance
				conservation interest								
Fauna	107	Exploitation/Maintenance	A	Impacts on animals of conservation interest	High	Low	Local	Long	Medium	Strong	Strong	Weak
Exotic and/or invasive species	108	Preparation	A, B, C and D	Risk of dispersal of exotic and/or invasive species	Medium	Low	Occasional	Short	Minor	Low	Low	
Exotic and/or invasive species	109	Construction	A, B, C and D	Risk of dispersal of exotic and/or invasive species	Average	Medium	Occasional	Average	Medium	Low	Average	
Exotic and/or invasive species	110	Exploitation/Maintenance	A	Risk of dispersal of exotic and/or invasive species	Average	Medium	Occasional	Long	Medium	Low	Average	

Environmental component	No	Phase	Project component	Impact	Impact	Residual impact after adoption of avoidance, reduction and compensation measures						and compensation measures
					Relative importance	Intensity	Scope	Duration	Absolute importance	Relative value of the component	Relative importance	Relative importance
Areas protected or recognised for their biodiversity	111	Preparation	A, B and D	Impacts on an area recognised for its biodiversity	Average	Low	Occasional	Short	Minor	Medium	Medium	
Areas protected or recognised for their biodiversity	112	Construction	A, B and D	Impacts on an area recognised for its biodiversity	Average	Average	Local	Average	Average	Average	Average	
Areas protected or recognised for their biodiversity	113	Exploitation/Maintenance	A	Impacts on an area recognised for its biodiversity	Significant	Significant	Local	Long	Major	Medium	Strong	

8.4. Analysis of cumulative impacts

Indirect and cumulative impacts must be taken into account if they are reasonably foreseeable (NES 1§ 23 NO 23.5).

The cumulative impact assessment allows for the study of the impact of the project when added to the effect produced by other past, present and reasonably foreseeable developments, as well as the consequences of unplanned activities made possible by the project, which may take place later or in another location.

The main project contributing to cumulative impacts with the project under study is the Guinea-Mali Electricity Interconnection Project (PIEGM). A portion of this 225 kV line between the two countries follows the left side of the RN 32 from end to end, from Koumana to Niandankoro. At the time of the field mission for this study, this portion of the line was under construction and the lines were beginning to be strung along most of its route between the two rural commune capitals. It is highly likely that the implementation or, failing that, the maintenance of the PIEGM will still be ongoing at the time of implementation of the project under study. This route is located at most twenty metres from the RN 32, and in some places, such as Nounkounkan and other inhabited areas, it runs directly alongside the road.

The PIEGM shares many characteristics with the project under study: both are linear infrastructure construction projects following or merging with the route of the RN 32, with a small footprint and relatively limited impacts in terms of the number of communities affected.

Many components of the receiving environment are affected by the cumulative impacts of the two projects. Table 116 below summarises all the components of the receiving environment and assesses the impacts of the project, which are in addition to those already being caused by the PIEGM, which is currently under construction.

116 : Components of the environment affected and assessment of cumulative impacts with the PIEGM project, Source: Insuco, 2025

Affected environmental component	Cumulative impacts	Relative importance of cumulative impact
Physical environment	Increased risk of erosion during construction	Negative – High
	Increased impact of suspended solids in watercourses during construction	Negative – High
	Increased noise and air emissions during construction if carried out simultaneously	Negative – High
Biological environment	Increased degree or duration of disturbance to animals during construction	Negative – High
	Increased habitat loss	Negative – Strong
	Increased long-term barrier effect	Negative – Strong
Land and land use	Disruption to development plans	Negative – Medium
	Land inflation caused by land acquisition	Negative – Medium
	Permanent land loss	Negative – High
	Temporary land losses	Negative – Medium
	Restitution of temporarily acquired land	Positive – High

		Land inflation caused by proximity to the RN32	Negative – High
		Job creation in construction	Positive – Strong
Employment and working conditions		Development of AGR linked to the influx of project workers	Positive – Strong
		Opportunities for local businesses	Positive – Strong
Demographics and migration		Displacement related to resettlement	Negative – Strong
		Emigration of young people due to PAR compensation payments	Negative – Strong
		Influx of workers and opportunistic migration	Negative – Medium
		Increased workload for women hosting workers	Negative – Medium
		Cultural mixing	Positive – Strong
		Attractiveness of newly accessible areas	Positive – Strong
Governance and social cohesion		Exclusion of local authorities from decision-making processes and project stages	Negative – Medium
		Disruption related to the development of the ESIA and PAR	Negative – Medium
		Tensions related to recruitment	Negative – Medium
		Tensions with project workers	Negative – Average
Economic activities		Loss of economic activity linked to land acquisition	Negative – High
		Economic development of the region due to improved access	Positive – Strong
Traffic, circulation and mobility		Traffic disruption due to construction activities, including the transport of machinery, materials and workers	Negative – Medium
Health and safety of communities and workers		Road accidents and construction site accidents	Negative – High
		Health and safety risk behaviours among project workers	Negative – High
		Nuisances from construction sites	Negative – Strong
Access to essential services		Loss of community infrastructure due to land acquisition	Negative – High
		Pressure on essential services due to resettlement	Negative – Strong
		Pressure on essential services related to project workers	Negative – Medium

	Pressure on essential services related to migration due to improved access	Negative – High
	Opening up and improving access to basic services	Positive – High
Ecosystem services	Loss of ecosystem services linked to land acquisition	Negative – Medium
	Pressure on ecosystem services linked to resettlement	Negative – Medium
	Pressure on ecosystem services related to project workers	Negative – Medium
	Pressure on ecosystem services related to migration due to improved access	Negative – High
Cultural heritage	Displacement and destruction of socio-cultural heritage sites	Negative – Medium
	Discovery of archaeological artefacts	Negative – Medium
	Degradation of socio-cultural heritage sites	Negative – Medium
	Desecration of socio-cultural heritage sites	Negative – Medium

The impacts related to land acquisition and the resulting loss of AGR and essential ecosystem services, those affecting governance and traffic, but also the positive impacts on the local economy and access to essential services are the impacts whose cumulative effect with the PIEGM project significantly increases their relative importance (before management measures are adopted). It will be important to consider that the project is integrated into a territory that is not free of other projects, and that stakeholders (local communities, vulnerable groups and traditional authorities) will develop adaptation strategies to deal with these negative impacts, which will need to be taken into account in project planning.

9. Human rights risks analysis

9.1. Introduction

In accordance with the requirements of the Equator Principles and the United Nations Guiding Principles, an analysis of the potential negative human rights impacts associated with the construction and operation of the RN32 project is proposed in order to determine the initial levels of risk and the mitigation measures that should be developed and implemented for the project. The human rights applied are those expressed in the International Bill of Human Rights, namely the **Universal Declaration of Human Rights**, the **International Covenant on Civil and Political Rights** and the **International Covenant on Economic, Social and Cultural Rights**, and the principles concerning fundamental rights set out in the **International Labour Organisation's Declaration on Fundamental Principles and Rights at Work**.

The Human Rights Impact Assessment (HRIA) was carried out in accordance with the requirement of Principle 2 of the Equator Principles 4 (EP4), which requires an assessment of potential negative impacts on human rights. The scope of this assessment was defined in accordance with the guidelines provided by the Equator Principles Association²⁷.

9.1.1. Objectives of the HRIA

The objectives of the HRIA are to:

- Conduct an initial review of potential or actual negative impacts on human rights at the project level, using the methodology of the United Nations Guiding Principles and indicating which stakeholder groups could potentially be affected by which risks, if any.
- If the results of the initial screening indicate low risks, provide a general statement of risks or comments in an acceptable form.
- If the results of the screening indicate higher risks, conduct additional research to understand these risks and how they should be avoided or mitigated and/or remedied, and make recommendations as part of the ESMP.
- Ensure that the assessment includes information on the grievance mechanism at the project level.

9.1.2. Methodological approach

■ Data collection and review

The data sources used for the analysis are as follows:

- Interviews with duty bearers (prefectural and local authorities);
- Consultations with rights holders (local communities), with specific consultations held with vulnerable groups (women and young people);
- Socio-economic data available in regional monographs;
- Reports produced by leading human rights organisations (Amnesty International, Reporters Without Borders, etc.).

The analysis assesses all potential human rights impacts using the methodology proposed in the guidance note on implementing human rights assessments under the Equator Principles and in the *Danish Institute for Human Rights'* guidance manual on human rights assessments. It is based on an analysis of the following criteria:

- **Magnitude:** how serious are the consequences of the impact for the person(s) affected?
- **Scope:** how many people could be affected by the effects of this impact?
- **Irreversibility:** will redress enable the victim to return to the same or an equivalent situation as before the harm occurred?

- **Probability:** how likely is it that the impact will occur? This probability is a combination of the following factors:
 - Risks inherent in the country's legal, institutional and political framework;
 - Risks inherent in the project's sectors of activity;
 - Risks inherent in the project's operational context;
 - Evidence that the project proponent has faced similar risks that it has failed to mitigate properly, leading to impacts.

With regard to this last point, no information has been found in the media reporting the direct or indirect involvement of QGMI Construction UK Ltd, or any of its subsidiaries or affiliates, in human rights abuses in a previous project. This last sub-criterion therefore had no influence on the analysis of the probability of the impacts analysed.

The overall severity of the impact is calculated by multiplying the score obtained for each of the four impact assessment criteria. The score is given based on the following table, which is inspired by the methodology proposed by the *Danish Institute for Human Rights*. The Danish Institute for Human Rights (DIHR) methodology for assessing human rights impacts is one of the most widely used international references for HRIS. It is aligned with the United Nations Guiding Principles on Business and Human Rights (UNGPs).

In addition to the above, it is recognised that the project could have several positive impacts on human rights by strengthening connectivity between communities along its route. This could stimulate trade, promote local economic growth and improve access to social services (e.g. healthcare). In this context, the project could enhance the enjoyment by community members of their right to an adequate standard of living for health and well-being. However, in accordance with the Equator Principles, which specify that it is necessary to focus on risks rather than opportunities, this report aims to identify negative risks and propose measures to avoid them.

Table 117 : parameters for assessing the severity of human rights impacts

Criteria	Parameters	Rating
Scale	Threat to life or long-term health	6
	No threat to life or health but tangible harm to fundamental freedoms and basic needs (education, livelihood, etc.)	4
	Other impacts of lesser importance	2
Scope ²⁸	More than 20% of the total population in the project's indirect area of influence OR more than 50% of an identifiable vulnerable group	6
	Between 6% and 20% of the total population in the project's indirect area of influence OR between 11% and 50% of an identifiable vulnerable group	4
	5% or less of the total population in the project's indirect area of influence OR 10% or less of an identifiable vulnerable group	2
Irreversibility	No viable replacement, remediation involving complex measures and/or only marginally acceptable to those affected	6
	Viable replacement, remediation involving measures of medium complexity and acceptable to those affected	4
	Simple replacement involving measures of low complexity and high acceptability for those affected	2
Probability	Risks inherent to the sectors of activity and the operational context and/or rights not protected by the legal, institutional and national policy framework	6
	Risks inherent to the sectors of activity OR the operational context BUT protected by the national legal, institutional and political framework	4
	Risks not inherent to the project's business sectors or operational context, or inherent risk BUT managed in accordance with international best practices	2
Overall severity	If the product of the 4 criteria is greater than or equal to 432	High
	If the product of the four criteria is between 129 and 431	Medium
	If the product of the four criteria is less than or equal to 128	Low

9.2. QGMI's policies and procedures for human rights due diligence

QGMI has several internal policies and procedures that structure its due diligence approach and contribute to the prevention of human rights risks in its projects. These policies and procedures, which are available to QGMI staff and partners, were communicated during the drafting of this report.

■ QGMI's human rights policy

QGMI has adopted a human rights policy whereby the group undertakes to respect and protect the dignity of all individuals in all its activities.

²⁸ Considering that no significantly representative statistical data was produced during this study, the scope of the impact was characterised on the basis of existing data and expert opinion based on the results of interviews.

The company is committed to ethical behaviour in accordance with the United Nations Guiding Principles on Business and Human Rights and the ILO Declaration on Fundamental Principles and Rights at Work, recognising that its operations have a direct impact on society and stakeholders.

This policy reflects QGMI's commitment to being a responsible player through a series of concrete commitments:

- Supporting the Universal Declaration of Human Rights;
- Promoting respect for these rights among contractors, suppliers and business partners;
- Prohibiting all forms of forced, compulsory or child labour, as well as all forms of modern slavery or human trafficking;
- Guaranteeing freedom of movement for employees and prohibiting the confiscation of documents or forced labour;
- Create an inclusive work environment, free from discrimination based on age, gender, religion, ethnicity, sexual orientation or disability;
- Prevent all forms of intimidation, bullying or sexual harassment, and respond to them with appropriate disciplinary measures;
- Respect the right to rest and paid leave, while ensuring the health, safety and physical and social well-being of workers;
- Encourage employee training and professional development;
- Comply with international and national laws and regulations, adapting the policy locally where necessary;
- Require the entire supply chain to comply with these same principles and obligations.

■ Human capital management, 2024

QGMI's *Human Heritage Management* procedure defines the principles and guidelines governing human capital management within the company. It applies to all company staff, employees and partners, and aims to ensure consistent, fair management that respects fundamental rights at work, in accordance with international standards.

This policy covers the entire professional life cycle of employees, from recruitment to termination of contract, ensuring transparency, non-discrimination and equal opportunities. As part of this policy, QGMI promotes a safe and inclusive working environment based on risk prevention, employee health and well-being, and respect for diversity and the dignity of each individual.

It also provides for skills development and continuing training, **the promotion of local employment**, and rigorous monitoring of working and safety conditions on its construction sites. By establishing clear procedures and internal control mechanisms, QGMI ensures that its personnel management complies with national legislation, International Labour Organisation conventions and the United Nations Guiding Principles on Business and Human Rights.

■ Guidelines for environmental, health and safety monitoring, 2023

The Environmental, Health and Safety Guidelines define the framework for implementing environmental, health and safety monitoring within QGMI's management units. Integrated into the company's Integrated Management System (IMS), they aim to ensure compliance, risk prevention and continuous performance improvement.

They specify the responsibilities of each unit in identifying significant risks and aspects, defining monitoring parameters, determining the frequency of checks and retaining records. Monitoring focuses in particular on waste management, air and water quality, noise, and staff working conditions and health. In the event of non-compliance, deviation reports are drawn up and corrective actions are implemented.

These guidelines formalise an environmental and safety monitoring system that ensures risk control and compliance with legal and contractual requirements in all of QGMI's activities.

■ Risk management, 2024

The *Risk Management* document defines the methodology adopted by QGMI for identifying, assessing and controlling risks that may affect its activities, employees, partners or the communities and involved in its projects. It aims to ensure a structured and consistent approach to risk management, integrated into the company's Integrated Management System (IMS).

This policy applies to all levels of the organisation and is based on the principles of prevention, traceability and continuous improvement. It specifies the responsibilities of each department and management unit in detecting and prioritising threats and opportunities, defining response measures and monitoring the actions implemented.

The management process comprises several stages: identification of potential causes and consequences, qualitative and quantitative assessment of probability and impact, determination of the level of risk, selection of appropriate responses (avoid, reduce, transfer or accept) and recording in the risk register. This register is updated regularly and incorporates lessons learned from previous projects.

This system enables the anticipation of technical, financial, environmental, social and governance risks, while ensuring compliance with legal and contractual requirements. It reflects QGMI's commitment to preventing negative impacts, strengthening the resilience of its operations and ensuring responsible and transparent management of its activities.

■ Opening, conducting and closing investigations through the ethics channel, 2023

This document, developed and adopted by QGMI, defines grievances as any real or perceived concern or complaint that may be raised by internal stakeholders (employees, subcontractors) or external stakeholders (communities, local organisations). It provides a framework for receiving, processing and tracking grievances in accordance with data protection rules. The procedure also provides for an ethics committee responsible for ensuring the proper application of the company's Code of Ethics. Complaints may relate to various issues such as discrimination, harassment, corruption, legal breaches or behaviour that may affect human rights.

Preliminary analysis: human rights risks inherent in the project's context of intervention

9.2.1. Human rights risks inherent in the legal, institutional and political framework of the Republic of Guinea

9.2.1.1. Guinea's international human rights commitments

Guinea has ratified a number of international conventions and treaties. Guinean law adopts a monist approach to the place of international law in domestic law, meaning that treaties duly ratified or approved by the competent authorities are immediately applicable in domestic law. Guinean law gives international law greater authority than domestic law. It is important to note that, according to the 2021 Transition Charter, treaties ratified prior to the adoption of the Charter remain in force. The following table lists the main international and regional human rights treaties ratified by Guinea.

Table 118 : List of the main international and regional treaties ratified by Guinea

Fundamental human rights treaties	Fundamental ILO Conventions
International Covenant on Civil and Political Rights, 1966. Ratified in 1978	C029 - Convention on Forced Labour, 1930. Ratified in 1959
International Covenant on Economic, Social and Cultural Rights, 1967. Ratified in 1978	C087 - Convention on Freedom of Association and Protection of the Right to Organise, 1948. Ratified in 1959
International Convention on the Elimination of All Forms of Racial Discrimination, 1965. Ratified in 1977	C098 - Convention concerning the Right to Organise and Collective Bargaining, 1949. Ratified in 1959
Convention on the Elimination of All Forms of Discrimination against Women, 1979. Ratified in 1982.	C100 - Convention on Equal Remuneration, 1951. Ratified in 1967
Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment (CAT), 1984. Ratified in 1989	C105 - Convention concerning the Abolition of Forced Labour, 1957. Ratified in 1961
Convention on the Rights of the Child, 1989. Ratified in 1990	C111 - Convention concerning Discrimination (Employment and Occupation), 1958. Ratified in 1960
International Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families, 1990. Ratified in 2000	

Convention on the Rights of Persons with Disabilities, 2006. Ratified in 2008 UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage, 1972. Ratified in 1972	C138 - Minimum Age Convention, 1973. Ratified in 2003. Minimum age specified in Guinea: 16 years C182 - Convention concerning the Worst Forms of Child Labour, 1999. Ratified in 2003 C187 - Convention concerning the promotional framework for occupational safety and health, 2006. Ratified in 2017
Regional instruments	
African Charter on Human and Peoples' Rights, 1986. Ratified in 1982 Protocol to the African Charter on Human and Peoples' Rights on the Rights of Women in Africa, 2003. Ratified in 2012 African Convention on the Rights and Welfare of the Child, 1990. Ratified in 1999 African Union Convention on Preventing and Combating Corruption, 2003. Ratified in 2012	Environmental instruments Stockholm Convention on Persistent Organic Pollutants, 2001. Ratified in 2007 United Nations Framework Convention on Climate Change, 1992. Ratified in 1993 Kyoto Protocol, 1997. Ratified in 2000 United Nations Convention on Biological Diversity, 1992. Ratified in 1993 Paris Agreement, 2015. Ratified in 2016 Montreal Protocol on Substances that Deplete the Ozone Layer, 1987. Ratified in 1992

Guinea has ratified the main international human rights instruments, including the two International Covenants on Human Rights and 9 of the 10 fundamental ILO conventions, which cover a significant portion of the fundamental rights likely to be affected by the Project. Although the country has ratified the Convention concerning the Promotional Framework for Occupational Safety and Health, it has yet to ratify the Occupational Safety and Health Convention (C155). The 2014 Protocol to the Forced Labour Convention, 1930, has also not been ratified.

Guinea has not ratified the Convention on Violence and Harassment (C190) which, although not a fundamental instrument, provides a framework for protecting workers from sexual harassment and violence in the workplace. Similarly, Guinea has not accepted the Optional Protocol to the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW), which provides for the possibility of filing complaints with the United Nations about discrimination against women.

Guinea has also not ratified the 2006 International Convention for the Protection of All Persons from Enforced Disappearance. Given the Project and its context, the failure to ratify this treaty is unlikely to have an impact on human rights.

Finally, it should be noted that Guinea has not ratified ILO Convention No. 169 concerning Indigenous and Tribal Peoples, which involves the recognition and protection of the rights of indigenous and tribal peoples, guaranteeing their participation in decision-making on matters affecting them and preserving their cultural identity. This convention establishes clear standards regarding territorial rights, consultation, participation and respect for cultural identity. It requires States to obtain the free, prior and informed consent of these communities on matters affecting their rights and interests. **However, the absence of indigenous peoples within the meaning of international law in Guinea means that the non-ratification of this convention is unlikely to have an impact on human rights.**

9.2.1.2. National legal framework for the protection of human rights

The following subsections set out the main legal texts promoting and protecting human rights in Guinea. They are not intended to be exhaustive but to highlight the level of protection of the main human rights under the current legislative framework.

In general, Guinean labour law covers the main areas of employment and working conditions and is generally in line with the international standards set out in the ILO'. However, certain provisions that could create obligations for employers have not been transposed into national law, which creates risks for rights holders, particularly with regard to child labour, freedom of association and collective bargaining, non-discrimination, and occupational health and safety. Criminal law does not contain specific provisions on gender-based violence or sexual harassment.

9.2.1.3. The Transition Charter

The Constitution, which was the supreme law of the state, has been suspended since Guinea's transitional government took power in September 2021. A Transition Charter was published in the same month and assigns a series of tasks to the current authorities, including the drafting of a new constitution. Chapter IV of the Transition Charter recognises fundamental rights and freedoms and guarantees their exercise by citizens under the conditions and in the forms provided for by law. In particular, the Charter recognises the right to respect for physical and moral integrity, intimacy and privacy (Art. 10), the prohibition of torture (Art. 11), and the main principles of criminal law (Arts. 12 to 14, such as the presumption of innocence, the personal nature of punishment and the non-retroactivity of penalties and offences). The Charter also recognises freedom of expression (Art. 23), the prohibition of discrimination (Art. 15), the right to property (Art. 26), freedom of association (Art. 35) and freedom of association (Art. 34).

9.2.1.4. Relevant laws and regulations

Guinea has adopted a number of national laws aimed at protecting and promoting human rights, the main ones of which are detailed below. This section presents Guinea's legal provisions according to the main themes related to human rights.

■ Labour law

Guinea has a well-developed labour law system that is generally in line with international requirements.

The Labour Code prohibits forced labour as defined by ILO Convention No. 29 (Articles 3 and 172.1 to 172.5). This prohibition is accompanied by criminal penalties: the Criminal Code punishes human trafficking with imprisonment (from five to ten years) and fines for individuals, the duration and amount of which depend on the circumstances of the offence. If a person is exposed to inhumane working and housing conditions because of their dependence or vulnerability, the exploiters face penalties ranging from one month to five years' imprisonment and fines ranging from 50,000 to 500,000 GNF (Articles 323 to 333).

With regard to working conditions, the Code stipulates that the working week is 40 hours, compared with a maximum limit of 48 hours under ILO conventions. The threshold for overtime is set at 48 hours per week. The Labour Code also provides for a bonus for night work, a minimum of 24 hours' rest for a 7-day working period, and 30 days' rest per effective year (Articles 221.1 to 221.9, 222.5 to 222.8, 222.12 and 222.16).

With regard to wages, the Labour Code provides for a minimum wage that must be paid each month (every 15 days for workers hired for a period of 2 weeks or less) (Art. 241.7). However, it is unclear whether there are fixed criteria for increasing the minimum wage and whether the needs of workers and their families, as well as economic factors, are taken into account in setting the minimum wage, as required by ILO Convention No. 131.

Labour law includes requirements concerning health and safety at work (Art. 231.2, 231.4, 231.6, and 241.8). The Labour Code requires employers to take all necessary measures appropriate to the operating conditions of the enterprise to protect the life and health of employees, including practical training in safety, hygiene and health. Employers are also required to comply with the general provisions and specific safety requirements for certain occupations determined by ministerial order. With regard to living conditions in accommodation, the Labour Code stipulates that whenever an employee is moved from their usual place of residence by their employer for the purpose of performing a contract of employment, the employer is required to provide them with suitable accommodation corresponding to their category and meeting hygiene standards, or to pay them compensation.

However, the Labour Code only contains general provisions on health and safety at work and does not fully align with the country's international obligations as stipulated in ratified international conventions. The legislation does not establish occupational health and safety standards. Furthermore, the legislation does not oblige employers to ensure the protection of persons other than their own employees or to collaborate with other companies carrying out simultaneous activities, which could create risks for contract workers. Finally, national legislation does not fully reflect the provisions on prevention and protection measures in the Convention (No. 167) on Safety and Health in Construction, for example, the precautionary measures taken with regard to excavations, pits, earthworks, underground work and tunnels, or the conditions governing the transport and use of explosives in construction.

Finally, labour law includes provisions prohibiting discrimination. These are detailed in the relevant paragraph below.

■ Freedom of association and trade unions

Freedom of association, the right to organise, collective bargaining and the right to strike are guaranteed by the Transitional Charter and labour legislation. Workers are allowed to join and form trade unions, but also to participate, through representatives, in determining their working conditions, in particular through collective agreements. The law protects workers against anti-union discrimination, prohibiting employers from taking union membership into account when considering decisions regarding hiring, dismissal and employee conduct.

The right to organise and participate in strikes is guaranteed by the Transitional Charter and the Labour Code, but the law provides for certain limitations, including the obligation to maintain minimum service levels. Furthermore, the definition of a strike is limited to work-related grievances and does not cover strikes organised to express dissent against the government's economic or social policies and measures. Unlike the 2010 Constitution, the Transitional Charter does not guarantee freedom of peaceful assembly.

However, the law provides for several limitations on the right to strike that are not provided for in international standards. The International Trade Union Confederation (ITUC), as well as the Committee of Experts on the Application of Conventions and Recommendations (CEACR), have identified several limitations, including restrictions on the right of trade unions to organise their administration, obstacles to legal strike action, restrictions or bans on certain types of strike action, and undue interference by the authorities or employers during a strike.

These restrictions can reduce workers' ability to collectively assert their rights in the workplace, including the right to fair and favourable working conditions and to work in dignity, but also to protest against public social and economic policies or harmful commercial practices.

■ Prohibition of discrimination

The principle of equal treatment of citizens before the law is guaranteed by the Transitional Charter (Art. 9) and subsequent legislation.

In particular, the Labour Code prohibits any discrimination based on race, colour, national origin, citizenship, social origin, age, language, HIV status or any other communicable disease. This principle applies to human resource management, including, but not limited to, hiring, work distribution, promotion, remuneration, discipline or termination of contract. At the same time, certain sectoral laws include provisions prohibiting discrimination. In particular, the Mining Code stipulates that, under equal conditions of work, professional qualifications and performance, wages shall be equal for all workers recruited in the Republic of Guinea, regardless of their origin, nationality, sex, age or status (Art. 96).

In 2018, Law No. L/2018/021/AN on the protection and promotion of persons with disabilities in the Republic of Guinea was adopted, supplemented by an implementing decree. These provisions were adopted to ensure equal opportunities for persons with disabilities, promote their rights and protect them against all forms of discrimination. In addition, the government has set up informal employment programmes for persons with disabilities.

Furthermore, Law 2021/0016/AN on the protection and promotion of the rights of persons with albinism in the Republic of Guinea grants persons with albinism equal rights in terms of access to education, healthcare, mobility and employment.

Finally, Guinea adopted Law L/2005/025/AN of 22 November 2005 and Ordinance No. 056/2009/PRG/SGG on the Prevention, Care and Control of HIV/AIDS in the Republic of Guinea to protect people infected with HIV and AIDS from stigmatisation. The National Transition Council (CNT) adopted a bill to modernise these provisions and ensure that they are more in line with international law and other Guinean legal texts, in particular the Penal Code and the Civil Code. This bill also aims to take gender issues into account.

Despite these protective provisions and the fact that the Labour Code prohibits discrimination in all areas of employment and occupation, the protected grounds do not include sexual orientation or family responsibilities, which creates risks for certain categories of workers. Similarly, the definition in the transitional charter appears restrictive and non-exhaustive, excluding certain grounds for discrimination, such as disability, age, sexual orientation and gender identity. The country's legislation is therefore not in line with international standards, in particular the International Covenant on Civil and Political Rights and the African Charter on Human and Peoples' Rights.

Finally, it should be noted that the legal provisions relating to the protection of women's reproductive health do not include men's reproductive health within their scope. At the same time, men are not entitled to paternity leave around the time of birth.



■ Public health and a healthy environment

The Constitution, which was suspended following the political events of September 2021, enshrines the right to health and physical well-being (Art. 15), as well as the right to a healthy and sustainable environment. Article 22 specifies that "the right to a healthy environment is recognised throughout the territory and that the State shall ensure the protection of the environment and promote access to decent housing". However, these provisions have not been included in the Transition Charter.

General provisions of the Guinean legal system include measures to protect the health and safety of local residents: the Environment Code requires classified projects to establish an emergency management plan to alert the authorities and communities in the event of a threat or disaster (Art. 85). The Environment Code also requires an impact assessment to be carried out to analyse the impacts on the human environment (Art. 83).

Sectoral legislation, in particular the Mining Code, includes legal provisions relating to health and environmental protection. In accordance with Articles 104, 126 and 144 of this Code, holders of mining permits or quarrying authorisations are required to ensure the preservation of health and the environment or to minimise the adverse effects of their mining or quarrying activities. This includes prohibiting the use of harmful and dangerous chemicals, emitting noise that is harmful to human health, producing odours that are harmful to human health, polluting water, air and soil, and degrading ecosystems and biological diversity. It also includes the prevention and management of HIV/AIDS at the local level and the effective management of waste by minimising its production, ensuring its total safety and disposing of non-recyclable waste in an environmentally appropriate manner. In addition, companies or holders of quarry operating licences are required to set up and maintain an environmental rehabilitation trust account to ensure the rehabilitation of their site at the time of or after its closure. Finally, the Mining Code provides for the obligation to compensate the State or any other individual for damage and losses that a mining licence or permit holder may have caused.

The measures provided for in the legal system lack the detail needed to be operational, but key aspects of the health and safety of local residents are mentioned. A gap has been identified with regard to traffic management, as no traffic management measures are required in the case of construction works. In addition, a gap has been identified with regard to the impacts on local residents that could result from impacts on ecosystem services, as such impacts are not taken into account.

■ Property rights and land use

The Transition Charter guarantees property rights (Art. 28).

The Land and Property Code (hereinafter the Land Code) and Decree A/2023/1595/MEDD/CAB/SGG. To a lesser extent, the Civil Code and the Pastoral Code also regulate the consideration of land and property rights. The Transition Charter guarantees the right to property: it may only be infringed upon for reasons of public utility established in accordance with the legal procedures in force, and against prior payment of fair compensation (Art. 28). The Land Code defines the different phases of the expropriation procedure (detailed in Section **Erreur ! Source du renvoi introuvable.**), the transfer of ownership and the principles of compensation (Arts. 55 to 83). The Civil Code incorporates the general provisions of the Transition Charter on the protection of property (Art. 534). Finally, the Pastoral Code recognises the traditional pastoral rights of local livestock farmers and sets out the terms and conditions for restricting and compensating for any restriction of pastoral rights (Arts. 75 to 78). These provisions are supplemented by the Operations Manual in the form of "guidelines" for expropriation for public use and compensation for land and natural resources in the Republic of Guinea. Decree- e A/2023/1595 contains general requirements for the resettlement of persons in the context of environmental impact assessments, but the requirements remain limited.

The main requirements relating to expropriation and resettlement are as follows. Expropriation requires the **payment of fair compensation prior to the transfer of ownership**, which must cover the entire **direct, material and certain damage** caused by the expropriation (Art. 69). The calculation of the expropriation is based on the condition and value of the property on the date of expropriation, and any increase or decrease in value of the part of the property not expropriated, if applicable (Art. 69). With regard to eligibility, the Land Code states that persons who can prove peaceful, personal, continuous and bona fide occupation as owners are recognised as owners, provided that the land concerned is not part of the classified public domain. Thus, **eligibility for compensation is reserved for occupants with formal title deeds or persons who have acquired the property through continuous and peaceful occupation**. On the other hand, occupants without formal title to private property and non-decommissioned public property of the State have no right to compensation under current legislation. Customary law is not expressly taken into account by formal law. Only the Land Code refers to continuous and bona fide occupation, which can be

proven, among other means, by the development of the property in accordance with local customs (Art. 39). Similarly, Guinean law does not formally recognise traditional authorities despite their role in regulating social relations, including land disputes.

Resettlement is dealt with by Decree A/2023/1595, which states that any project involving the involuntary displacement of more than 200 people must specify the principles and modalities of their resettlement in the ESIA report and be subject to a PAR (Art. 26). In particular, the project must specify the number of people affected, the eligibility criteria for resettlement and identify the assets affected (Art. 27). However, **Guinean law does not provide for measures to support resettlement and the restoration of livelihoods.**

Sectoral provisions also deal with property rights and land use. This is particularly the case with the Mining Code. In order to exercise property rights throughout the duration of the operation, the Mining Code requires title holders to pay compensation to the legitimate occupants of the land to cover the disruption they suffer. Furthermore, in cases where the owner, usufructuary, legitimate occupant(s) of the land or their beneficiaries have undertaken work or owned facilities that have become unusable as a result of mining operations, the mining title holder must reimburse them for the cost of such work or facilities or, if lower, their value on the date on which they became unusable.

Article 142 of the Mining Code refers directly to the concept of population displacement resulting from mining activities. The Mining Code stipulates that any application for a mining permit or title submitted by a mining operator to the authorities must include an environmental and social impact assessment in accordance with recognised international standards. The development of a resettlement plan for populations forcibly displaced by extractive sector activities may be required by the public authority and must include compensation for loss of income and livelihoods resulting from such displacement. All projects, whether public or private, must develop a resettlement action plan (RAP) if more than 200 people are displaced, or a "summary resettlement plan" for fewer than 200 people. The legislation requires that eligibility and compensation criteria be defined.

■ Gender equality and women's rights

Gender equality and parity were guaranteed by the 2010 Constitution; however, the Transitional Charter does not include any guarantees of gender equality and parity.

In the civil sphere, the new Civil Code of 2019 (adopted by Law L/2019/035/AN of 4 July 2019) improves gender equality. In particular, it repealed the provision of the previous code whereby women could only pursue a profession different from that of their husband unless he objected on grounds of family interest. In addition, the Civil Code ensures equality in terms of inheritance (Art. 680) and household management (Art. 287).

Furthermore, the law guarantees equal pay for work of equal value and requires that certain aspects of the remuneration system be the same for men and women.

It should be noted that certain types of employment are prohibited for women, including night work in factories, construction sites, workshops, mines and quarries. In addition, work that could impair women's reproductive capacity or, in the case of pregnant women, harm their health or that of their child, is also prohibited or subject to specific requirements laid down by decree. By prohibiting night work and work in certain industries (apart from underground work), the law does not respect the principle of gender equality and does not guarantee that men and women have equal access to employment.

Finally, despite the 2019 reform of the Civil Code, which improves gender equality, customary law and social practices lead to gender inequality in matters of inheritance, property, credit and divorce.

■ Gender-based violence and sexual exploitation, abuse or harassment

The issue of gender-based violence and sexual exploitation, abuse or harassment (GBV/SEA-SH) is governed by civil, social and criminal provisions.

According to the Civil Code, serious abuse and other forms of mistreatment constitute serious misconduct that can make living together intolerable and therefore grounds for divorce (Art. 317).

In the workplace, legislation prohibits all forms of harassment, including sexual harassment. Although this was guaranteed by the former Constitution, the Transitional Charter does not explicitly protect individuals against harassment at work or sexual harassment.

In criminal law, Article 305 of the Criminal Code punishes genital mutilation. In addition, the prohibition of forced marriage (Art. 319 et seq.) is a key provision in the fight against genital mutilation and GBV.

Furthermore, Articles 323 and 324 of the Criminal Code criminalise trafficking for sexual purposes and trafficking for forced labour. These articles provide for penalties for trafficking offences involving adult victims, which can result in imprisonment for a term of three to seven years, with the possibility of a fine. For offences involving child victims, the penalties are more severe, with imprisonment for a term of five to ten years, with the possibility of a fine. In accordance with Articles 893 and 894 of the Children's Code, offences of child trafficking are punishable by penalties including imprisonment for a term of five to ten years and a fine of 50 to 100 million Guinean francs (equivalent to US\$5,850 to US\$11,690). Finally, the Penal Code punishes sexual harassment.

■ Child protection

Guinea has adopted several pieces of legislation aimed at protecting children. These consist mainly of the adoption of a new Penal Code and a new Code of Criminal Procedure in 2016, a new Code of Military Justice in 2017, a new Civil Code in 2019, and a new Children's Code (Law L/2019/059/AN of 30 December 2019) and the Labour Code. However, the Transition Charter of 27 September 2021, in its Chapter IV on fundamental freedoms, duties and rights, does not contain any specific provisions on the promotion and protection of children's rights.

The new Children's Code is the key text in the legal framework for the promotion and protection of children's rights in Guinea. This text is based on the definition of a child as set out in Article 1 of the International Convention on the Rights of the Child. In addition, the Children's Code mentions the basic principles of child protection (the best interests of the child in Article 114, the principle of non-discrimination in Article 3, the right to life and development in Article 9, and the right to be heard in Article 25). It should be noted, however, that with regard to discrimination, Article 3 of the Children's Code does not mention sexual orientation and gender identity, nor disability, as potential sources of discrimination. The new Children's Code of 2019 incorporates the provisions of the new Civil Code, which confers the same status and rights on all children, regardless of their status (natural, illegitimate, etc.). The new Children's Code also enshrines the right of children to protect their privacy and image (Art. 22), the right to freedom of expression (Art. 23), freedom of thought and conscience (Art. 24), and freedom of association and peaceful assembly (Art. 26). It also incorporates the provisions of Article 241 of the new Civil Code of 2019, prohibiting the marriage of boys and girls under the age of 18, except for serious reasons.

With regard to child labour, the minimum legal working age is set at 16, except for apprentices who may be employed from the age of 14 with parental consent, or from the age of 12 for light work in domestic service and other non-industrial sectors, with the authorisation of the labour inspector. The Labour Code also describes the worst forms of child labour. Hazardous work is regulated and may not be performed by children under the age of 18. The law includes a list of such work, including work in mines and quarries, tanneries, handling explosive materials, night work and work that is harmful to a child's morals. Children are not allowed to perform work that would expose them to physical, psychological or sexual violence. They must be examined periodically to ensure that their work is appropriate to their physical strength. Violation of the provisions of the Labour Code on child labour is punishable by criminal penalties.

Despite these provisions, the minimum age for light work is lower than that provided for in ILO Convention C138. Furthermore, the law does not specify the number of hours of work per week or the conditions under which light work may be performed, and limits the protection of children to the formal sector alone, which puts children working in the informal sector at risk.

■ Governance and corruption

The Transition Charter stipulates that all Guinean citizens are voters and eligible for election under the conditions determined by law (Art. 8). These conditions are set out in the Electoral Code established by Law L/2017/N002/AN on the Revised Electoral Code of the Republic of Guinea. Women who have acquired Guinean nationality through marriage are also eligible. The National Transition Council, whose main task is to draft and submit the draft Constitution for adoption by referendum, is a broadly inclusive body, including representatives of political parties, civil society, trade unions, employers' organisations, human rights organisations, women's and youth organisations, cultural and religious organisations, the informal sector, farmers' organisations, elders representing the regions, representatives of persons with disabilities, and press organisations (Art. 60).

With regard to the fight against corruption, the country has established a significant legal and regulatory framework, inspired by various international agreements and conventions aimed at combating corruption. In addition, institutions responsible for oversight and governance are in place and functioning, most of which enjoy administrative and financial autonomy. This indicates that Guinea is technically compliant with the laws and regulations in force.

Guinea adopted the Anti-Corruption Act of 4 July 2017, which governs the legal and institutional framework for corruption in Guinea and applies to acts of corruption and related offences. In particular, companies are required to develop and implement anti-corruption mechanisms. Corruption of public officials and private commercial corruption are prohibited and constitute criminal offences. Corruption and related acts are severely punished by the Penal Code (up to 10 years' imprisonment and a fine of up to GNF 10,000,000) and are considered imprescriptible.

9.2.1.5. National institutional framework for the protection of human rights

This section details the main institutions and bodies responsible for implementing the legal framework for the protection of human rights.

9.2.1.5.1. The Independent National Human Rights Institution (dissolved)

The 2010 and 2020 Constitutions established the Independent National Human Rights Institution (INIDH) as a constitutional institution. Governed by Organic Law L/008/CNT/2011 of 14 July 2011, which mandated the Independent National Human Rights Institution (INIDH) to promote and protect all fundamental human rights and freedoms and to prevent torture and other cruel, inhuman or degrading treatment or punishment, The INIDH was established in 2014 by Decree D/2014/261/PRG/SGG of 30 December 2014.

However, the 2021 Transition Charter does not refer to this institution, and it is one of the institutions that were dissolved following political events.

9.2.1.5.2. Ministries

■ The Ministry of Justice and Human Rights

Its mission is to design, develop and implement government policy in the areas of justice, the rule of law and human rights, and to ensure its consistency and follow-up.

To this end, the Ministry has a National Directorate for Human Rights and Fundamental Freedoms. This Directorate also represents Guinea in international bodies dealing with human rights issues. In addition to providing legislative support to the Ministry, the Directorate can receive complaints of human rights violations and ensure that they are dealt with diligently by the relevant authorities. As a result, several appeals lodged by Guinean and foreign citizens who have been victims of human rights violations have been heard, and the Minister or senior officials from the department have provided advice, guidance or assistance.

■ The Ministry for the Advancement of Women, Children and Vulnerable Persons

Its mission is to design, develop and implement government policy on the promotion of women, children and vulnerable persons and to monitor its implementation. More specifically, the Ministry is responsible for drafting legislation and regulations relating to women, children and vulnerable persons and ensuring their implementation, coordinating activities in the areas of rights, equality, equity, gender and the empowerment of women and girls, and combating gender inequality and gender-based violence. The Ministry is also responsible for protecting and promoting vulnerable groups such as persons with disabilities, older persons and persons with albinism.

9.2.1.5.3. Other stakeholders responsible for protecting human rights

The Constitutional Court is the guarantor of human rights. If the Constitutional Court declares that a law contains a provision that violates fundamental human rights and civil liberties, the law is considered null and void and cannot be applied or enforced by the executive branch. The jurisprudence of the Constitutional Court in this matter takes precedence over that of other courts. The reform of the Court in 2020 reduced its powers to hear cases of human rights violations. Previously, it could be referred to by the INIDH, among others.

The Economic, Social, Environmental and Cultural Council (CESEC) is an advisory body responsible for issuing opinions and/or recommendations on matters submitted to it. It must be consulted for its opinion on draft economic, social, environmental and cultural programme laws. Its composition, which includes different sectors (academia, trade unions, commerce, public transport, etc.) and different sensibilities

(nature conservation, associations, arts), ensures that a wide range of socio-economic, environmental and cultural issues are taken into account. The preliminary draft constitution prepared in July 2024 suggests abolishing the CESEC.

The Ombudsman of the Republic has the essential task of mediating disputes between citizens and the public administration. The Ombudsman is a free and independent intermediary between the public administration and the citizens. The institution was suspended following the political events of September 2021, and the preliminary draft constitution prepared in July 2024 suggests its abolition.

Numerous non-governmental organisations and civil society associations are also working to defend human rights in Guinea. They play a crucial role in raising awareness, advocacy and providing legal assistance to people whose rights have been violated. The following international NGOs are notable for their work in the field of human rights: Amnesty International, Human Rights Watch (HRW), Transparency International, SOS Torture and Lawyers Without Borders. At the national level, the following entities are noteworthy:

- The Guinean League for Human Rights: this is a non-governmental organisation that defends human rights based on the principles enshrined in the Universal Declaration of Human Rights and the African Charter on Human and Peoples' Rights.
- The Guinean Organisation for the Defence of Human and Citizen Rights (OGDH): this organisation was created with the aim of participating in the struggle to establish true democracy in Guinea, placing respect for democracy, human rights, freedom of expression and political and ideological pluralism at the heart of its principles.
- The Association of Victims, Parents and Friends of 28 September 2009 (AVIPA): this is an NGO that defends the memory of the victims and the cause of the survivors of the massacres and other abuses committed on 28 September 2009 and the following days in Conakry. It supports families and victims in the ongoing legal process.
- The Fédération Espoir Guinée (FEG), created in 1995, is an association promoting the rights of people living with HIV (PLHIV) and providing them with psychosocial support. The FEG is active in the country's main care facilities.
- The NGO Korassy for the Empowerment of Women in Guinea (NGO-KAFEG). This apolitical, non-profit non-governmental organisation aims to contribute to the promotion and protection of the rights of women and girls in the Republic of Guinea.
- The National Coalition for Women's Rights and Citizenship (CONAG DCF) was created in 2002. Its areas of intervention are gender equality, combating violence against girls and women, and promoting citizenship for women and girls.
- Les Mêmes Droits pour Tous (MDT) is a Guinean civil society organisation that actively works to defend and promote human rights in Guinea. MDT specialises in the field of criminal justice.

9.2.1.6. *National policies and measures for the protection and promotion of human rights*

Guinea has adopted certain policies to strengthen the implementation of the legal framework relating to human rights.

9.2.1.6.1. *Actions to promote civil and political rights*

The transitional authorities in Guinea have adopted the 2022-2025 Interim Transition Reference Programme, whose main objective is to contribute, through its interventions, to the achievement of the Transition's missions as defined in the Transition Charter of 27 September 2021. This programme is based on five pillars, including one on institutional reforms, which aims to ensure free elections and a constitutional framework. A second pillar focuses on the legal and governance framework and aims to modernise and strengthen the judiciary.

The National Economic and Social Development Plan (PNDES 2016-2020), now obsolete, provides Guinea with a roadmap for addressing development challenges and meeting the needs of the population through quantified objectives. The PNDES aims in particular to improve the well-being of the Guinean population, reduce inequalities and ensure intergenerational equity, and accelerate the sustainable structural transformation of the Guinean economy. Pillar 1 focuses on promoting good governance for sustainable development and has two objectives: consolidating the rule of law, democracy, security and social cohesion, and making public action effective, efficient, inclusive and sustainable.

With regard to gender equality and GBV, Guinea has amended its National Gender Policy (PNG) to address disparities between men and women in education, employment, the economy and decision-making bodies. The mining sector is included in this policy, which takes into account women's needs in terms of corporate social responsibility (CSR) and access to employment for local communities. The five strategic priorities of the PNG are:

- Access to basic social services: education, health, HIV/AIDS, water, hygiene and sanitation;
- Respect for human rights and the elimination of violence: fundamental rights – girls – violence – human trafficking;
- Access to, control of resources and equitable sharing of income: economy – poverty – environment;
- Improved governance and equitable access to decision-making bodies: power – media – institutional mechanisms – armed conflict – new information and communication technologies; and
- Integration of gender into the macroeconomic framework: national development policies and programmes – national planning and budgeting – African Gender Inequality Development Indicator (AGDI) tool for the formulation of sex-disaggregated data.

The National Strategy to Combat Gender-Based Violence has three fundamental objectives: the development of a national strategy, the drafting and implementation of an operational action plan, and the definition of the mandate of the National Observatory to Combat Gender-Based Violence. This strategy has contributed to the establishment of a toll-free number (116) to provide information and assistance to victims of violence against women and girls.

In 2017, Guinea established the National Committee to Combat Trafficking in Persons and Related Practices. This Committee is responsible for developing the National Action Plan (NAP) on prevention, protection, repression, return, reintegration, coordination and cooperation in the fight against human trafficking and related practices, collecting and disseminating information on human trafficking and related practices, and advocating for the fight against human trafficking and related practices. To date, the NAP has not been adopted.

The adoption of these national sectoral policies and strategies has been reflected at the institutional level by the establishment of structures, directorates and departments, and by the creation of new services, such as:

- The Office for the Protection of Gender, Children and Morals (OPROGEM), created in December 2009 within the Ministry of Security and Civil Protection. OPROGEM's mission is to coordinate investigations into all forms of violations of the rights of children and women, and to exchange and disseminate data on the identity of the perpetrators and accomplices of these violations throughout Guinea and beyond. Despite the limited resources allocated, the establishment of OPROGEM branches in the eight administrative regions and 33 prefectures () since 2018 has made it possible to develop prevention work and bring about criminal sanctions following several cases of violence against women and girls.
- The Special Brigade for the Protection of Vulnerable Persons (BSPPV, created in 2020, which reports to the gendarmerie). It was set up to strengthen the operational capacities of gendarmerie units in the policing of children, violence against women and other vulnerable persons. The BSPPV carries out judicial police missions in collaboration with other relevant State services. It is responsible for preventing violence and investigating alleged violations.
- The National Committee to Combat Trafficking in Persons and Related Practices (CNLTTPA);
- The National Observatory on Gender-Based Violence, created in 2011. The Observatory's mission is to monitor and alert on shortcomings in reducing gender-based violence, review the national strategy to combat such violence, and identify research and advocacy needs. The Observatory is responsible for centralising data on gender-based violence, managing a database, and coordinating and guiding the actions of regional committees to combat gender-based violence. It also has the prerogative to issue opinions on draft legislation on gender-based violence. The Observatory lacks the human and financial resources to fully carry out its mandate.

9.2.1.6.2. Actions to promote economic, social and cultural rights

Guinea adopted a national sustainable development strategy in February 2019, which comprises seven major areas of focus. In area 1, the plan aims to promote good governance by combating corruption. In particular, the document focuses on improving governance and transparency in strategic sectors such as mining. In this regard, one of the proposed objectives is to strengthen the role of actors committed to

sustainable development (local authorities, businesses and citizens). In areas 2, 6 and 7, the strategy aims to improve the quality of life of citizens and reduce inequalities. In particular, through area 2, the policy seeks to guarantee access to education, healthcare and drinking water. Similarly, axis 6 aims to consolidate peace and security as the foundation for sustainable development. Finally, axis 7 provides for actions to promote gender equality and green jobs for young people, as well as to promote access for women and young people to decision-making bodies in sustainable development and to include people living with disabilities in sustainable development actions.

Other policies have been adopted concerning the right to health.

In 2015, Guinea adopted the National Health Development Plan (PNDS) 2015-2024, and the 2025-2034 version is currently being developed at the time of writing. The Plan aims to contribute to improving the well-being of the population through actions to promote maternal and child health, prevent and combat disease, and strengthen the health system. To address food and nutritional insecurity and combat food shortages, the National Health Development Plan provides for the development of nutritional and social support mechanisms for affected families.

In 2021, Guinea adopted the National Strategic Plan for Health and Development of Adolescents and Young People (PSNDAJ) 2021-2025. Its objectives are to improve access to health services and adapt infrastructure for young people, train healthcare providers to provide specific care for adolescents and young people, and raise awareness of disease prevention and risky behaviours.

Guinea has adopted the National Agricultural Investment and Food and Nutrition Security Plan (PNIASAN) 2018-2025. This is a multisectoral national programme whose overall objective is to accelerate the fight against poverty and its implications for the availability of and access to healthy food, including for the most vulnerable sections of society. The programme includes a component to strengthen the resilience of the agricultural sector and improve food and nutrition security for vulnerable populations, and a component to develop human capital and promote young people and women in the agricultural sector, which includes the establishment of a social protection system in the agricultural sector, strengthening food and nutrition security and promoting the employability of young people and women in the agricultural sector and the empowerment of rural women.

Finally, in 2018 Guinea adopted the Government's Strategic Framework Plan for Strategic and Operational Approaches. The objective of the Plan is to implement health policy through a national agenda in which all technical and financial partners and other state entities harmonise their actions with a view to bringing basic health services closer to the community. The Plan proposes a structured approach to scaling up community health services. It also provides details to guide the planning, implementation, coordination and monitoring and evaluation of these services.

9.2.1.6.3. Actions to promote labour rights

The 2016–2020 PNDES included a fourth pillar focusing on improving human capital. One of the strategic objectives is to ensure decent employment for citizens and the inclusion of vulnerable groups in the economic fabric.

Furthermore, with the support of the ILO, Guinea adopted a Decent Work Promotion Country Programme in 2015. This programme is based on two priorities: promoting decent employment for young people and women in job-creating sectors such as agriculture, mining and construction; and strengthening social dialogue as a means of preventing crises and promoting decent employment and social peace.

9.2.2. Human rights risks inherent in the construction sector

The Project is mainly linked to two economic sectors:

- The construction sector, which will be responsible for the construction and operation of the project's infrastructure (RN 32, engineering structures and toll stations) and will be active during the construction phase of the project;
- The transport and mobility sector, which will be strengthened by the implementation of the Project and will be active throughout the Project's operational phase.

These two sectors are likely to be associated, in Guinea, with a series of human rights risks that must be taken into account and addressed in this analysis, given that they are recurrent in these sectors and, if they

were to occur in the context of the RN32 project, could have significant impacts on workers and communities.

The main risks associated with **the construction sector** are as follows:

- **Labour rights violations:** these include forced labour, child labour, unfair wages, discrimination in hiring, hazardous working conditions and lack of protective equipment. The construction sector poses significant risks to workers' health and safety, including accidents and exposure to harmful materials. These risks are often amplified by inadequate safety standards and poor enforcement of regulations. The construction industry often employs large numbers of unskilled workers who may not be aware of their rights or find themselves in positions that make them more vulnerable to the impacts of construction activities, making them more susceptible to exploitation.
- **Gender discrimination among workers:** Women working in the construction sector may face discrimination, including unequal pay, sexual harassment and abuse, and barriers to employment (particularly in positions of responsibility) in this male-dominated field.
- **Involuntary displacement and problems with land rights:** Construction projects such as road rehabilitation and construction can lead to the displacement of communities without adequate compensation or consideration for their resettlement in equivalent conditions. Customary land rights, which complement positive land law, are also insufficiently taken into account in compensation policies for loss of property, AGR or residence. This impacts the economic stability of affected communities as well as the social and cultural fabric.
- **Corruption and lack of transparency:** The construction sector is plagued by corruption, leading to construction practices of lower quality than those required by project owners' specifications, poor allocation of funds, and projects that do not meet the needs or priorities of local communities. Corruption and lack of transparency in the construction sector undermine the right to honest governance, reflecting a violation of the general principles of the Universal Declaration of Human Rights concerning legality and transparency in public administration.
- **Environmental degradation:** Construction projects can cause significant environmental damage, including deforestation, pollution, and habitat destruction, which in turn affects the health and well-being of populations and the rights of local communities to a healthy and sustainable environment.

The main risks associated with **the transport and mobility sector** are as follows:

- **Transport accidents and passenger safety:** Road accidents pose a risk to the human rights to life, health, physical safety and protection from violence. A distinction must be made between road accidents on the one hand and the lack of regulation and safety controls on the other.
- **Precarious working conditions and exploitation of road transport workers:** Road transport workers, such as lorry, bus and taxi drivers, often face precarious working conditions, a lack of social protection and excessive working hours, which violate their right to decent work, social security, health and protection from exploitation. A large proportion of road transport workers, such as taxi drivers and motorcycle taxi drivers, work informally, without employment contracts or social security coverage, making them vulnerable to exploitation and economic insecurity.
- **Discrimination in access to transport and infrastructure:** Access to road transport can be discriminatory due to socio-economic and geographical factors or the vulnerability of the individual (vulnerability being linked to socio-economic, health, political and other factors). People living in remote rural areas have limited access to public transport services, thus excluding them from employment, education and healthcare opportunities. Women, particularly in developing countries, may face additional barriers to accessing public transport, including safety, cost and access issues. Finally, road transport infrastructure is less accessible to vulnerable groups such as people with disabilities or the elderly.
- **Environmental impact and climate change:** The road transport sector is a major source of air pollution and greenhouse gases, which have negative effects on individuals' health and living conditions, thereby affecting their rights to a healthy environment.

9.2.3. Human rights risks inherent in the project's operational context

The initial state of the human environment in the project's area of influence is described in part **Erreur ! Source du renvoi introuvable.** . Analysis of this through the lens of human rights reveals several significant issues relating to the following rights:

- **Right to health:** Access to the right to health in the project area is limited by the insufficient resources of the local health system. In 2022, Guinea had only 0.2 doctors per 10,000 inhabitants, placing the country among those with the lowest density of doctors in the world, alongside Niger. Malaria remains the main cause of medical consultations, highlighting the significant health challenges in the region. The combination of limited financial and material resources and a lack of qualified personnel restricts access to healthcare, particularly for rural communities, which often turn to local traditional healers.

However, the project is expected to contribute to improving people's access to existing health services. By facilitating mobility, particularly for the most isolated villages, the road should reduce the constraints of travelling to healthcare centres, which represents an opportunity for the gradual improvement of the right to health despite the structural limitations of the healthcare system.

- **Right to education:** The project's area of influence presents significant educational challenges. In the primary education sector, the pupil-to-class ratio remains high, with an average of around 50 pupils per class²⁹. Local schools face several difficulties, including a lack of teaching staff and material resources, ageing and dilapidated infrastructure, and a worrying pupil-to-latrine ratio, highlighting shortcomings in sanitary conditions. In 2018-2019, the literacy rate for people over 15 years of age in the Kankan administrative region was 29.3%. As regards secondary education, schools are mainly concentrated in large towns, such as certain sub-prefecture capitals, which is a major obstacle for rural communities. Furthermore, challenges related to the accessibility and availability of educational resources remain important issues to be overcome.

The project is expected to help improve population mobility and reduce the constraints of travelling to schools located in remote areas. Better accessibility could facilitate travel for pupils and teachers and thus, to a certain extent, promote access to education for children in the most isolated villages.

- **Right to food:** The project's area of influence faces several significant challenges in ensuring access to food for all. The majority of households surveyed are engaged in agriculture, and the main food crops, such as rice, cassava and maize, are highly dependent on rainfall cycles and vulnerable to flooding, exposing livelihoods to the risks associated with climate change. The small size of farms and the low level of mechanisation of cropping systems limit productivity and farmers' incomes.

In addition, gold panning is increasingly practised as an alternative to agricultural losses and limited income from other income-generating activities (IGAs), although the benefits are uncertain and the impacts on health, the environment and community well-being remain a concern.

In the livestock sector, reduced grazing areas and limited access to water during the dry season are exacerbating tensions between livestock farmers and crop farmers. Finally, the collection of non-timber forest products (NTFPs), trade and crafts represent an additional or even primary source of income for many households, particularly women and young people, contributing significantly to improving their food security.

Improved mobility linked to the project could facilitate households' access to markets, agricultural inputs and essential services, thereby contributing to a certain extent to strengthening local food security.

- **Women's rights:** In the project area, several obstacles limit women's equal access to resources and opportunities. With regard to land ownership, a small proportion of women own land. In addition, disparities in literacy and education between men and women persist, partly due to socio-cultural factors such as early marriage and teenage pregnancy. Income-generating activities, such as gold panning, offer economic opportunities for women, but they also carry environmental and safety risks, including accidents and gender-based violence, including sexual exploitation and abuse and sexual harassment.

Politically, the dissolution of the National Assembly following the CNRD's rise to power in September 2021 led to a decline in female representation, which stood at around 13% of MPs. The government recently appointed on 13 March 2024 includes 20% female ministers, which, although positive, still reflects the low representation of women in the country's decision-making bodies.

In addition, there are inherent risks in the country that should be mentioned, which are as follows:

²⁹ For primary education, UNESCO tends to recommend a pupil-to-class ratio that promotes an effective learning environment, generally around 30 pupils per class or less.

- **Child labour:** In 2010, Guinea, along with Guinea-Bissau and Burkina Faso, had one of the highest rates of child labour among 5- to 14-year-olds in the sub-region³⁰. Children are mainly employed in sectors such as agriculture, domestic work, trade, construction and as street vendors in markets. However, labour inspectors lack sufficient resources and capacity to carry out regular and effective monitoring in all sectors where child labour may be present, making it difficult to identify and address individual cases.
- **Corruption and lack of transparency:** According to the World Bank's global governance indicators³¹, Guinea ranks relatively low in terms of control of corruption, with a percentile rank of 18.4 in 2022³². Corruption is present in both minor (petty corruption) and major (grand corruption) forms, as well as through the ability of elites and private interests to influence public decisions for their own benefit. This situation has significant negative repercussions, such as additional costs and budget overruns, delays in project implementation, compromised service quality, and disregard for the rights of workers and communities.
- **Right to justice, a fair trial and reparation:** The right to a fair trial is a fundamental principle recognised in the Guinean Constitution and confirmed by the Transition Charter. However, concerns have been raised about arbitrary detentions and conditions that appear not to fully respect this right. There have been reports of arrests followed by treatment that raises questions about legal safeguards. In addition, concerns have been expressed about the transparency and impartiality of certain trials, particularly with regard to past human rights violations. These situations highlight persistent challenges in protecting fundamental rights and respecting judicial procedures.
- **Inhumane conditions of detention:** Concerns have been raised about conditions of detention in some institutions in the country. Reports have documented deaths in detention facilities attributed to extreme heat, highlighting the challenges of managing conditions in overcrowded facilities. In addition, alerts have been issued regarding the treatment of minors in detention, highlighting that some children are imprisoned without trial and find themselves in facilities where detention conditions are particularly difficult, raising serious questions about respect for human rights and international standards on detention^{33,34}.
- **Freedom of association and assembly:** The general ban on all political gatherings in Guinea, except for demonstrations in support of the president, was still in force at the time of writing.
- **Freedom of expression:** Concerns were raised about restrictions on internet access and measures limiting press freedom. There were reports of certain radio stations and television channels being suspended for administrative reasons, raising questions about media freedom and respect for the rights to information. In addition, there have been reports of defamation lawsuits or threats of legal action against individuals who have expressed criticism of the government, raising questions about the protection of freedom of expression and pressure on dissenting voices.

9.3. Assessment of the project's impact on human rights

9.3.1. Assessment of impacts on labour rights

Risks of non-compliance with labour rights could arise during project stages involving significant recruitment of labour and subcontractors. These situations correspond in particular to hiring on construction sites and during the operational phase. The preparation and construction phase will require the employment of 818 workers during the peak period. During the operational phase, the number of workers is expected to be significantly reduced. Although current legislation in Guinea complies with fundamental rights as defined by the ILO, there are still gaps in the practical application of these rights. These shortcomings are mainly

³⁰ ILO, "The dual challenge of child labour and school marginalisation in the ECOWAS region" (2014)

³¹ <https://www.worldbank.org/en/publication/worldwide-governance-indicators>

³³ <https://www.ohchr.org/sites/default/files/documents/countries/guinea/Rapport-situation-mineurs-detention-2024-guinee.pdf>

due to insufficient resources available to the Labour Inspectorate, limiting its ability to carry out effective workplace inspections.

However, QGMI is committed to implementing international best practices and has developed a series of policies aimed at promoting workers' rights: PC-TIC-QGMI-001 – IT Policy Labour, PC-SUS-QGMI-006 – Grievance Mechanism, PC-SUS-QGMI-002 – Environmental, Safety and Health Monitoring, PC-PLA-QGMI-001 Works Management Guide, QGMI's Human Rights Policy, etc.

The table below provides an assessment of the Project's potential impacts on labour rights. The impacts are ranked according to their level of severity.

Table 119 : Project impacts on labour rights

Impact/affected right	Scale	Scope	Irreversibility	Probability	Severity
Right to safe and healthy working conditions	6	2	6	2	Average Score: 144
Non-discrimination, prevention of gender-based violence and pay equity	6	2	6	2	Average Score: 144
Right to effective recourse for workers and subcontractors	4	2	4	2	Low Score: 64
Prohibition of forced and/or child labour	4	2	4	2	Low Score: 64
Right to fair and satisfactory remuneration (level of remuneration, job security)	4	2	2	2	Low Score: 32
Freedom of assembly and trade unions for project workers	4	2	2	2	Low Score: 32

Right to safe and healthy working conditions:

National context: It is important to recognise that the Labour Code has established compulsory health insurance for employees in industry, services and the liberal professions. However, the construction sector presents considerable challenges in terms of occupational health and safety, exacerbated by hazardous working environments, inadequate preventive measures and a lack of adequate protective equipment. The frequent use of contract or outsourced workers increases the risk of health and safety deficiencies. Vulnerable populations, particularly migrants and women, are most at risk of violations of their right to a safe and healthy working environment. This impact is directly related to the Project's activities, as it concerns the workers recruited for its implementation.

Mitigation measures already implemented by QGMI: The company already has a series of internal policies and regulations specifically designed to provide safe and healthy working conditions for employees: Integrated Management System comprising several relevant policies and procedures, including the Human Rights Policy, Human Resources Management Policy, Environment, Health and Safety Guidelines, Ethics Channel Management Procedure, Complaints Management Procedure, and procedures governing the management of third parties and subcontractors. These instruments define the prevention, training, supervision and monitoring measures that apply to all project workers, including those employed by subcontractors.

Impact assessment: The risks to the right to safe and healthy working conditions are significant (6) due to the potentially serious and sometimes irreparable consequences for workers (6). However, the scope of the risk remains limited (2) and, as the company already has internal and external policies in place that comply with international best practices, its probability is low (2), resulting in an overall severity rating of medium.

Non-discrimination, prevention of gender-based violence (GBV) and pay equity:

National context: Guinea has amended its National Gender Policy (PNG) to address disparities between men and women in education, employment, the economy and decision-making bodies. However, in the project area, particularly in rural areas, challenges to women's rights include marked disparities in access to resources and opportunities. Furthermore, women working in the construction sector may face discrimination in the form of wage gaps, sexual harassment and barriers to employment in a traditionally male-dominated sector. Thus, there is a significant risk that workers will be treated unfairly on the basis of certain characteristics, particularly their gender. This may take the form of direct discrimination (unjustified

differential treatment) or indirect discrimination (conditions that, although neutral in appearance, disadvantage certain vulnerable groups).

Mitigation measures already implemented by QGMI: QGMI has a set of tools, including its human rights policy, human capital management policy and ethics channel procedure, which are specifically designed to combat all forms of discrimination, prevent harassment, promote equal treatment and protect people working on its projects, including those employed by subcontractors. A complaints mechanism, with trained staff dedicated to its management, is also available to anyone wishing to file a complaint.

Impact assessment: The risks to the right to non-discrimination, the prevention of GBV and pay equity are significant (6) due to the potentially serious and sometimes irreparable consequences for workers (6). However, the scope of the risk remains limited (2) and, as the company already has internal and external policies in place that comply with international best practices, its probability is low (2), resulting in an overall severity rating of medium.

Right to effective remedy for workers:

National context: According to the US State Department's 2023 Human Rights Report, "the judicial system remains subject to political influence and corruption. Informed observers note that political and social status often influences decisions. Outdated and repressive laws, a shortage of qualified lawyers and judges, nepotism, and ethnic bias limit the effectiveness of the judicial system."³⁵ . The current Guinean judicial system does not guarantee an adequate complaint and redress mechanism for direct and subcontracted workers. In addition, the construction sector is plagued by corruption and a lack of transparency, which increases the vulnerability of workers' right to an effective remedy. Workers, particularly women, with the lowest levels of education face the greatest difficulties in accessing the judicial system, making them more vulnerable to violations of their right to an effective remedy.

Mitigation measures already in place at QGMI: QGMI already has an internal complaint management procedure and an ethics channel in place, which provide for the reporting, handling and protection of complainants, and which can be used to strengthen workers' access to effective remedies within the project.

Impact assessment: The risks to workers' right to an effective remedy are medium (4) due to the tangible and irreparable harm to workers' fundamental freedoms and basic needs (4). However, the scope of the risk remains limited (2) and, as the company is already implementing internal and external policies in line with international best practices, its probability is low (2), resulting in a low overall severity rating.

Prohibition of forced and/or child labour:

National context: Forced and/or child labour is an inherent risk in the country and therefore requires special attention. On construction sites, children or their guardians may make false statements about the child's age in order to obtain employment on construction sites due to financial or family pressures. Construction and demolition companies may unknowingly benefit in their supply chains from the labour of workers who have been trafficked and forced to work, for example, in factories. Women and children may be particularly severely affected in such situations. When child labour is discovered, a company may have a negative impact on other rights if it does not take the best interests of the child into account when determining the appropriate response. For example, simply dismissing the child (or terminating the contract with the supplier concerned) may result in the child having to find other, more dangerous forms of work (such as prostitution).

Mitigation measure already in place at QGMI: QGMI is committed to combating forced labour and child labour and has a human rights policy inspired by the United Nations Guiding Principles on Business and Human Rights and the ILO Declaration on Fundamental Principles and Rights at Work. QGMI therefore rejects all forms of modern slavery and informs its workers of their fundamental rights. The company also ensures that its subcontractors, suppliers and partners comply with the principles of the Universal Declaration of Human Rights.

Impact assessment: The risks relating to forced labour and/or child labour are moderate (4) due to the tangible but remediable infringement of workers' freedoms and fundamental needs (4). However, the scope of the risk remains limited (2) and, as the company is already implementing internal and external policies in line with international best practices, its probability is low (2), resulting in a low overall severity rating.

Right to fair and satisfactory remuneration:

³⁵ <https://freedomhouse.org/country/guinea>

National context: Generally speaking, at the national level, two main factors can compromise this right: job stability and the amount of remuneration. In terms of wages, employees may not receive sufficient income to guarantee a decent standard of living for themselves and their families. The use of subcontractors, who may offer very low wages, represents a specific risk in this area. As for job stability, construction workers are often hired on short-term contracts, which deprives them of the benefits of stable employment. Women, migrants and young people are particularly likely to accept such positions in the absence of better opportunities.

Mitigation measure already implemented by QGMI: The company takes particular care to hire local workers and pay its workers fairly. QGMI emphasises the stability of its teams and prefers to retain, train and develop its workers rather than recruit new ones. QGMI's workforce management guide highlights this principle, as does its human resources policy.

Impact assessment: The risks relating to the right to fair and satisfactory remuneration are medium (4) due to the easily remediable infringement of workers' fundamental freedoms and basic needs (2). The scope of the risk remains limited (2) and, as the company is already implementing internal and external policies in line with international best practices, its probability is low (2), resulting in a low overall severity rating.

Freedom of assembly and trade unions:

National context: It is important to note that challenges have been identified in Guinea with regard to the full enjoyment of the rights of association and assembly, as well as freedom of expression. In this context, the formation of trade unions among project workers and subcontractors could be difficult. It should be noted that when employers do not engage with trade union representatives or do not recognise trade unions, this can disrupt the employer-employee relationship, which can lead to unrest in the workplace and potentially lead to collective action such as strikes.

Mitigation measure already in place by QGMI: In accordance with the United Nations Guiding Principles on Business and Human Rights and the ILO Declaration on Fundamental Principles and Rights at Work, QGMI is committed to respecting the freedom of association, assembly and unionisation of workers if they so wish. QGMI's workforce management guide highlights this principle, as well as the policy of respect for human rights.

Impact assessment: Risks to the right to fair and satisfactory remuneration are medium (4) due to the easily remediable infringement of workers' freedoms and basic needs (2). The scope of the risk remains limited (2) and, as the company already has internal and external policies in place that comply with international best practices, its probability is low (2), resulting in a low overall severity rating.

9.3.1.1. Assessment of impacts on civil and political rights

Risks of civil and political rights violations could arise mainly during project stages requiring intensive consultation with stakeholders. This concern is particularly acute during the preparatory phase, when it is crucial to develop key strategies for managing social and environmental impacts. It remains relevant, albeit to a lesser extent, during the construction and operational phases of the project.

However, QGMI is committed to implementing international best practices and has developed a series of policies aimed at protecting civil and political rights: PC-TIC-QGMI-001 – IT Policy Labour, PC-SUS-QGMI-006 – Grievance Mechanism, PC-SUS-QGMI-002 – Environmental, Safety and Health Monitoring, PC-PLA-QGMI-001 Works Management Guide, QGMI's Human Rights Policy, etc.

The table below provides an assessment of the potential impacts of the Project on civil and political rights, ranked in order of severity.

Table 120 : Project impacts on civil and political rights

Impact/affected right	Scale	Scope	Irreversibility	Probability	Severity
Right to life and security of the person	6	4	4	2	Average Score: 192
Right to effective recourse for all stakeholders	4	4	4	2	Low Score: 128
Right to freedom of expression	4	2	2	2	Low Score: 32
Right to privacy	2	2	2	2	Low

Impact/affected right	Scale	Scope	Irreversibility	Probability	Severity
					Score: 16
Right of access to information	2	2	2	2	Low Score: 16

Right to life and security of the person:

National context: Individuals have the right not to be arbitrarily or unlawfully deprived of their life, a principle that includes protection from physical assault, arbitrary arrest or detention, and risks to health and safety. In the Guinean context, some sources refer to practices that could lead to abuses by the security forces. However, with regard to the project, the likelihood of a situation arising that would require the intervention of security forces, where communities would attack facilities or personnel, remains extremely low. Such a scenario would involve a series of exceptional events, unrelated to the project's activities, and can be considered unlikely.

Mitigation measures already implemented by QGMI: aware of the risks to the safety of its workers, QGMI is committed to implementing best practices in prevention, supervision and worker training. Internal policies on health, safety and incident management have been developed and are being implemented by the company.

Impact assessment: The risks to the right to life and personal safety are high (6) due to the moderately remediable infringement of workers' freedoms and basic needs (4). The scope of the risk remains limited (4) and, as the company is already implementing internal and external policies in line with international best practices, its probability is low (2), resulting in an overall severity rating of medium.

Right to an effective remedy for all stakeholders:

National context: As mentioned in the previous section on labour rights, several reliable sources have highlighted challenges regarding access to justice and the right to a fair trial in Guinea. These reports indicate that the current judicial system has certain limitations that may affect citizens' ability to fully exercise their right to an effective remedy.

Mitigation measure already in place by QGMI: QGMI has already developed a free complaint management mechanism that aims to ensure that all stakeholders, including communities and workers, can file a complaint and/or grievance. QGMI is committed to not disclosing information and to responding to complainants within timeframes that are consistent with international best practices. QGMI is also committed to recruiting CLOs who will be able to communicate with the population, including the most vulnerable, and collect their complaints.

Impact assessment: The risks relating to the right to an effective remedy for all stakeholders are medium (4) due to the moderately remediable infringement of workers' fundamental freedoms and basic needs (4). The scope of the risk remains limited (4) and, as the company is already implementing internal and external policies in line with international best practices, its probability is low (2), resulting in a low overall severity rating.

Right to freedom of expression:

National context: Challenges have been identified in Guinea with regard to the right to freedom of expression, particularly with regard to the ability to express opinions without external interference. Journalists and media professionals, as well as some members of political parties, face obstacles such as difficulties in accessing information, precarious working conditions and the risk of arbitrary detention. In this context, it is possible that certain actors may be limited in their ability to express themselves publicly, that content may be censored at the request of the authorities, and that legal action may be taken against individuals or groups who have voiced criticism, particularly when resources for defending oneself in court are unevenly distributed.

Mitigation measures already implemented by QGMI: In accordance with the United Nations Guiding Principles on Business and Human Rights and the ILO Declaration on Fundamental Principles and Rights at Work, QGMI is committed to upholding the freedom of expression of its workers through its human rights policy.

Impact assessment: The risks relating to the right to freedom of expression for all stakeholders are medium (4) due to the easily remediable infringement of workers' freedoms and fundamental needs (2). The scope of the risk remains limited (2) and, as the company already has internal and external policies in place that comply with international best practices, its probability is low (2), resulting in a low overall severity rating.

Right to privacy:

National context: During the pre-construction and construction phases, the project could infringe on the privacy rights of members of local communities and other individuals involved in the project, as well as individuals employed directly or indirectly (including employees of contractors, third parties and the supply chain), if the personal data held on these rights holders is not adequately protected and managed confidentially. Poor management of personal data could lead to a data breach and potentially the destruction, loss, alteration, unauthorised disclosure or unauthorised access to such data. This impact could also occur during the operational phase, affecting individuals employed to carry out project-related maintenance activities.

Mitigation measures already implemented by QGMI: QGMI is committed to not disclosing its workers' data and has developed an ethical investigation policy to this effect.

Impact assessment: The risks to the privacy rights of all stakeholders are low (2) due to the easily remediable infringement of workers' fundamental freedoms and basic needs (2). The scope of the risk remains limited (2) and, as the company already has internal and external policies in place that comply with international best practices, its probability is low (2), resulting in a low overall severity rating.

Right of access to information:

National context: This right is a fundamental element of the right to freedom of expression and plays a crucial role in the right to participation. It could be compromised if the studies carried out mainly during the preparatory phase are not adequately shared with rights holders (in a timely, accessible, appropriate and sufficient manner).

Mitigation measure already in place by QGMI: Through its workforce management manual and human rights policy, QGMI is committed to informing and consulting its employees, in particular through a CLO recruited for this purpose.

Impact assessment: The risks to the right to privacy for all stakeholders are low (2) due to the easily remediable infringement of workers' fundamental freedoms and basic needs (2). The scope of the risk remains limited (2) and, as the company is already implementing internal and external policies in line with international best practices, its probability is low (2), resulting in a low overall severity rating.

9.3.1.2. Assessment of impacts on economic, social and cultural rights

The risks of violating economic, social and cultural rights could mainly arise from two aspects of the project: the process of land acquisition/restriction during the preparation phase, and the migration and displacement of populations, whether voluntary or forced, throughout the implementation of the project.

The displacement caused by these land acquisitions (permanent or temporary) and restrictions on land use will be mainly economic, although several households may also be resettled.

In terms of the scale of anticipated migration, land acquisition or restrictions by the Project could lead to the economic resettlement of a significant number of people, without however affecting the local demographic structure in a lasting way, as these economic displacements will take place at the local or district level. The construction phase, with its recruitment process, is expected to attract candidates from other regions of Guinea to the Project site, leading to the establishment of non-local workers.

However, QGMI is committed to implementing international best practices and has developed a series of policies aimed at protecting economic, social and cultural rights: PC-TIC-QGMI-001 – IT Labour Policy, PC-SUS-QGMI-006 – Grievance Mechanism, PC-SUS-QGMI-002 – Environmental, Safety and Health Monitoring, PC-PLA-QGMI-001 Works Management Guide, QGMI's Human Rights Policy, etc.

The table below provides an assessment of the severity of the Project's potential impacts on economic, social and cultural rights.

Table121 : Project impacts on economic, social and cultural rights

Impact/affected right	Scale	Scope	Irreversibility	Probability	Severity
Property rights	2	4	2	2	Low Score: 32
Right to health	2	4	2	2	Low Score: 32
Right to adequate housing	2	4	2	2	Low Score: 32
Right to food	2	4	2	2	Low Score: 32
Right to participate in the cultural life of the community	2	2	2	2	Low Score: 16

Property rights:

National context: The main difficulty that should be noted here concerns the nature of the property rights in question. Guinea's legal framework includes a procedure for expropriation for public use that meets certain international requirements. However, Guinea's requirements allow for the protection of formally held property rights. However, as the populations concerned live in rural areas, property rights are mainly customary and informal, and held either by individuals or communities. In the case of informal or customary property titles, the protection afforded by Guinean law is minimal or even non-existent.

The project could infringe on the property rights of individuals and households who are physically displaced (if applicable) during the pre-construction phase if the land acquisition and resettlement process is conducted in an arbitrary or unfair manner, resulting in a violation of individuals' rights to own and use their property.

The project could also infringe on the right to an adequate standard of living of individuals and households physically and/or economically displaced (if applicable) during the pre-construction phase if the impacts related to physical and/or economic displacement are insufficiently mitigated or poorly managed.

Mitigation measures already in place by QGMI: Through the implementation of its human rights policy, QGMI is committed to respecting all human rights, including the right to property. QGMI's guidelines on environmental, health and safety monitoring also already take into account the risk of involuntary resettlement.

Impact assessment: The risks to the property rights of all stakeholders are low (2) due to the easily remediable infringement of workers' fundamental freedoms and basic needs (2). The scope of the risk remains limited (4) and, as the company already has internal and external policies in place that comply with international best practices, its probability is low (2), resulting in a low overall severity rating.

Right to health:

National context: The project poses a risk of infringing on the right to health, exacerbating existing health problems and reducing access to care in an area already facing an under-resourced health system. The arrival of migrant workers could harm the health of local communities by increasing the risk of transmission of STIs/STDs/HIV-AIDS and the occurrence of early or unwanted pregnancies, or through risky interactions between workers and the local population. This situation could also lead to an increase in GBV/EAS-HS/VCE. In addition, the significant construction activities required for the project will generate environmental nuisances that will affect both workers and neighbouring communities, with negative health consequences (risk of road accidents, nuisances due to noise, dust, vibrations, etc.).

Mitigation measures already implemented by QGMI: the health and safety of workers and communities is one of the company's priorities. This concern is reflected in all of QGMI's policy, its integrated management manual, its workforce management guide and its human resources policy.

Impact assessment: The risks to the right to health for all stakeholders are low (2) due to the easily remediable infringement of workers' fundamental freedoms and basic needs (2). The scope of the risk remains limited (4) and, as the company is already implementing internal and external policies in line with international best practices, its probability is low (2), resulting in a low overall severity rating.

Right to adequate housing:

National context: The project will result in the involuntary displacement of several households. Regardless of the quality and type of housing these individuals currently have, their right to housing must be respected

during the resettlement process. Therefore, housing provided to physically displaced persons must be available, accessible, adequate and of good quality. This consideration is particularly crucial for certain households that may have already experienced a deterioration in their living conditions as a result of previous involuntary resettlement. Another group requiring specific attention is women, who may face discrimination in relation to their legal rights to land and property due to cultural, religious or social norms, as well as their status in the context of marriage, divorce or as victims of domestic violence.

Mitigation measures already in place by QGMI: Through the implementation of its human rights policy, QGMI is committed to respecting all human rights, including the right to adequate housing. QGMI's guidelines on environmental, health and safety monitoring also already take into account the risk of involuntary resettlement.

Impact assessment: The risks to the right to adequate housing for all stakeholders are low (2) due to the easily remediable infringement of workers' fundamental freedoms and basic needs (2). The scope of the risk remains limited (4) and, as the company already has internal and external policies in place that comply with international best practices, its probability is low (2), resulting in a low overall severity rating.

Right to food:

Context: The project will potentially disrupt the use of hectares of land currently used mainly for agriculture, NTFP and fuelwood collection, and livestock farming. It is important to note that the project's indirect area of influence already faces challenges in ensuring the right to food, given the low productivity of farms and livestock.

Mitigation measures already implemented by QGMI: Through the implementation of its human rights policy, QGMI is committed to respecting all human rights, including the right to food. QGMI's guidelines on environmental, health and safety monitoring also already take into account the risk of involuntary resettlement and loss of livelihoods.

Impact assessment: The risks to the right to food for all stakeholders are low (2) due to the easily remediable infringement of workers' fundamental freedoms and basic needs (2). The scope of the risk remains limited (4) and, as the company already has internal and external policies in place that comply with international best practices, its probability is low (2), resulting in a low overall severity rating.

Right to participate in the cultural life of the community:

Context: The project area is likely to be home to several active cultural sites within the local communities. These sites could be significantly disrupted by the project and in some cases may need to be relocated or destroyed. The project therefore risks affecting the communities' right to participate in cultural life by causing the displacement or destruction of cultural sites that are important to local populations. This impact could potentially affect elements of local history and cosmogony (genie sites, fetishes) and disrupt the communities' right and ability to practise their culture, religion or spirituality.

Mitigation measures already implemented by QGMI: Through the implementation of its cultural heritage management policy, QGMI is already committed to identifying, protecting and promoting cultural sites (tangible and intangible). QGMI's guidelines on environmental, health and safety monitoring also already take this risk into account.

Impact assessment: The risks to the right to participate in the cultural life of the community for all stakeholders are low (2) due to the easily remediable infringement of workers' fundamental freedoms and basic needs (2). The scope of the risk remains limited (4) and, as the company is already implementing internal and external policies in line with international best practices, its probability is low (2), resulting in a low overall severity rating.

9.3.2. Consideration of the management of the Project's impacts on human rights in the ESMP

The management of human rights impacts is taken into account in the social impact management plans already established in the ESMP. This should ensure that the human rights-based approach is implemented in the management of the project's environmental and social impacts. No impacts requiring further in-depth studies or the development of a specific management plan have been identified.

The main mitigation measures, already taken into account in the various plans proposed in the ESMP, are summarised in the table below:

Table 122 : Main mitigation measures concerning the project's impacts on human rights

#	Potential Risk to Scoped-In Human Rights, Including Identification of Affected Rights-Holders	Reference to Relevant QGMI Documentation on Management	Key mitigation measure	Probability	Scale	Scope	Irremediability	Severity
Labour law								
1	Right to safe and healthy working conditions	PC-TIC-QGMI-001 – IT Policy Labour, PC-SUS-QGMI-006 – Grievance Mechanism, PC-SUS-QGMI-002 – Environmental, Safety and Health Monitoring, PC-PLA-QGMI-001 Works Management Guide, QGMI's Human Rights Policy	1- Implementation of a comprehensive Health & Safety Plan (HSP) including: risk analysis, safe working procedures, continuous supervision, work permits, machinery and traffic management. 2- Systematic provision of PPE and monitoring of effective use: helmets, vests, safety footwear, respiratory protection, etc., with graduated penalties and daily monitoring. 3- Mandatory HSE training for all personnel (including subcontractors) on working at height, machinery, defensive driving, hazardous materials management, first aid.	2	6	2	6	144



2 Non-discrimination, prevention of GBV and pay equity		1- Zero tolerance policy against GBV + regular awareness-raising: monthly meetings for workers/communities; trained referral team. 2- Transparent hiring procedure: public pay scales, objective recruitment criteria, prohibition of discrimination. 3- Gender-sensitive complaint mechanism: confidential channels, female staff, rapid resolution, no reprisals.	2	6	2	6	144
3 Right to effective recourse for workers and subcontractors		1- Establishment of an accessible, anonymous, free, on-site complaint management mechanism (CMM) available in local languages. 2- Contractual obligation for subcontractors to use the CMM, regular checks, social audits, penalties for non-compliance. 3- Maintenance of a complaints register and quarterly analysis, identification of trends, corrective actions, public project report.	2	4	2	4	64

4 Prohibition of forced and/or child labour		1- Strict verification of the age of all workers: ID checks, prohibition of under-18s in hazardous jobs. 2- Systematic audit of subcontractors' working conditions and particular attention to informal work, late payment, and withholding of documents. 3- Contractual clause prohibiting all forms of forced labour, formal prohibition on withholding identity documents or creating coercive debts.	2 4 2 4 64

5 Right to fair and satisfactory remuneration (level of remuneration, job security)		1- Salary scale in accordance with the Guinean Labour Code and IFC standards: display of salary levels and bonuses; equal pay for equal work. 2- Regular and traceable payment: monthly pay slips, payments by mobile money or bank, reliable attendance register. 3- Formalisation of contracts: written contracts for all, including day labourers and subcontractors; clauses on job security and notice periods.	2	4	2	2	32
6 Freedom of assembly and trade unions for project workers		1-Formal recognition of existing trade unions: access to the site for representatives, authorised meetings, display of contact details. 2-Free elections of worker representatives, voting monitored by observers; regular meetings between the workers' committee and management. 3- Policy prohibiting reprisals, right to organise freely, no sanctions for union participation.	2	4	2	2	32
Civil and political rights							

7	Right to life and security of the person	PC-TIC-QGMI-001 – IT Policy Labour, PC-SUS-QGMI-006 – Grievance Mechanism, PC-SUS-QGMI-002 – Environmental, Safety and Health Monitoring, PC-PLA-QGMI-001 Works Management Guide, QGMI's Human Rights Policy	1- Strict management of construction site risks: traffic management plan (TMP) to protect local residents and users, appropriate signage, speed limits, safe pedestrian crossing areas 2- System for monitoring violence and abuse in the project area: mandatory code of conduct for all workers, sanctions in the event of abuse, assault or threats, awareness-raising among workers and communities 3- Emergency response plan: teams trained in first aid, emergency equipment available (ambulance, first aid kits), clear procedures in the event of an accident or threat to people	2	6	4	4	192

8	Right to an effective remedy for all stakeholders	1-Establishment of a community complaint management mechanism (CMM) accessible to women, young people and vulnerable individuals, with multiple channels: mailboxes, hotline, WhatsApp, local mediators 2- Independent mediation: support from a joint committee (project + local authorities + community representatives), role of local leaders in facilitating conflict resolution 3- Transparent monitoring of complaints: public register (without personal data) of complaints and resolutions, monthly report shared with communities, guaranteed maximum resolution time (e.g. 30 days)	2	4	4	4	128

9	Right to freedom of expression	1- Guarantee an environment free from reprisals: formal prohibition of intimidation or sanctions against persons expressing concerns, code of conduct including "zero reprisals" 2- Regular spaces for dialogue: monthly meetings with communities, participation of specific groups (women, young people, farmers), possibility to ask questions anonymously 3- Accessible channels of expression: dedicated telephone line, suggestion boxes in villages, community representatives speaking local languages	2	4	2	2		32

10	Right to privacy	1- Personal data management policy: information collected limited to what is strictly necessary, informed consent, secure data storage 2- Confidentiality in the handling of complaints: anonymisation, specially trained staff, confidential process for GBV or sensitive conflicts 3- Regulation of surveillance and images: prohibition on filming/photographing households without authorisation, training of security personnel, strictly professional use of drones/cameras	2	2	2	2	16

11	Right of access to information	1- Proactive transparency: dissemination of key project information: schedule, impacts, works, risks, measures, display in public places (town halls, markets), local radio messages 2- Information tailored to community needs: documents in local languages (Soussou, Malinké, Fulani depending on the area), accessible formats: audio, diagrams, simple videos, information sessions in each affected village 3- Continuous and updated information: monthly project bulletins, transparent communication in the event of delays, route changes or impacts, regular updates to the environmental and social management plan (ESMP)	2	2	2	2	16

Economic, social and cultural rights

12	Right to property	PC-TIC-QGMI-001 – IT Policy Labour, PC-SUS-QGMI-006 – Grievance Mechanism, PC-SUS-QGMI-002 – Environmental, Safety and Health Monitoring, PC-PLA-QGMI-001 Works Management Guide, QGMI's Human Rights Policy	1- Fair and transparent compensation procedure: independent assessment of affected assets (land, crops, fences), use of official scales or local market prices, compensation before taking possession of the land 2- Land acquisition plan complying with international standards: clear identification of owners, users, women and vulnerable groups, written documentation provided to each affected household, appeal mechanism in case of disagreement 3- Prevention of indirect impacts on properties: physical demarcation of construction sites, control of vehicle access to prevent damage to houses and crops, rapid repair procedure in the event of accidental damage	2	2	4	2	32



13	Right to health	1- Reduction of risks related to dust, noise and pollution: watering of tracks, limiting night-time work, regular maintenance of machinery 2- Raising community awareness of health risks: campaigns on construction site risks, HIV/STIs, GBV, accidents, sessions tailored to women and young people 3- Improved access to care in the event of an incident: first aid stations on site, medical evacuation procedures, partnerships with local health centres	2	2	4	2	32

14	Right to adequate housing	1- Prevention of destruction or damage to homes: accurate mapping of houses, physical barriers around risk areas, prohibition of unescorted vehicles in the vicinity 2- Full compensation in the event of displacement: equivalent or better replacement housing, relocation assistance (transport, reconstruction), compensation taking into account local materials and labour 3- Social support for displaced households: post-displacement follow-up (income, stability, vulnerability), specific measures for female heads of households, integration of households into local public services and social networks	2	2	4	2	32

15	Right to food	1- Minimisation of impacts on agricultural land and crops: adaptation of the route where possible, barriers to protect crops during works, immediate repair in the event of unintentional destruction 2: Compensation for agricultural losses, assessment by local agronomists, compensation based on market value + loss of earnings, technical assistance for replanting or rehabilitating land 3- Maintaining access to land and food resources: construction of alternative access tracks, securing livestock passages, reduction of temporary closures related to works	2	2	4	2	32

16	Right to participate in the cultural life of the community	1- Preservation of tangible and intangible cultural heritage: identification of sacred sites, cultural sites, cemeteries, systematic avoidance during route planning, physical protection during works 2- Procedure for "fortuitous discovery", training of workers, immediate halt to works in the event of discovery, rapid intervention by cultural authorities 3- Maintaining access to cultural and religious sites: traffic management plan providing for alternative routes, adapted work schedules to allow for ceremonies, consultation with religious and cultural leaders in planning	2	2	2	2	16



10. Assessment of residual impacts and negative impacts as well as specific measures to reduce greenhouse gases and adapt to climate change

During the approximately 10,000 years of human civilization, the Earth's climate has been exceptionally stable. Global temperatures and sea levels have remained virtually unchanged. Humans have taken advantage of this to cultivate crops, build cities, and develop a global economy. This period of stability has been coming to an end in recent years due to greenhouse gases emitted into the atmosphere by human activities. Small changes in global temperature correspond to large changes in the global climate.

Given this context, and in accordance with international and Guinean regulations, it is necessary to assess the risks of climate change in the context of development projects. A risk assessment asks the following questions: "What could happen?" and "How serious would it be?"

Climate change meets the definition of a risk because it is likely to adversely affect human interests and because many of its consequences are uncertain. We do not know exactly how fast or how much the climate will warm, and we cannot accurately predict the multitude of associated changes that will occur. We can only make assumptions and predictions.

10.1. National context

The Republic of Guinea is facing the increasingly severe adverse effects of climate change. The country is subject to unstable climatic hazards that have negative effects on natural resources, ecosystems, socio-economic infrastructure, and human health. In response to climate risks that could threaten the survival of humanity, the United Nations Framework Convention on Climate Change (UNFCCC) is committed to working toward a sustainable development policy based on effective climate governance that promotes the rational use of natural resources. In response to this call, the Guinean government has established a proactive governance framework that aims to make the fight against climate change a strategic focus of its development plan.

10.2. Current natural hazards

A regional assessment of risk levels for major natural hazards was carried out using the ThinkHazard! tool (updated in June 2020). This tool was designed to take disaster risk into account in new development projects. It was developed in partnership with the World Bank, the Bureau de Recherches Géologiques et Minières (BRGM) and various donors.

It should be noted that Siguiri faces higher risks of urban flooding (higher flow rates, as it is downstream from the confluence of several rivers) and water shortages (warmer region with lower rainfall).

Table 123. Assessment by prefecture crossed by the project

Risk	Assessment for Kouroussa	Assessment for Siguiri
Flood	High	High
Urban flooding	Low	Moderate
Water scarcity	Very low	Moderate
Extreme heat	Moderate	Moderate
Forest fire	High	High
Landslide	Very low	Very low
Earthquake	Very low	Very low
Volcanic eruption	No data	No data

Cyclone	No data	No data
Dangerous animals ¹	Certain risks associated with the presence of species that, through their bite or sting, may pose a risk to people	Certain risks associated with the presence of species that, through their bites or stings, may pose a risk to people

10.3. Developments related to climate change

The data below is generally taken from the *Second National Communication to the United Nations Framework Convention on Climate Change* (Guinea Ministry of Environment, Water, and Forests, 2018).

10.3.1. Temperature trends

As with the rest of the world, models predict an increase in the average annual temperature in Guinea. The road is located in the region referred to as the Northeast in the MEEF publication cited above. This region will generally see the most pronounced temperature changes in Guinea compared to the 1961-1990 average (Table 124), with forecasts of average annual temperature increases for 2050 ranging from 0.8 to 3.3 °C and for 2100 ranging from 0.9 to 4.4 °C.

Table 124 . Results of the simulation of the three scenarios projected for 2010-2100 (MEEF, 2018)

Paramètres	Années	2010			2025			2050			2100		
	Scénarios	1,5°C	2,5°C	4,5°C	1,5°C	2,5°C	4,5°C	1,5°C	2,5°C	4,5°C	1,5°C	2,5°C	4,5°C
Température (°C)	Sud-Ouest	0,3	0,5	1,3	0,7	1,3	1,7	0,7	1,6	2,7	1,2	1,7	3,3
	Nord-Ouest	0,4	0,6	1,5	0,7	1,5	2,1	0,7	1,5	3,2	0,9	1,6	3,7
	Zone Nord	0,4	0,5	1,5	0,7	1,5	2,1	1,4	1,4	3,3	1,1	1,9	3,4
	Nord-Est	0,4	0,5	1,5	0,7	1,5	2,3	0,8	1,6	3,3	0,9	2,5	4,4
	Sud-Est	0,3	0,4	1,3	0,7	1,3	1,8	0,7	1,6	2,7	0,7	1,6	2,7
	Sud	0,4	0,4	1,3	0,6	1,3	1,9	0,6	1,3	2,4	0,7	1,3	3,5
	Sud-Ouest	-0,8	-1,2	-2,3	-3	-6,5	-9,8	-3,7	-10,1	-16,6	-7,5	-15,7	-25,4
Précipitation (%)	Nord-Ouest	-1,3	-2,1	-4,1	-3,7	-7,1	-13,3	-5,6	-13,4	-20,1	-8	-15,5	-27
	Nord	-1,5	-3,3	-4,1	-3,4	-7,2	-12,1	-6,3	-12,1	-15,9	-8,4	-16,9	-28,1
	Nord-Est	-1,3	-2,5	-2,3	-2,8	-8,3	-12,1	-6,3	-12,8	-20,4	-6,4	-17,8	-30
	Sud-Est	-0,7	-1,2	-2	-2	-4	-4,9	-3,3	-6,9	-11,1	-4,5	-10,3	-18,8
	Sud	-0,7	-1,1	-2,1	-2,3	-6	-8	-2,4	-9,4	-17,2	-4,3	-14,3	-23,4
	Sud-Ouest	-0,8	-1,2	-2,3	-3	-6,5	-9,8	-3,7	-10,1	-16,6	-7,5	-15,7	-25,4
Élévations du Niveau de la mer	Scénario	1,5°C	2,5°C	4,5°C	1,5°C	2,5°C	4,5°C	1,5°C	2,5°C	4,5°C	1,5°C	2,5°C	4,5°C
	Toutes les zones	0,28	0,581	1,174	0,508	1,035	2,116	0,875	1,801	3,733	1,555	3,252	6,913

10.3.2. Changes in precipitation

Modeling indicates that precipitation in Guinea will decrease overall. As with temperature, the northeast will be the area of Guinea with the most significant changes. The models indicate a decrease in precipitation compared to the 1961-1990 average, ranging from -6.3% to -20.4% for 2050 and from -6.4% to -30% for 2100.

10.3.3. Changes in Niger River flows

Changes in river flow in the Niger basin in Guinea, predicted based on the temperature and precipitation data described above, are illustrated on the web Table128 . The three scenarios used predict significant decreases in river flow. For Kouroussa, for example, the predicted flow for 2100 will range from 76% (scenario 1.5 °C) to only 38% (scenario 4.5 °C) of the recent historical average flow (Figure63). The change is even more pronounced for Siguiri.

Table125. Predicted average annual flows at different time scales in m³/s for the Niger basin in Guinea (MEEF, 2018)

Station	Average flows	Time frames										
		2010	2015	2020	2025	2030	2035	2040	2045	2050	2070	2100
		Sensitivity 1.5°C										
Kouroussa	222	222	219	217	214	207	204	198	196	188	177	170
Siguiri	992	823	814	806	795	767	753	728	721	688	644	615
Kankan	176	172	171	171	170	167	166	164	163	160	156	154
Sensitivity 2.5°C												
Kouroussa	222	219	216	208	198	195	190	182	178	167	154	131
Siguiri	992	812	800	770	728	715	698	663	646	602	552	454
Kankan	176	171	170	167	164	163	161	158	157	153	148	140
Sensitivity 4.5°C												
Kouroussa	222	217	214	207	197	191	183	171	159	143	121	85
Siguiri	992	805	792	767	725	699	670	619	571	505	417	269
Kankan	176	170	169	167	164	161	159	154	150	144	136	123

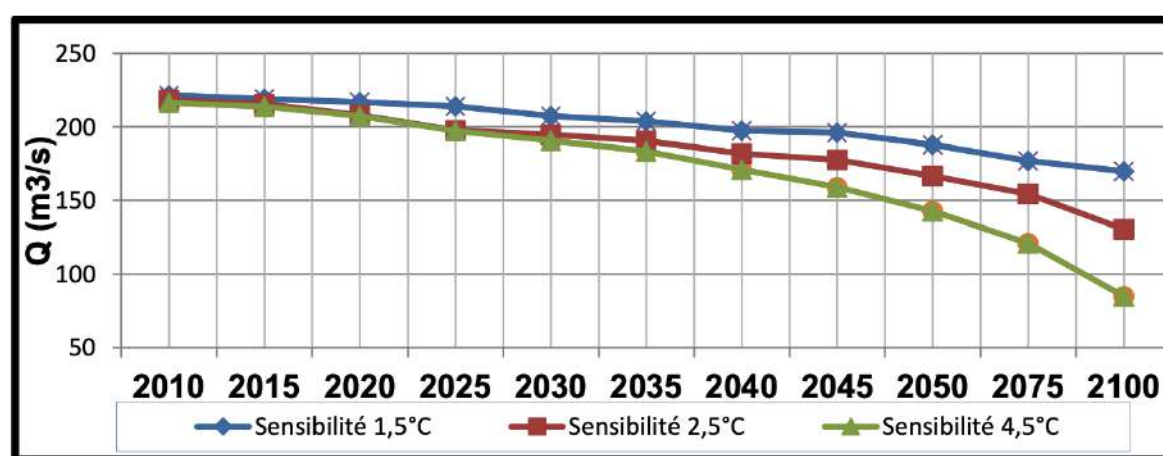


Figure63 . Projected flows of the Niger River at the Kouroussa hydrometric station (MEEF, 2018)

10.4. Climate change risks to the project

10.4.1. High temperatures and asphalt

The increase in average temperature and the risk of extreme weather events may have an impact on bitumen, for example causing deformation of the road surface and emissions of volatile organic compounds. Project engineers will need to take these issues into account when selecting the bitumen.

10.4.2. Water resources

Rising temperatures and declining precipitation will have a pronounced effect on water resources, leading to a series of impacts (Table 126). The decline in water resource availability could have an impact on road maintenance measures.

Table 126. Impacts of climate change on water resources (MEEF, 2018)

Impacts	Expected impacts
Environmental impacts	- Drying up of small waterways during dry periods; - Pronounced low water levels in large rivers; - High frequency of land flooding; - Decreased availability of water resources; - Decline in water quality/pollution; - Changes in the hydrological regime of waterways, which become irregular due to seasonal variations in rainfall; - Decline in groundwater levels; - Decreased soil moisture; - Drying up of flooded areas; - Alarming degradation of vegetation cover; - Soil degradation; - Degradation of terrestrial biodiversity; - Degradation of wetland biodiversity; Increase in forest fires; - Savannization of forest formations in southern regions.
Socio-economic impacts	- Reduction in flooded crop areas due to the drying up of plains; - Disruption of the agricultural calendar; - Significant decline in crop yields; - Decrease in population income; - Rural exodus to urban centers.

10.4.3. Flood risks

Modeling results show a significant decrease in flow rates by 2100. One might think that this would reduce the risk of flooding from the various rivers that cross the region. However, as has been demonstrated around the world, the number and severity of extreme weather events appear to be increasing, which had been predicted as one of the effects of global warming. Therefore, when designing bridges and culverts, it is important not to rely solely on a decrease in average flow, but to maintain high safety margins.

10.4.4. Fire risks

Modeled climate projections indicate a likely increase in the frequency of fire-prone weather conditions in the region in the future, including higher temperatures and lower rainfall. In areas already exposed to fire risk, the length of the fire season is likely to increase, as is the number of days when weather conditions could favor the spread of fire due to longer periods without rain. Climate projections also indicate that the severity of fires could increase. This could have an impact on road maintenance and even damage the road itself.

10.4.5. Project vulnerability to climate change

In conclusion, based on the available technical information on the project and the climate projections, it is likely that the project will not be very vulnerable to climate change. However, there is a possibility that rising temperatures and declining precipitation could have an impact. However, the project includes both structural and functional adaptation measures (use of equipment that is more resistant to flooding, high



temperatures, and fires) to anticipate the risks associated with climate change and ensure the project's resilience.



10.5. Project impacts on climate change

This aspect is addressed in section 8.2.2.2. Over a 40-year lifetime, the project's GHG emissions are estimated at 2,000-3,000 tons of CO₂eq/year. This will have no impact on the climate change that Guinea may experience over the next 70 years. The project will account for less than 0.09% of the country's annual CO₂ emissions.

10.6. Project adaptation measures to climate change

The following measures are proposed so that technical teams can take into account the risks posed by climate change in the project design. These are structural adaptation measures.

Table 127. Proposed structural adaptation measures to climate change

Climate variable	Impacts on project components	Potential resilience adaptation measures
Access road to the quarry and temporary roads		
Temperature	Increased dust on unpaved access roads.	Road surfacing Dust suppression efforts
Precipitation	Lack of water for dust control	Plan not to take water from small streams and wells. Consider other means of dust reduction.
RN32		
Temperature	Expansion/contraction of asphalt causing unevenness in the road surface. Volatile organic compound emissions.	Selection of appropriate roofing materials.
Precipitation	Lack of water for maintenance measures	Plan not to take water from small streams and wells. Consider other means of maintenance that require little or no water.
Bridges and culverts		
Flow rates	Despite a likely significant reduction in flow rates, the risk of flooding is not reduced given the increase in extreme weather events.	Carefully consider the increase in extreme weather events when designing bridges and culverts.

10.7. Improvement measures

The site rehabilitation and revegetation plan described in section 15 will be implemented at the end of the construction phase. This plan will have a dual purpose: both ecological, for biodiversity and habitat restoration, and beneficial to the physical environment by (i) limiting soil erodibility and (ii) reducing the project's carbon footprint.

Based on habitat mapping and of the final project footprint , the areas to be rehabilitated/revegetated can be calculated in order to estimate the annual CO₂storage once the sites have been restored after construction.

It should also be noted that growing vegetation stores more carbon than mature or declining vegetation: plants in full growth capture carbon at a high rate for their development. The effect will therefore be particularly beneficial in the early years.

This measure will reduce the impact on the physical (particularly GHG emissions) and biological environment.

10.8. Monitoring and evaluation

It is recommended to monitor GHG emission reduction measures (even if they will not have a major impact on climate change), as well as to monitor and evaluate the project's adaptation measures validated by the design team and the project owner. The key to this phase is to agree on a set of "trigger indicators" in order to review and update the climate risk.

Monitoring, evaluation, and reporting allow the project's level of resilience to be tracked and adaptive management to be integrated in response to new developments and information related to climate change. The establishment of monitoring and evaluation frameworks also aims to ensure accountability and feedback from lessons learned, guiding future adaptation efforts.

However, it should be borne in mind that climate resilience performance must be assessed over a relatively long time scale given climate variability. "Bad years" do not necessarily require a thorough review of design options or resilience measures.

Monitoring GHG emission reduction measures

Table128 : Monitoring GHG emission reduction measures

Measure	Monitoring indicator	Monitoring location	Monitoring method	Monitoring frequency	Responsibility for monitoring	Cost of monitoring
Use of serviced vehicles	Number of vehicles in good condition	Project area (during construction and operation)	Surprise vehicle audit	Monthly	Project manager then project owner	1,000 euros per month
Use of energy-efficient technologies	Number of LED lights installed and home automation systems	Buildings	Audit at the start of the construction phase Audit before the end of the construction phase	Twice	Project manager and project owner	1,500
Limited clearing and deforestation around buildings, structures, the RN32 highway, and access roads	Preserved vegetation area	Buildings, RN32, access roads, irrigation area	Mapping of areas to be cleared/deforested and preserved	At the start of the project	Project manager	2,000 euros
Waste reduction	Amount of waste	Construction site area	Report	Monthly	Project manager	1,000 euros per month during the

						construction phase
Building insulation	Use/consumption of air conditioning	Buildings	Consumption report	Quarterly for the ^{first} year	Project owner	4,000 euros
Greening	Replanted area	Operating site	Revegetation report	Once, at the start of the operational phase	Project owner	1,500 euros

Monitoring climate change resilience

A climate resilience monitoring plan must be developed and linked to the project's operation and maintenance plan.

Climate risk assessment and reassessment

It is sometimes necessary to reassess and update climate risk management plans. The following triggers may prompt a more in-depth reassessment:

- significant long-term changes in climate change forecasts or trends, such as new scientific evidence,
- an unexpected new event or sequence of events related to climate or natural hazards (e.g., a major climate event that may impact the original assumptions).

11. Risk and accident assessment

When a project (new or existing) risks emitting toxic, hazardous, flammable or explosive substances, or when operations associated with the project risk causing injury to personnel involved in the construction site (road and quarry) or to the public, as indicated in the environmental and social assessment, the client must carry out an analysis of the hazards posed by its facilities (NP1 § 12 NO 29).

Take measures to prevent accidents, injuries and illnesses resulting from work, associated with work or occurring in the course of work by minimising the causes of these hazards as far as reasonably possible (NP2 § 23).

As part of this RN32 national road rehabilitation project, QGMI is responsible for ensuring the health and safety of workers and local communities around the road, as well as the borrow pit, while limiting risks to the environment. Measures relating to health and safety at work will therefore be implemented in accordance with international and national best practices in this area. These are procedures that QGMI teams have mastered thanks to the company's extensive experience in this area. As a reminder, these measures aim to protect project workers from accidents, illnesses or impacts resulting from exposure to hazards encountered in the workplace or in the course of their duties.

The employer has an obligation and a duty to organize health and safety at work

This chapter first presents the basis for the future health and safety plan for the project that QGMI will implement during the phase construction preparation, followed by an assessment of the main environmental risks and climate change

11.1. Basis of the future health and safety plan, risk management project

11.1.1. Health and safety management system

Occupational health and safety measures aim to protect project workers from accidents, illnesses or impacts resulting from exposure to hazards encountered in the workplace or in the course of their duties. The employer has an obligation and a duty to organize health and safety at work.

Section 231.2 of the Labour Code: "To protect the life and health of employees, the employer is required to take all necessary measures that are appropriate to the operating conditions of the business."

The implementation of an occupational health and safety management system provides a means of fulfilling this obligation.

Various standards/reference frameworks such as ILO-OSH 2001, OHSAS-18001 and ISO 45001 encourage the implementation of a systematic, "circular" approach to improving the management of risks and effects related to employment and working conditions in the context of projects.

It should be noted that Guinea is a signatory to Convention C187, "Convention concerning the Promotional Framework for Occupational Safety and Health," and Convention C176, "Convention concerning Safety and Health in Mines," of the International Labour Organisation.

Occupational health and safety measures are designed and implemented to address the following issues:

- identification of potential hazards to workers
- implementation of prevention and protection measures;
- training of project workers;
- recording of occupational accidents, illnesses and incidents
- emergency prevention and preparedness measures.

The process should follow the following framework, or any framework that allows for an equivalent circular approach:

- Commitment:
 - Identification of triggering factors (new project, serious accident, etc.)
 - Launch of the process by management (health and safety policy signed by management)
- Planning:
 - Initial hazard assessment
 - Risk prioritisation
 - Identification of legal or imposed requirements (financial partners, insurance companies, etc.)
 - Establishment of an action plan
- Implementation (execution and enforcement):
 - Implementation of organisational measures (training, policies, etc.)
 - Implementation of operational measures (procedures, job descriptions, etc.)
 - Implementation of collective and individual protection measures
 - And any other measures provided for in the action plan
- Monitoring and verification:
 - Monitoring of actions and indicators implemented
 - Audits
 - Review by management
- Adjustment:
 - Adjustment/adaptation required after performance review
 - Plan for system improvement

11.1.2. Mandatory policy and documentation base atory

The employer shall, in consultation with workers and their representatives, establish and present in a single document an occupational health and safety policy for the project. It should be noted that QGMI already has a human resources and human rights management policy.

The health and safety policy is a simple document, accessible to everyone within the company, and sets out, at a minimum, the essential principles and objectives that the organisation undertakes to comply with in order to:

- protect the health and safety of all members of the organisation, as well as those who may be affected by its activities;
- comply with Guinean legislation and regulations, collective agreements and voluntary programmes to which the organisation subscribes;
- ensure that workers and their representatives are consulted and encouraged to participate actively in the occupational health and safety management system;
- ensure the proper implementation of a training plan for workers;
- ensure that a maintenance plan for equipment is properly implemented;
- investigate every workplace accident;
- continuously improve the effectiveness of the occupational health and safety management system.

The health and safety policy highlights the role of the "Health and Safety Coordinator" and defines the function and the person designated to fulfil it.

It also defines the roles and responsibilities of each person within the company for occupational health and safety issues.

The policy defines the basic records that the organisation must keep up to date and available to the competent authorities and the lessor (register of workplace accidents, occupational illnesses and training). A central and fundamental document in the health and safety management system, the policy is signed by the person in charge of the organisation's highest position.

11.1.3. Identification of hazards, risk assessments and exposed persons

The identification of hazards, the assessment of risks and exposed persons, and the means of control will be carried out through the single risk assessment document (or Single Occupational Risk Assessment Document, Risk Register, etc.).

The hazard identification and risk assessment process enables the health and safety committee to fulfil its obligation to study health and safety conditions at work.

The single risk assessment document is a tool that follows the following process:

- hazard identification
- assessment of risks and exposed persons
- consideration of existing control measures
- determination of additional control measures or actions required
- determination of the person responsible for implementing additional control measures
- deadline for implementing additional control measures

The single document must include:

- the name of the company
- the name of the person who drew up the document
- the date on which the document was produced
- the date of the next revision of the document

The single document must be reviewed periodically, but also after any major change in the company's processes, any accident at work or any other major change in the company's usual way of operating.

11.1.4. Identification and assessment method

When it comes to risk and accidents, a distinction is made between identification and assessment. The former consists of identifying elements and situations that pose a risk in relation to the project's safety measures. The latter aims to assign a higher or lower value to each of the risks identified.

■ Identification methods

Identification of risks related to facilities and activities

One of the tools frequently used to analyse risks associated with facilities is the Preliminary Risk Analysis (PRA). It can be used to identify risks at the preliminary stage of designing a facility or project and does not generally require in-depth knowledge of the facility. PRA makes it possible to assess the hazardous elements of an installation and to identify hazardous situations for each hazardous element.

The hazardous elements identified can vary greatly depending on the system, ranging from hazardous substances or preparations to hazardous equipment.

The causes and consequences of each hazardous situation are also assessed, as are the existing safety measures. If these are deemed insufficient in relation to the risks, proposals for improvement will be considered.

■ Risk assessment method

Risk is the product of the probability of damage occurring and its severity³⁶. It is quantified using a criticality grid. This is a tool that assigns a value to risk by combining the probability of damage occurring due to a hazard and the potential severity of that damage. A rating grid is developed for this purpose. We use scales rated from 1 to 4 according to the matrices below.

129 : Probability of occurrence rating

Probability of occurrence

³⁶ ISO/IEC GUIDE 51:2014(F). The calculation formula is criticality = probability x severity

1	Unlikely event (has never happened)
2	Rare event (may occur once a year)
3	Frequent event (once a month)
4	Very frequent event (every day)

130 : Damage severity rating

Severity of damage

1	Minor consequences (little or no damage)
2	Serious consequences (damage to equipment, facilities)
3	Very serious consequences (bodily injury, very high material damage)
4	Extremely serious consequences (loss of life)

The risk value obtained, or criticality, allows us to prioritise risks and set the criticality threshold³⁷. In the table below, we have chosen to set this threshold at 25 per cent of the maximum criticality ($16 \times 25\% = 4$). Risks rated equal to or greater than 4 will be subject to management measures and will be detailed in the future dedicated plan designed during the project preparation phase.

Table131 : Criticality grid

Probability of occurrence	4	4	8	12	16
	3	3	6	9	12
	2	2	4	6	8
	1	1	2	3	4
		1	2	3	4
Severity of damage					

11.1.5. Implementation of risk control measures

The selection and implementation of control measures will be based on a hierarchical approach:

- Elimination/substitution:
Any measure that eliminates or substitutes the source of the hazard with less hazardous equipment, materials, processes or products.
- Collective control measures:
Any device, mechanism, apparatus or installation which, by its design, is capable of effectively protecting employees against one or more occupational risks and thus limiting their consequences.

It is referred to as collective protection if it ensures the safety of both the employee assigned to the workstation and other persons present in the vicinity.
- Administrative control measures, such as:
 - internal regulations
 - safety instructions

³⁷ Value at which risk is deemed unacceptable and requires elimination, reduction or mitigation measures.

- written procedures
- signed and recorded risk assessment for any task not covered by a written procedure and outside the usual scope of activities
- work permits

→ Personal protective equipment.

It should be noted that Guinea's Labour Code explicitly mentions the employer's obligation to provide personal protective equipment free of charge to all workers for certain activities, in particular underground work or work in confined spaces.

Article 231.14 of the Labour Code: "When workers are required to work in wells, gas pipes, smoke ducts, cesspools, tanks [...] The employer is obliged to provide the worker with personal protective equipment when collective technical prevention measures are insufficient. All protective equipment must be provided by the employer free of charge."

Nevertheless, the interpretation of the Labour Code, as well as international best practices as described in the World Bank's Environmental and Social Standards and the International Finance Corporation's Performance Standard 2 on labour and working conditions, recommend the free provision of all personal protective equipment to all workers on the project, whether employed or subcontracted, regardless of the activities undertaken.

IFC Guidance Note 2, NO 78: *"It is recommended to eliminate sources of risk to workers' health and safety, rather than allowing these risks to persist and providing personal protective equipment to workers."*

WB NES2, NO 25.2 *"[...] the free distribution of personal protective equipment to project workers."*

■ Implementation of internal control measures

Measures to monitor the proper application of safety instructions and advice must be implemented.

This can be done in two ways:

→ Informal:

During visits to the construction site and/or affected villages, these measures allow for visual verification that health and safety instructions are being properly followed. They also promote dialogue with various supervisors, workers and villagers in order to gather information on health and safety issues.

These visits also demonstrate the company's commitment to health and safety issues.

→ Formal:

Periodic inspections of the various areas of the construction site must be organised. These inspections are carried out with the supervisor of the area being inspected and result in the drafting of an inspection report, which must be signed by the health and safety coordinator and then archived.

More broadly, but based on the same principle, an audit of the performance of the health and safety management system must be conducted at least once a year.

■ Communication and health and safety committee

An internal and external communication plan must be developed to disseminate information on health and safety issues.

This enables vertical communication from management to workers, but also from workers to management. It also ensures the proper communication of health and safety information to the relevant national authorities.

The plan must define the procedures for communicating audit reports to management and the means put in place to disseminate information to workers.



These means include: notice boards, internal memos, regular health and safety meetings, "safety minutes" during project kick-off meetings.

A legal obligation and a recommendation of the World Bank and International Finance Corporation standards, the health and safety committee is an essential communication tool within an organisation. It ensures transparency on OHS issues and involves workers, who have an official platform with recorded minutes to raise any questions or concerns related to occupational health and safety.

It also allows management to explain its policy and responses to health and safety issues.

Section 231.2 of the Labour Code: "...All establishments or companies regularly employing at least twenty-five employees must set up a health and safety committee. The purpose of this committee is to study, develop and ensure the implementation of preventive and protective measures in the areas of occupational health and safety."

Labour Code, Section II: Special provisions applicable to construction operations:

Article 231.26: "A technical committee for the prevention of occupational risks must be set up. Its role is to issue technical opinions and make proposals to the Consultative Commission on Labour and Social Laws on draft legislation and regulations to be introduced in the field of occupational health and safety."

Article 231.27: "An order of the Minister responsible for labour shall determine the composition, organisation and functioning of the technical committee for the prevention of occupational risks after consultation with the Advisory Committee on Labour and Social Laws."

■ Post-accident/incident investigation

The company must have a procedure in place that describes the conditions for initiating an investigation after an incident or accident.

The purpose of the investigation is to identify the probable causes of the accident in order to define corrective measures to prevent a recurrence. The investigation is not intended to identify those responsible for the accident for the purposes of prosecution.

The investigation report must be recorded and presented to management and to the workers' representatives on the health and safety committee.

The single risk assessment document must be updated with the findings of the investigation.

■ Training

A plan must be established to identify, plan and provide the necessary training for workers to operate safely.

This must cover, at a minimum:

- health and safety training at the time of taking up employment (induction)
- first aid (first aid, use of fire extinguishers, emergency procedures)
- training in the use of machinery, tools, equipment, systems and procedures that the worker is required to use

Article 231.6 of the Labour Code: "All establishment managers are required to organise appropriate practical training in occupational health and safety for the workers they hire, those who change jobs or techniques, and those who return to work after a break of more than six months."

This training must be updated for all staff in the event of changes in legislation or regulations."

■ Maintenance

A maintenance plan for machinery and equipment, ensuring their proper functioning and safe use, must be developed and implemented.



Its technical implementation is the responsibility of the maintenance manager or, failing that, the operations manager.

The health and safety coordinator must ensure that it is implemented and applied.

Article 231.13 of the Labour Code: "...Machines, mechanisms, transmission devices, tools and mechanical or manual equipment must be installed and maintained in the best possible safety conditions.

[...]

The employer or their representative must organise the ongoing monitoring of the condition of machinery in order to ensure the protection of employees."

■ **Medical examination, infirmary and emergency response**

In order to ensure medical monitoring and care for workers, the project must be organised to provide a pre-employment medical examination for all workers, employees and subcontractors. An annual medical check-up must also be organised in order to monitor and track the impact of activities on workers' health.

Article 232.1 of the Labour Code: "[...] The employers concerned must organise occupational health services within the company for all workers.

Occupational health services are organised at or near the workplace for the purpose of:

a) ensure the protection of workers against any damage to their health that may result from their work or the conditions in which it is carried out;

b) contribute to the adaptation of workstations, techniques and work patterns to human physiology;

c) contribute to establishing and maintaining the highest possible level of physical and mental well-being for workers;

d) contribute to the health education of workers so that their behaviour complies with occupational health standards and instructions.

All employers must provide successful job applicants with a medical examination before the end of the probationary period at the latest.

As stipulated in the Labour Code, the project must have at least one infirmary with an isolation room for emergencies and a medical evacuation procedure, as well as equipment to evacuate injured and sick persons who cannot be treated on site to the nearest appropriate medical facility.

As stipulated in Article 232.5 of the Labour Code, and depending on the number of workers in the company, the establishment must have nursing staff and/or a doctor on site.

Occupational health services must be provided by legally authorised personnel.

Article 232.2 of the Labour Code: "Occupational health services shall be provided by medical and paramedical staff who hold a licence issued by the Minister of Health..."

Article 232.6 of the Labour Code: "The employer must take measures to provide first aid to sick employees and victims of accidents at work."



11.1.6. Points to note

■ Safety

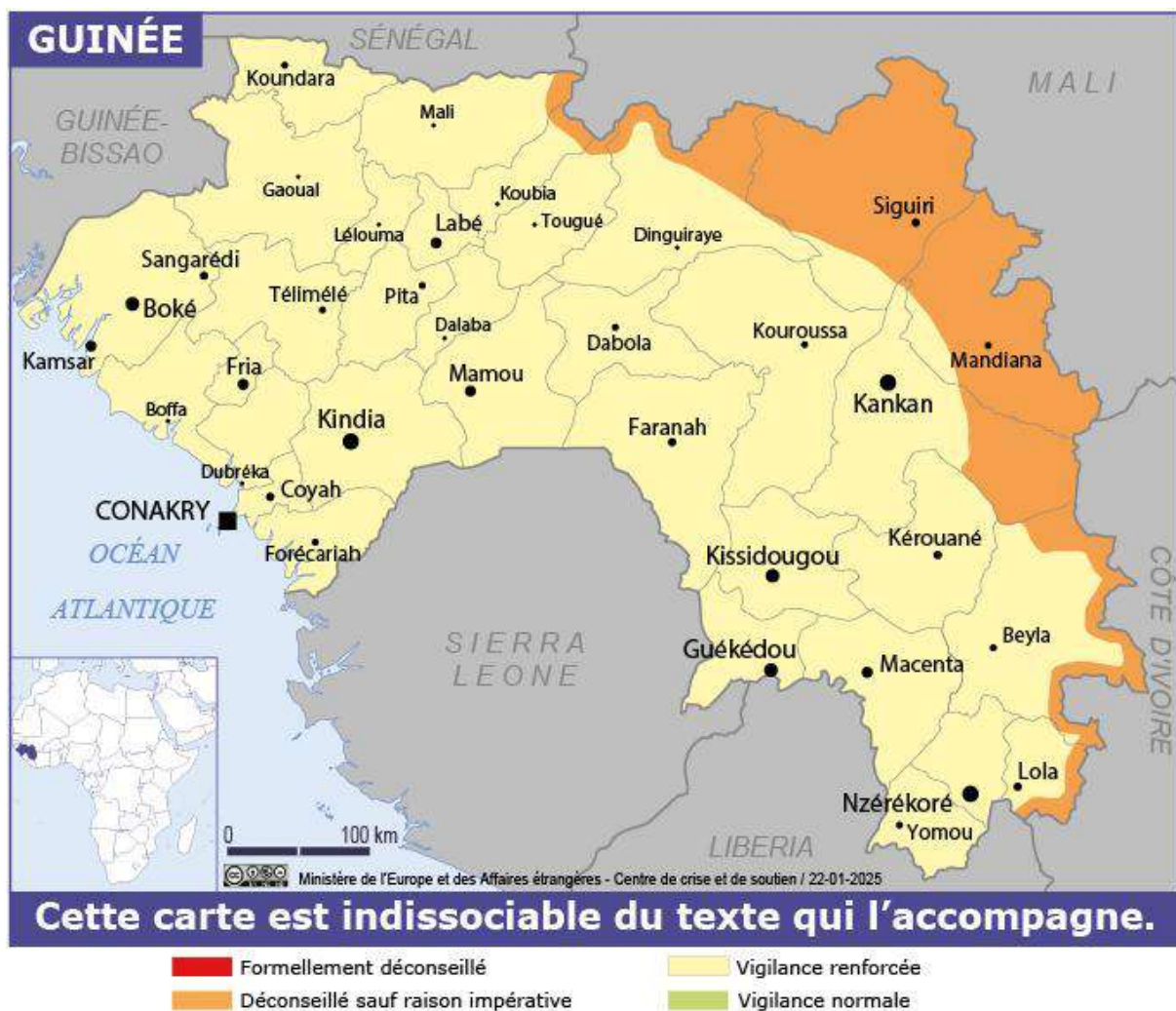
In June 2025, Guinea was placed under heightened vigilance by the French Ministry of Foreign Affairs, with the exception of the north-eastern areas of the country bordering Mali and the entire border with Côte d'Ivoire, which are classified as areas formally advised against due to a low risk of terrorist incursions.

The project will also be exposed to the security risks inherent in any industrial or construction operation, in particular the risk of intrusion with the aim of stealing company property.

The proximity of the project to areas with high levels of organised crime requires enhanced security measures, particularly for the protection of machinery and diesel fuel. The cross-border nature and extent of criminal networks across the region create a risky environment for companies and construction projects that use this type of goods and equipment. These criminal groups specifically target heavy equipment and fuel, which are valuable assets and easily resold on the black market. The theft of machinery can result in financial losses, but also delay the project. Diesel fuel is a commodity sought after by these networks, either for their own use or to be resold on the black market, thereby financing other illegal activities.

Consequently, the project must have rigorous security management protocols in place, particularly for diesel management (securing depots, monitoring vehicle consumption, vehicle refuelling management system with controls, etc.) and for protecting the vehicle fleet (GPS tracking system, end-of-day security rules, access control to the base camp and workshops, etc.). Staff must undergo training on how to respond in the event of an intrusion or detected theft.

Failure to control security risks could lead to project delays, direct and indirect financial costs, and could also have an impact on local populations by contributing to an increase in criminal activity in or around villages near the project.



[France Diplomatie - Guinea \(external link\)](#)

■ Management of waste generated by the project

The project must demonstrate its ability to manage the waste generated by its presence.

This includes both solid and liquid waste resulting from construction site operations, equipment maintenance operations and the base camp.

- ⇒ The waste management plan will be the reference tool during the construction phase, but also during maintenance work in the restoration phase.

■ Risk of interactions between users and the road construction site

The risk of accidents related to human/machine or machine/machine interactions during road construction is very high. This applies to both workers and local residents.

The project must adopt concrete measures to limit these risks.

These measures must include:

- an "end of day" procedure, which defines where and how machinery is parked at the end of the day. This is to avoid situations where machinery is left overnight on roads under construction, but

still used by the public, without markings or signage, without lights and without a flagman, creating a high risk of collision.

- a road traffic management plan, clearly defining the rules of good conduct when using vehicles (heavy or light), defined parking areas and methods, prevention devices to be installed on each vehicle on the construction site (signalling flag, orange flashing light, reflective tape, reversing alarms, etc.), the direction of traffic on the site, the rules for approaching and passing other vehicles, the role and positioning of flagmen, etc.
- Flaggers must be positioned on both sides of each section of the road under construction, as well as at the entrance and exit of each village crossed by construction machinery or project vehicles travelling between the camp and the construction site.
As far as possible, flagmen placed at the entrances and exits of villages are recruited from within the villages themselves, in order to act as relays for the project's safety rules in the communities.

Local legislation in terms of signage and markings must be respected during road construction (speed limit signs, village entrance and exit signs, etc.).

■ Road drainage water and drainage system

Poor management of road drainage water will have a real long-term impact on the health of local populations.

"Misuse and lack of maintenance are the two main reasons why drainage structures (road drainage ditches, culverts, dam site drainage or drainage canals in irrigation schemes, and also drainage water treatment and disposal facilities) are often associated with environmental health problems." – Source FAO: [Management of agricultural drainage water quality, Chapter 7 - Health issues related to drainage water management](#)

It is important that the project takes into account the location of villages and dwellings when designating the locations of the various components of the road drainage system.

Retention and settling basins located near inhabited areas are breeding grounds for waterborne vector-borne diseases such as malaria. The same applies to poorly located and poorly maintained ditches in inhabited areas.

Settling basins located near watercourses pose a risk of red mud pollution.

■ Dust management

Managing the dust generated by the construction site is an important part of health and safety policy.

Dust will impact workers and villages.

The project must have measures in place to control, prevent and protect against dust.

Measurements of particle levels in the air must be taken before and during construction, in work areas and in villages affected by the construction site.

A dust prevention plan must be established, clearly defining how dust generation will be kept to a minimum: road watering techniques, frequencies, dedicated equipment, products used (water alone or water with additives, etc.), speed limits for project vehicles when passing near villages, etc.

Protective measures for workers exposed to dust, such as masks (FFP2 minimum), must also be implemented.



■ Management of borrow pits and water points

The creation of borrow pits and water wells is an integral part of any road construction project. It is the project's responsibility to properly manage the risks associated with their use, both for workers and villagers.

It is essential to take into account the location of borrow pits so as not to endanger the surrounding populations.

They pose a risk of falling, but also of drowning if they are not properly rehabilitated once the work is completed.

It is the responsibility of the company in charge of the project to determine the appropriate control measures to protect the population and workers: fencing, vegetation buffer zone, guard, signage, type of cut (straight or sloping edge).

The location of the borrow pit must also take into account its proximity to various watercourses. The dust generated during their use, as well as runoff during the rainy season, can cause pollution of watercourses.

The same approach should be applied when creating wells for construction purposes.

■ Explosives

The project will require the use of explosives for construction purposes, particularly at the borrow pit.

A robust supply chain must be put in place to minimise the risks associated with the use of explosives, particularly detonators.

The project must have a procedure in place defining the procedures for evacuating inhabited areas that may be within a 500-metre radius of the blasting site.

Such a procedure must include, at a minimum:

- the designated assembly point for villagers
- the procedures for listing people with reduced mobility and the means put in place to move them to the assembly point
- the organisation of human resources and vehicles (particularly buses) to facilitate the evacuation of the inhabited area
- the process for confirming the total evacuation of the inhabited area before blasting

11.2. Environmental risk assessment and climate change – GHG emissions

The main changes projected by the end of the 21st century are a reduction in average annual rainfall, but an increase in episodes of intense rainfall and the intensity of tropical cyclones. An increase in average and maximum temperatures of around 1 to 4°C is also expected. The main impacts of these changes are an increase in erosion and landslides, an increase in the frequency of bushfires, an increase in plant mortality and a decrease in growth rates due to reduced rainfall and higher temperatures, as well as soil depletion due to repeated fires and erosion. The main possible adaptation and mitigation measures are the use of a wide variety of species in revegetation operations, increased control of combustible material and species that promote a short fire cycle, and monitoring of operations in order to establish a system for the continuous improvement of knowledge. The marine environment is also subject to numerous risks (erosion, pollution, warming waters, etc.) due to industrial development and infrastructure projects carried out at both local and international levels.

There is still considerable uncertainty about future climate change and its impact on the ecosystems in the project area. Climate change must therefore be taken into account here in two distinct ways, namely:

- The impact of the project itself on climate change, particularly due to greenhouse gas (GHG) emissions from machinery and trucks during the construction phase and during maintenance work during the operational phase of the road, but also due to the impact of road traffic, which will be a significant source of GHG emissions.
- The impact of global climate change on the project through major precipitation events causing flooding and climatic disturbances affecting soil stability at the level of the road and bridges.

■ Identification of the project's risks in relation to climate change

● *Main sources of influence on climate change*

General information on GHG emissions in the industrial sector in West Africa:

The primary source of GHG emissions is electricity generation (60%) by thermal power plants to supply mines, while road transport using heavy diesel-powered construction equipment is the second largest source of GHG emissions (31%). Other causes of emissions are ore processing and other processes (8%) and waste management (1%).

Specific aspects of this project

Construction site activities requiring machinery, as well as activities at the quarry and the transport of materials from the quarry to the road by truck, will be subject to various unavoidable constraints:

- The first is due to the distance between the borrow pit and the road, and therefore the need to transport rock and gravel ;
- The second is linked to the need to use construction machinery that emits high levels of greenhouse gases, particularly during the construction phase;
- The third is linked to the very purpose of the project, which aims to improve the RN32 and therefore increase road traffic, a source of air pollution that will impact local residents, as well as flora and fauna.

Note: The CCRA produced as part of this study is a self-contained document is included ,, but part of whichin this chapterit serves as a reference document on the subject.

Criticality grid result: probability/occurrence level 4 and damage severity level 1 = **Criticality 4**

During both the construction and operational phases, GHG emissions will occur on a daily basis, but the consequences will be minor. The criticality grid assesses this as a medium long-term risk, but in reality it is difficult to evaluate.

● *Erosion and ground movements*

As water is the main factor contributing to erosion, the predicted increase in the frequency and intensity of extreme rainfall and the project's proximity to the Niger River will have a negative impact on erosion processes along the riverbanks and crossing structures on tributaries. The road construction site and activities at the quarry could exacerbate this phenomenon. All these aspects will significantly increase the vulnerability of the exposed soil. Erosion control will be important.

Criticality grid result: probability/occurrence level 3 and damage severity level 1 = **Criticality 3**

- The anti-erosion plan will be effective in limiting risks. *Control of invasive species*

Invasive species are colonising species that establish populations outside their normal distribution. The spread of invasive species is recognised as a significant threat to ecosystems and their biodiversity, and is a major factor in species decline, biodiversity loss and the loss of ecosystem services on a global scale.

The extent of the colonisation success of invasive species in a context of climate change depends on many factors, including ease of access to migration routes, conditions in the host environment, ability to compete with native species, and ability to adapt to the new environment.

Soil degradation and the degradation of existing ecosystems for road construction (parking areas, storage areas, base camps, etc.) will leave bare soil that will be favourable to the establishment of invasive alien species, which will colonise these areas and gradually invade neighbouring ecosystems that are still preserved.

It is therefore essential to monitor invasive species, control and limit their establishment, and protect sites undergoing restoration/rehabilitation from them.

Monitoring of these species should also assess their level of resistance to climate change in the area in the medium term.

Criticality grid result: probability/occurrence level 3 and damage severity level 1 = **Criticality 3**

The invasive species management plan will be effective in limiting risks

- **Risks related to dust**

Dust emissions from the road and quarry will pose a risk to the environment. As explained in 11.1.6, this represents a respiratory risk for local residents and wildlife, but also a reduction in the photosynthetic capacity of plants whose leaves have reduced access to light, limiting their development and therefore their productivity.

Criticality grid result: probability/occurrence level 4 and damage severity level 1 = **Criticality 4**

The dust management plan will help to limit this risk, particularly during the dry season (watering e.g. by the runway or avoiding the use of explosives when the wind is strong).

- **fires**

An additional risk inherent in climate change is the increase in the frequency of bush fires, which can be explained by the slight reduction in rainfall during certain periods and the increase in average and maximum temperatures in the near future.

Fires are part of the natural processes that regulate ecosystems. It will therefore be necessary in reforestation plans (even if this is reduced in relation to the project itself) to select species that are resistant to bush fires, but also to ensure a fire monitoring and prevention system at the quarry and in the areas where teams are working during the construction phase and along the road. In any case, fires are more likely to be caused by fires village bush than by the project in terms of responsibility, but the event should not be overlooked.

Criticality grid result: probability/occurrence level 2 and damage severity level 2 = **Criticality 4**

The reforestation plan prioritises species that are resistant to bush fires, and monitoring and raising awareness among the local population can limit the risk. Choosing tree species that are of interest to the local population (fruit trees, medicinal trees, etc.) can increase the local population's interest in preserving these reforestation sites.

- **Flooding and runoff**

Major climatic events causing severe flooding may pose a risk to the project and its activities through significant runoff and flooding that could render the site impassable or even damage infrastructure. We have already encountered this situation in certain areas of the project during biodiversity inventories in the rainy season, due to the proximity of the Niger River. A weather monitoring system and an early warning system will be necessary to avoid any risk to workers and protect site equipment (particularly machinery and trucks) during the construction and maintenance phases. In addition, during the operational phase, appropriate signage will need to be put in place along the road to alert users to flood-prone areas and higher, safer areas.

Furthermore, as explained in 11.1.6, the project will need to have an in place effective surface water drainage system at road level to limit the risks associated with heavy rainfall and rising water levels in the event of a major climatic event.

Criticality grid result: probability/occurrence level 2 and damage severity level 2 = **Criticality 4**

The water management plan will be effective in limiting these risks.

- **Risk associated with the use of explosives**

As explained in 11.1.6, the use of explosives in the quarry poses a risk to the environment, particularly due to instability in rock and soil near the mining areas, which presents a risk of landslides. It also poses a risk due to dust emissions, vibrations and noise pollution for wildlife.

Criticality grid result: probability/occurrence level 2 and damage severity level 2 = **Criticality 4**

The use of explosives by a trained and competent QGMI team will greatly reduce this type of risk.

- **Waste-related pollution**

As explained in 11.1.6, depending on how it is managed, construction site waste can pose a risk to the environment, particularly in terms of pollution of soil, air and water.

Criticality grid result: probability/occurrence level 3 and damage severity level 1 = **Criticality 3**

The waste management plan will ensure that this risk is closely monitored and significantly limited.

- **Identification of other natural hazards**

The following risk levels are mainly taken from the ThinkHazard! website of the Global Facility for Disaster Reduction and Recovery (GFDRR) and the World Bank Group (<http://thinkhazard.org/fr/>). Although fairly general, these estimates are useful for better targeting the aspects to be considered for measures in the ESMP.

132 Table Natural hazards

Risk	Assessment for the project area
Flood	High
Flood	High
Urban flooding	High
Water scarcity	Very low
Extreme heat	High
Forest fire	High
Landslide	Low
Earthquake	Low
Volcanic eruption	-
Cyclone	-

Dangerous animals¹

Certain risks associated with the presence of species that, through their bite or sting, may pose a risk to people

¹ Team estimate

■ Management of waste generated by the project

The project must demonstrate its ability to manage the waste generated by its presence.

This includes both solid and liquid waste resulting from construction site operations, equipment maintenance operations, and the base camp.

- ⇒ The waste management plan will be the reference tool during the construction phase, but also during maintenance work in the restoration phase.

■ Risk of interactions between users and the road construction site

The risk of accidents related to human/machine or machine/machine interactions during road construction is very high. This applies to both workers and local residents.

The project must adopt concrete measures to limit these risks.

These measures must include:

- an "end of day" procedure, which defines where and how machinery is parked at the end of the day. This is to avoid situations where machinery is left overnight on roads under construction, but still used by the public, without markings or signage, without lights and without a flagman, creating a high risk of collision.
- a road traffic management plan, clearly defining the rules of good conduct when using vehicles (heavy or light), defined parking areas and methods, prevention devices to be installed on each vehicle on the construction site (signalling flag, orange flashing light, reflective tape, reversing alarms, etc.), the direction of traffic on the site, the rules for approaching and passing other vehicles, the role and positioning of flaggers, etc.
- The deployment of flagmen on both sides of each section of road under construction, as well as at the entrance and exit of each village crossed by construction machinery or project vehicles travelling between the camp and the construction site.

As far as possible, flagmen stationed at the entrances and exits of villages are recruited from within the villages themselves, in order to act as relays for the project's safety rules in the communities.

Local legislation in terms of signage and markings must be respected during road construction (speed limit signs, village entrance and exit signs, etc.).

■ Road drainage water and drainage system

Poor management of road drainage water will have a real long-term impact on the health of local populations.

"Misuse and lack of maintenance are the two main reasons why drainage structures (road drainage ditches, culverts, dam site drainage or drainage canals in irrigation schemes, and also drainage water treatment and disposal facilities) are often associated with environmental health problems." – Source: FAO

It is important that the project takes into account the location of villages and dwellings when designating the locations of the various parts of the road drainage system.

Retention and settling basins located near inhabited areas are breeding grounds for waterborne vector-borne diseases such as malaria. The same applies to poorly located and poorly maintained ditches in inhabited areas.

Settling basins located near watercourses pose a risk of red mud pollution.

■ **Dust management**

Managing the dust generated by the construction site is an important part of health and safety policy.

Dust will impact workers and villages.

The project must have measures in place to control, prevent and protect against dust.

Measurements of particle levels in the air must be taken before and during construction, in work areas and in villages affected by the construction site.

A dust prevention plan must be established, clearly defining how dust generation will be kept to a minimum: road watering techniques, frequencies, dedicated equipment, products used (water alone or water with additives, etc.), speed limits for project vehicles when passing near villages, etc.

Protective measures for workers exposed to dust, such as masks (FFP2 minimum), must also be implemented.

■ **Management of borrow pits and water points**

The creation of borrow pits and water wells is an integral part of any road construction project.

It is the project's responsibility to properly manage the risks associated with their use, both for workers and villagers.

It is essential to take into account the location of borrow pits so as not to endanger the surrounding populations.

They pose a risk of falling, but also of drowning if they are not properly rehabilitated once the construction work is completed.

It is the responsibility of the company in charge of the project to determine the appropriate control measures to protect the population and workers: fencing, vegetation buffer zone, guard, signage, type of cut (straight or sloping edge).

The location of the borrow pit must also take into account its proximity to various watercourses. The dust generated during their use, as well as runoff during the rainy season, can cause pollution of watercourses.

The same approach should be applied when creating pits for construction purposes.

■ **Explosives**

The project will require the use of explosives for construction purposes, particularly at the borrow pit.

A robust supply chain must be put in place to minimise the risks associated with the use of explosives, particularly detonators.

The project must have a procedure in place defining the procedures for evacuating inhabited areas that may be within a 500-metre radius of the blasting site.

Such a procedure must include, at a minimum:

- the designated assembly point for villagers
- the procedures for listing people with reduced mobility and the means put in place to move them to the assembly point



- the organisation of human resources and vehicles (particularly buses) to facilitate the evacuation of the inhabited area
- the process for confirming the total evacuation of the inhabited area before blasting



12. Public consultation and participation

Disclosure or dissemination of information consists of providing information about the project to affected communities and other stakeholders. This information must be provided in the appropriate language(s) (NP1 §29 NO99).

Where affected communities are exposed to the risks and adverse impacts of a project, care must be taken to ensure that a consultation process allows affected communities to express their views freely on the risks of the project, its impacts and mitigation measures, and that the client considers these views and formulates a response (NP1 §30).

The objective of public consultation and participation is to ensure that individuals and groups directly affected by the project, often referred to as stakeholders, receive clear and transparent information about it. It is also an opportunity to gather the expectations and grievances of these individuals or groups in order to improve the ESIA and propose impact mitigation measures that meet the expectations and needs expressed by those who have been consulted.

Although the ESIA is an appropriate time to carry out preliminary stakeholder consultation, public participation must take place throughout the life of the project and must be planned in advance in order to maximise the positive benefits of such a strategy (see section 6.3.2).

12.1. Objectives of the consultation process

Public consultation is an important and essential step in conducting an environmental and social impact assessment. Its objective is twofold:

To bring the project to the attention of the main stakeholder groups and disclose its technical characteristics to them in a transparent manner, so that they can anticipate the positive and negative impacts of the project based on their knowledge of the project environment.

In response to this presentation of the project, gather stakeholders' fears and concerns, as well as their expectations and recommendations.

The consultation process informs the impact analysis and the definition of corrective measures through:

Identifying impacts not anticipated by the consultant in charge of the impact assessment.

Adjusting the assessment of the significance of the impact, taking into account the perceptions of stakeholders, which may differ from those of the consultant.

The proposal by stakeholders of new mitigation measures or measures that are more suited to the realities of the local context.

Public consultation is distinct from the public hearing procedure, which is a regulatory procedure allowing environmental authorities to ensure that the project does not raise any major objections and that the opinions of stakeholders have been taken into account in the impact assessment.

Public consultation ultimately enables the effective involvement of the populations concerned in all phases of the project, and thus the establishment of mechanisms that guarantee their support for the project.

12.2. Methodology

The length of the road, its condition and the high number of settlements along its entire length were constraints that prevented us from conducting as exhaustive a consultation as we would have liked with all the local communities in the area of indirect influence for the collection of EBS data, the measurement of impacts and the gathering of stakeholders' fears and expectations.

However, this limitation was greatly mitigated by:

- Firstly, by organising public consultations and stakeholder consultations (semi-structured group interviews and focus groups) in **all the sub-prefecture capitals in the project's indirect area of influence**, as well as in additional districts and sectors, this allowed for an in-depth analysis while striving for comprehensiveness.

- By opting for an exhaustive inventory of basic infrastructure³⁸ accessible to local communities in the project's indirect area of influence.
- By broadcasting radio announcements via rural radio stations in each of the two prefectures concerned (in Malinké and French, four times a week for two weeks for each prefecture, i.e. 16 announcements in all languages and prefectures combined), enabling large-scale and recurring dissemination of information about the project, its partners, the ESIA mission and its objectives, and thus serving as a means of amplifying the public consultations.
- It also empowered the representatives of the local communities consulted and the participants in the public consultations to disseminate the information they had accessed during their exchanges with the Insuco teams. This made it possible to gain a better understanding of the situation and the socio-environmental issues in each area targeted for the study, as well as to communicate about the project on a large scale and reach a significant number of people.

Thus, as part of the EIA's EBS, surveys of 128 households along the project's indirect area of influence revealed that 78% of the households surveyed were already aware of the project **before** the arrival of the survey and consultation teams, thanks to **radio announcements** (for 64% of the households surveyed), **information disseminated by local and administrative authorities** (soti kémo, sector chiefs, district president, mayor and sub-prefect, for 57% of households surveyed), and to a lesser extent **previous missions carried out as part of the project** (Insuco-Oryx scoping mission, Ministry of Public Works missions, QGMI missions). This finding was confirmed by the stakeholders met during the consultations (sub-prefectural and municipal authorities, local authorities and community groups).

In addition to these methods of disseminating information, public consultations and stakeholder consultations (focus groups, semi-structured group interviews and semi-structured individual interviews) were also carried out.

Given the constraints of the study, the combination of these methods of information disclosure and stakeholder consultation proved to be effective and efficient in firstly informing the majority of local communities about the technical details and timetable of the project and secondly in gathering their fears and concerns as well as their perceptions of the impacts and corrective measures to be taken.

These consultations were conducted with the main categories of stakeholders affected by the project:

- Decentralised administrative authorities (prefectures and sub-prefectures in their entirety);
- Decentralised administrative authorities (all rural municipalities);
- Customary authorities, local communities and their representatives, at the level of all sub-prefecture capitals in the project's indirect area of influence, as well as in additional districts and sectors.

These consultations addressed various topics:

- Stakeholder engagement:
 - Knowledge of the project;
 - Desired engagement methods;
 - Expectations and concerns;
 - Recommendations regarding the implementation of the complaints management mechanism (CMM);
 - Languages spoken and written locally;
 - Identification of key stakeholders.
- Identification of potential impacts:
 - Positive and negative impacts during the construction phase;
 - Positive and negative impacts during the operational phase.
- Recommendations relating to vulnerable groups;
- Issues in terms of access to public services in the study area, including the possibility of housing for project workers;
- Historical and land ownership situation in the study area;
- Income-generating activities (IGAs) and their specific challenges;

³⁸ Basic collective services in health, education, water supply, administration, social welfare and the economy.



- Specific issues related to gender and migration;
- Cultural heritage sites.

12.3. Prior consultation process

The prior consultation process was organised during the field survey phase for the collection of socio-economic data. It was based on the organisation of public consultations, focus groups, semi-structured group interviews and semi-structured individual interviews with various stakeholders.

The stakeholders³⁹ were notified several days before the consultation date in order to find a suitable time slot and ensure their participation.

Table 133 presents all the meetings held in connection with the production of this report and the CPR.

The attendance sheets for these consultations are available in Appendix 21.

Appendix 22 also details information on the key stakeholders met in individual or group interviews, in order to compile a preliminary address book of the project's key stakeholders. This database is integrated into the PEPP and will evolve over the course of the project. Methodological tools such as semi-structured interviews, group interviews and focus groups were used and can be consulted in Appendix 6. The messages that were disseminated are presented in the Communication Plan in Appendix 23.

³⁹ With the exception of prefectural authorities for scheduling reasons.



Table 133 : Public consultations for the development of the ESIA and CPR, Source: Insuco, 20 25

Date	Prefecture	Sub-prefecture (and village, if applicable)	Type of stakeholder(s) met	Purpose of consultation
Prefectural administrative authorities				
15/04/2025	Kouroussa	-	Kouroussa Prefecture	
			Prefectural technical services:	Project presentation
			Infrastructure and Public Works	Knowledge, hopes and concerns regarding the project
			Environment and Sustainable Development	Stakeholders' opinions on the project and its impacts
			Agriculture and Livestock, Mines and Geology	Access to basic services Vulnerable groups Recommendations on the MGP Other stakeholders to consider
Siguiri Prefecture				
16/04/2025	Siguiri	-	Prefectural technical services:	
			Infrastructure and Public Works	Project presentation
			Environment and Sustainable Development	Knowledge, hopes and concerns regarding the project
			Agriculture and Livestock	Stakeholders' opinions on the project and its impacts
			Mines and Geology	Recommendations on the MGP Other stakeholders to be taken into account
Sub-prefectural administrative authorities				
17/04/2025	Kouroussa	Sub-prefecture and rural commune of Koumana	Koumana Town Hall Sub-prefect of Koumana	Project presentation Knowledge, hopes and concerns regarding the project Stakeholders' opinions on the project and its impacts Housing Vulnerable groups Recommendations on the MGP Migration

Date	Prefecture	Sub-prefecture (and village, if applicable)	Type of stakeholder(s) met	Purpose of consultation
17/04/2025	Kouroussa	Balato sub-prefecture and rural municipality	Balato Town Hall Sub-prefect of Balato	Other stakeholders to be taken into account Project presentation Knowledge, hopes and concerns regarding the project Stakeholders' opinions on the project and its impacts Housing Vulnerable groups Recommendations on the MGP Migration
				Other stakeholders to be taken into account Project presentation Knowledge, hopes and concerns regarding the project Stakeholders' opinions on the project and its impacts Land Housing Recommendations on the MGP
17/04/2025	Kouroussa	Sub-prefecture and rural municipality of Doura	Doura Town Hall Sub-prefect of Doura	Project presentation Knowledge, hopes and concerns regarding the project Stakeholders' opinions on the project and its impacts Housing Recommendations on the MGP
02/05/2025	Siguiri	Sub-prefecture and rural commune of Norassoba	Norassoba Town Hall Sub-prefect of Norassoba	Project presentation Knowledge, hopes and concerns regarding the project Stakeholders' opinions on the project and its impacts Housing Vulnerable groups Recommendations on the MGP History and dynamics of settlement Land
				Project presentation Knowledge, hopes and concerns regarding the project Stakeholders' opinions on the project and its impacts Housing Vulnerable groups Recommendations on the MGP History and dynamics of settlement Land
28/04/2025	Siguiri	Sub-prefecture and rural commune of Nounkounkan	Nounkounkan Town Hall Sub-prefect of Nounkounkan	Project presentation Knowledge, hopes and concerns regarding the project Stakeholders' opinions on the project and its impacts Housing Vulnerable groups Recommendations on the MGP History and dynamics of settlement Land

Date	Prefecture	Sub-prefecture (and village, if applicable)	Type of stakeholder(s) met	Purpose of consultation
28/04/2025	Siguiri	Niandankoro sub-prefecture and rural commune	Niandankoro Town Hall Sub-prefect of Niandankoro	Project presentation Knowledge, hopes and concerns regarding the project Stakeholders' opinions on the project and its impacts Housing Vulnerable groups Recommendations on the MGP History and dynamics of settlement Land
Local and traditional authorities and local communities				
01/05/2025	Kouroussa	Koumana sub-prefecture – Koumana locality	Public consultation (open to anyone wishing to learn more about the project)	Project presentation Knowledge, hopes and concerns regarding the project Stakeholders' opinions on the project and its impacts Housing Vulnerable groups Recommendations on the MGP History and settlement dynamics AGR and resources Sites considered important by communities
01/05/2025	Kouroussa	Koumana sub-prefecture – Koumana locality	Local authorities (district president, sector chief, soti kέmo and elders)	Project presentation Knowledge, hopes and concerns regarding the project Stakeholders' opinions on the project and its impacts Housing Vulnerable groups Recommendations on the MGP History and settlement dynamics AGR and resources Sites considered important by communities
01/05/2025	Kouroussa	Koumana sub-prefecture – Koumana locality	Women (women's representatives and local women)	Project presentation AGR and resources Roles and responsibilities of men and women Knowledge, hopes and concerns regarding the project Stakeholders' opinions on the project and its impacts
01/05/2025	Kouroussa	Koumana sub-prefecture – Koumana locality	Young people (youth representatives and local youth)	Project presentation AGR and resources Roles and responsibilities of men and women Knowledge, hopes and concerns regarding the project Stakeholders' opinions on the project and its impacts

Date	Prefecture	Sub-prefecture (and village, if applicable)	Type of stakeholder(s) met	Purpose of consultation
				Recommendations on the MGP Vulnerable groups
20/04/2025	Kouroussa	Balato sub-prefecture – Balato locality	Public consultation (open to anyone wishing to learn more about the project)	Project presentation Discussions on the project presentation and stakeholders' opinions
20/04/2025	Kouroussa	Balato sub-prefecture – Balato locality	Local authorities (district president, sector chief, soti kέmo and elders)	Project presentation History and population dynamics AGR and resources Access to basic services Sites considered important by communities Knowledge, hopes and concerns regarding the project Stakeholder opinions on the project and its impacts Vulnerable groups Recommendations on the MGP
20/04/2025	Kouroussa	Balato sub-prefecture – Balato locality	Women (women's representative and local women)	Project presentation AGR and resources Roles and responsibilities of men and women Access to basic services Knowledge, hopes and concerns regarding the project Stakeholders' opinions on the project and its impacts Recommendations on the MGP Vulnerable groups
20/04/2025	Kouroussa	Balato sub-prefecture – Balato locality	Young people (youth representatives and local young people)	Project presentation AGR and resources Roles and responsibilities of men and women Land Knowledge, hopes and concerns regarding the project Stakeholders' opinions on the project and its impacts Recommendations on the MGP Vulnerable groups
18/04/2025	Kouroussa	Doura sub-prefecture – Doura locality	Public consultation (open to anyone wishing to learn more about the project)	Project presentation Discussions on the project presentation and stakeholders' opinions

Date	Prefecture	Sub-prefecture (and village, if applicable)	Type of stakeholder(s) met	Purpose of consultation
18/04/2025	Kouroussa	Doura sub-prefecture – Doura locality	Local authorities (district president, sector chief, soti kέmo and elders)	Project presentation Sites considered important by the communities Knowledge, hopes and concerns regarding the project Stakeholders' opinions on the project and its impacts Vulnerable groups Recommendations on the MGP
18/04/2025	Kouroussa	Doura sub-prefecture – Doura locality	Women (women's representative and local women)	Project presentation AGR and resources Access to basic services Knowledge, hopes, concerns regarding the project Stakeholder opinions on the project and its impacts Recommendations on the MGP Vulnerable groups
18/04/2025	Kouroussa	Doura sub-prefecture – Doura locality	Young people (youth representatives and local young people)	Project presentation AGR and resources Roles and responsibilities of men and women Knowledge, hopes and concerns regarding the project Stakeholders' opinions on the project and its impacts Recommendations on the MGP Vulnerable groups
21/04/2025	Siguiri	Norassoba sub-prefecture – Norassoba locality	Public consultation (open to anyone wishing to learn more about the project)	Project presentation Discussions on the project presentation and stakeholders' opinions
21/04/2025	Siguiri	Norassoba sub-prefecture – Norassoba locality	Local authorities (district president, sector chief, soti kέmo and elders)	Project presentation History and settlement dynamics Land tenure and gold panning AGR and resources Sites considered important by communities Knowledge, hopes and concerns regarding the project Stakeholders' opinions on the project and its impacts Housing Vulnerable groups Recommendations on the MGP

Date	Prefecture	Sub-prefecture (and village, if applicable)	Type of stakeholder(s) met	Purpose of consultation
21/04/2025	Siguiri	Norassoba sub-prefecture – Norassoba locality	Women (women's representative and local women)	Project presentation AGR and resources Roles and responsibilities of men and women Knowledge, hopes and concerns regarding the project Stakeholders' opinions on the project and its impacts Recommendations on the MGP
21/04/2025	Siguiri	Norassoba sub-prefecture – Norassoba locality	Young people (youth representatives and local youth)	Project presentation AGR and resources Roles and responsibilities of men and women Access to basic services Knowledge, hopes and concerns regarding the project Stakeholders' opinions on the project and its impacts Recommendations on the MGP Vulnerable groups
22/04/2025	Siguiri	Norassoba sub-prefecture – Koukono locality	Public consultation (open to anyone wishing to learn more about the project)	Project presentation Discussions on the project presentation and stakeholders' opinions
22/04/2025	Siguiri	Norassoba sub-prefecture – Koukono locality	Local authorities (district president, sector chief, soti kémo and elders)	Project presentation History and settlement dynamics Land AGR and resources Access to basic services Sites considered important by communities Knowledge, hopes and concerns regarding the project Stakeholder opinions on the project and its impacts Housing Vulnerable groups Recommendations on the MGP
22/04/2025	Siguiri	Norassoba sub-prefecture – Koukono locality	Women (women's representative and local women)	Project presentation AGR and resources Roles and responsibilities of men and women Knowledge, hopes and concerns regarding the project

Date	Prefecture	Sub-prefecture (and village, if applicable)	Type of stakeholder(s) met	Purpose of consultation
				Stakeholders' opinions on the project and its impacts Recommendations on the MGP Vulnerable groups
22/04/2025	Siguiri	Norassoba sub-prefecture – Kounkono locality	Young people (youth representatives and local youth)	Project presentation AGR and resources Roles and responsibilities of men and women Knowledge, hopes and concerns regarding the project Stakeholders' opinions on the project and its impacts Recommendations on the MGP Vulnerable groups
23/04/2025	Siguiri	Norassoba sub-prefecture – Fandia locality	Public consultation (open to anyone wishing to learn more about the project)	Project presentation Discussions on the project presentation and stakeholders' opinions
23/04/2025	Siguiri	Norassoba sub-prefecture – Fandia locality	Local authorities (district president, sector chief, soti kémo and elders)	Project presentation History and settlement dynamics Land AGR and resources Sites considered important by communities Knowledge, hopes and concerns regarding the project Stakeholder opinions on the project and its impacts Housing Vulnerable groups Recommendations on the MGP
23/04/2025	Siguiri	Norassoba sub-prefecture – Fandia locality	Women (women's representative and local women)	Project presentation AGR and resources Roles and responsibilities of men and women Access to basic services Knowledge, hopes and concerns regarding the project Stakeholders' opinions on the project and its impacts Recommendations on the PMF Vulnerable groups

Date	Prefecture	Sub-prefecture (and village, if applicable)	Type of stakeholder(s) met	Purpose of consultation
23/04/2025	Siguiri	Norassoba sub-prefecture – Fandia locality	Young people (youth representatives and local young people)	Project presentation AGR and resources Knowledge, hopes and concerns regarding the project Stakeholders' opinions on the project and its impacts Recommendations on the MGP Vulnerable groups
24/04/2025	Siguiri	Nounkounkan sub-prefecture – Nounkounkan locality	Public consultation (open to anyone wishing to learn more about the project)	Project presentation Discussions on the project presentation and stakeholders' opinions
24/04/2025	Siguiri	Nounkounkan sub-prefecture – Nounkounkan locality	Local authorities (district president, sector chief, soti kémo and elders)	Project presentation Knowledge, hopes and concerns regarding the project Stakeholders' opinions on the project and its impacts Housing Vulnerable groups Recommendations on the MGP History and dynamics of settlement Land AGR and resources Sites considered important by communities
24/04/2025	Siguiri	Nounkounkan sub-prefecture – Nounkounkan locality	Women (women's representatives and local women)	Project presentation Knowledge, hopes and concerns regarding the project Stakeholders' opinions on the project and its impacts Vulnerable groups Recommendations on the MGP AGR and resources Roles and responsibilities of men and women Access to basic services
24/04/2025	Siguiri	Nounkounkan sub-prefecture – Nounkounkan locality	Young people (youth representatives and local youth)	Project presentation Knowledge, hopes and concerns regarding the project Stakeholders' opinions on the project and its impacts

Date	Prefecture	Sub-prefecture (and village, if applicable)	Type of stakeholder(s) met	Purpose of consultation
				- Vulnerable groups - Recommendations on the MGP - AGR and resources - Roles and responsibilities of men and women
29/04/2025	Siguiri	Niandankoro sub-prefecture – Niandankoro locality	Public consultation (open to anyone wishing to learn more about the project)	- Project presentation - Discussions on the project presentation and stakeholders' opinions
29/04/2025	Siguiri	Niandankoro sub-prefecture – Niandankoro locality	Local authorities (district president, sector chief, soti kémo and elders)	- Project presentation - History and settlement dynamics - Land tenure and gold panning - AGR and resources - Sites considered important by communities - Knowledge, hopes and concerns regarding the project - Stakeholders' opinions on the project and its impacts - Housing - Vulnerable groups - Recommendations on the MGP
29/04/2025	Siguiri	Niandankoro sub-prefecture – Niandankoro locality	Women (women's representative and local women)	- Project presentation - AGR and resources - Roles and responsibilities of men and women - Knowledge, hopes and concerns regarding the project - Stakeholders' opinions on the project and its impacts
29/04/2025	Siguiri	Niandankoro sub-prefecture – Niandankoro locality	Young people (youth representatives and local youth)	- Presentation of the project - AGR and resources - Roles and responsibilities of men and women - Knowledge, hopes and concerns regarding the project - Stakeholders' opinions on the project and its impacts - Recommendations on the MGP - Vulnerable groups

13.Environmental and Social Management Plan

The management programmes will give rise to the implementation of Environmental and Social Action Plans that define the desired achievements and actions in response to the issues raised during the risk and impact identification process. These achievements and actions will be presented, as far as possible, in the form of quantifiable events, accompanied in particular by performance indicators, objectives or assessment criteria that can be monitored over specific periods. They will also include an estimate of the resources and responsibilities required for their implementation (NP 1 § 16).

This chapter deals with the project's Environmental and Social Management Plan (ESMP) and describes the various environmental and social (E&S) management activities that will be carried out by QGMI and AGEROUTE (Guinea Road Management Agency), which will operate the road. The ESMP focuses on E&S management measures for the pre-construction and construction phases, as well as high-level requirements for the operational phase.

Environmental and social management (E&S) is an integral part of the project. The ESMP provides a framework for the effective implementation of the E&S management measures developed as part of the ESIA.

Accordingly, an ESMP will be developed to manage environmental and social risks during the pre-construction and construction phases of the project, with an overview of measures to be pursued during operation and implemented by AGEROUTE. During the pre-construction and construction phases, the ESMP will build on the existing Integrated Management System (IMS) used by QGMI.

The objectives of an ESMP are as follows:

- Ensure that all activities and responsible persons anticipate and take measures to avoid negative impacts or risks to communities and the environment as much as possible.
- Ensure that QGMI and AGEROUTE's activities comply with applicable Guinean government laws and regulations and lender requirements.
- Identify and assess social and environmental impacts, both negative and positive.
- Adopt a mitigation hierarchy to anticipate and avoid, or where this is not possible, minimise and, where residual impacts remain, compensate/offset risks and impacts to workers, affected communities and the environment.
- Ensure that affected communities and stakeholders are involved in issues that may affect them.
- Promote and provide the necessary means for adequate participation of affected communities throughout the project life cycle in matters that may affect them, and ensure that relevant environmental and social information is disclosed and disseminated.
- Promote improved social and environmental performance through the effective use of management systems.
- Ensure that all activities and responsible persons consciously promote positive environmental and social impacts and benefits through proactive project planning and design.

An ESMP thus consists of a series of mitigation and monitoring measures, as well as institutional arrangements to be taken during the implementation and operation of a project to avoid, reduce or compensate for negative environmental and social risks and effects in order to bring them to acceptable levels.

To minimise negative impacts and maximise the benefits of the project, it is essential to implement a set of specific measures:

- Consultation and stakeholder participation: local communities, local authorities, civil society organisations and businesses must be closely involved in all phases of the project.
- Equitable compensation measures: compensation measures must be put in place, particularly for impacts related to physical resettlement, loss of income and environmental damage.
- Local capacity building: it is essential to build the capacity of local stakeholders to enable them to actively participate in the development of the project and benefit from its outcomes.



- Long-term monitoring and evaluation: Regular monitoring of the project's impacts is necessary to adjust the measures implemented and ensure that the project's objectives are achieved.

The outline of this chapter is as follows:

- Impact management measures
 - Impact management measures during the preparation phase
 - Impact management measures during the construction phase
 - Impact management measures during the operational phase
- Programme for implementing measures to improve, mitigate and compensate for impacts
 - Summary of environmental and social plans to be developed as part of the implementation of the ESMP
 - Responsibilities for implementing the ESMP
 - Planning for the implementation of impact management measures
- Monitoring and follow-up programme
- Capacity building programme
- Complementary initiatives
- Monetary estimation of protection and support measures
- QGMI Standards
- QGMI Integrated Management System Policy

The PGES in spreadsheet form, detailing each successive activity to be implemented, is presented in Appendix 24. The [Table 134](#) establishes the links between the identified impacts and the management plans that will need to be developed.



Table134 : Summary of potential impacts before management measures, residual impacts with compensation and relevant management plans (PASR = Road Safety Action Plan e

Impact No.	Phase	Impact	Impact - Relative importance	Residual impact - Relative importance	PEPP	PAR	PRMS	PGPC	PG Migration (PGM)	PGES Construction	PASR	PGES O&M	PGEC	PG Biodiversity	Other PG Enviro
1	Construction	Job creation in construction	Positive Strong	Positive Strong	X					X					
2	Construction	Development of SMEs linked to the influx of project workers	Positive Strong	Positive Strong	X					X					
3	Construction	Opportunities for local businesses	Positive Strong	Positive Strong	X					X					
4	Operation	Creation of jobs for the maintenance of the RN32, engineering structures and toll stations	Positive Strong	Positive Strong	X							X			
5	Preparation	Disruption of housing development plans	High	Low	X	X	X								
6	Preparation	Land inflation caused by land acquisition	Average	Low		X	X								
7	Preparation	Permanent loss of land	High	Low		X	X								
8	Preparation	Temporary loss of land	High	Low		X	X								
49	Construction	Return of temporarily acquired land	Positive Strong	Positive Strong	X					X					
9	Exploitation	Land inflation caused by proximity to the RN32 motorway	High	Strong											
10	Preparation	Relocation-related travel	High	Low		X	X								
11	Preparation	Emigration of young people due to the payment of PAR compensation	High	Low	X				X	X					
12	Construction	Influx of workers and opportunistic migration	Strong	Low	X				X						
13	Construction	Increased workload for women hosting workers	Average	Low	X					X					

Impact No.	Phase	Impact	Impact - Relative importance	Residual impact - Relative importance	PEPP	PAR	PRMS	PGPC	PG Migration (PGM)	PGES Construction	PASR	PGES O&M	PGEC	PG Biodiversity	Other PG Enviro
14	Construction	Cultural diversity	Positive Average	Positive Average											
15	Exploitation	Attractiveness of newly opened-up areas	Positive Strong	Positive Strong											
16	Construction	Traffic disruption caused by construction activities, including the transport of machinery, materials and workers	Average	Low	X					X	X				
17	Operations	Traffic disruption due to construction activities, including the transport of machinery, materials and workers	Average	Low	X							X			
18	Operation	Improvement of traffic, circulation and mobility on the RN32	Positive Strong	Positive Strong	X							X			
19	Operation	Improvement of traffic, circulation and mobility on the track between Norassoba and Kounkono	Positive Strong	Positive Strong	X							X			
20	Preparation	Exclusion of local authorities from decision-making processes and project stages	Average	Low	X										
21	Preparation	Disruptions related to the implementation of the ESIA and PAR	Average	Low	X	X	X								
22	Construction	Recruitment-related tensions	Average	Average	X					X					
23	Construction	Tensions with project workers	Average	Low	X					X					
24	Exploitation	Recruitment tensions	Average	Low	X							X			
25	Exploitation	Tensions with project workers	Average	Low	X							X			
26	Construction	Road accidents and construction site accidents	High	Low	X					X	X				
27	Construction	Health and safety risk behaviours among workers	High	Low	X					X					
28	Construction	Accidents and loss of property in the event of poor flood management (rainwater runoff and flooding of the Niger River)	Average	Low	X					X					

Impact No.	Phase	Impact	Impact - Relative importance	Residual impact - Relative importance	PEPP	PAR	PRMS	PGPC	PG Migration (PGM)	PGES Construction	PASR	PGES O&M	PGEC	PG Biodiversity	Other PG Enviro
29	Construction	Construction site nuisances (noise, dust, explosions, etc.)	High	Low	X					X					
30	Operation	Road accidents and construction site accidents	High	Low	X							X			
31	Operation	Accidents and loss of property in the event of poor design of project structures leading to poor flood management (rainwater runoff and flooding of the Niger River)	High	Medium	X							X			
32	Exploitation	Health and safety risk behaviours among project workers	Average	Low	X							X			
33	Preparation	Loss of community infrastructure due to land acquisition	High	Low		X	X								
34	Preparation	Disruption to water supply networks, power lines and fibre optic cables	High	Low		X	X								
35	Preparation	Pressure on essential services related to resettlement	High	Low	X	X	X								
36	Construction	Pressure on essential services related to project workers	Average	Low	X				X						
37	Exploitation	Pressure on essential services linked to migration due to improved accessibility	High	High											
38	Operation	Opening up and improving access to basic services	Positive Strong	Positive Strong											
39	Preparation	Loss of services related to land acquisition	High	Low		X	X								
40	Preparation	Pressure on ecosystem services related to resettlement	Average	Low	X	X	X								
41	Construction	Pressure on ecosystem services related to project workers	Average	Low	X				X						
42	Exploitation	Pressure on ecosystem services linked to migration due to improved access	High	High											
43	Preparation	Loss of economic activity linked to land acquisition	High	Low		X	X								

Impact No.	Phase	Impact	Impact - Relative importance	Residual impact - Relative importance	PEPP	PAR	PRMS	PGPC	PG Migration (PGM)	PGES Construction	PASR	PGES O&M	PGEC	PG Biodiversity	Other PG Enviro
44	Exploitation	Economic development of the region due to improved accessibility	Positive Strong	Positive Strong											
45	Preparation	Displacement and destruction of sites of socio-cultural heritage	Average	Low	X			X							
46	Construction	Archaeological artefact discoveries	Average	Low	X					X					
47	Construction	Degradation of socio-cultural heritage sites	Average	Low	X					X					
48	Exploitation	Degradation of socio-cultural heritage sites during the rehabilitation of the RN32 and related structures	Average	Low	X			X				X			
50	Preparation	PM10 & PM2.5 dust/particle emissions	Average	Average									X		
51	Construction	Dust/PM10 & PM2.5 emissions	Average	Average									X		
52	Operation/Maintenance	Dust/PM10 & PM2.5 emissions	Average	Average									X		
53	Preparation	NOx, NO2 and SO2 emissions	Average	Average									X		
54	Construction	NOx, NO2 and SO2 emissions	Average	Average									X		
55	Operation/Maintenance	NOx, NO2 and SO2 emissions	Average	Average									X		
56	Preparation	GHG emissions	Average	Average									X		
57	Construction	GHG emissions	High	Low									X		X
58	Operation/Maintenance	GHG emissions	High	Low									X		X
59	Preparation	Climate impacts	Average	Average									X		X
60	Construction	Climate impacts	Average	Average									X		X
61	Operation/Maintenance	Climate impacts	Average	Average									X		X
62	Preparation	Modification of sound levels	Average	Average									X		X
63	Construction	Modification of noise levels	Average	Average									X		X
64	Operation/Maintenance	Modification of noise levels	Average	Average									X		X
65	Closure	Modification of sound levels	Average	Average									X		X
66	Preparation	Soil erosion and compaction associated with land clearing	Average	Average									X		
67	Construction	Soil erosion and compaction linked to land clearing	Average	Average									X		

Impact No.	Phase	Impact	Impact - Relative importance	Residual impact - Relative importance	PEPP	PAR	PRMS	PGPC	PG Migration (PGM)	PGES Construction	PASR	PGES O&M	PGEC	PG Biodiversity	Other PG Enviro
68	Exploitation/Maintenance	Soil erosion and compaction associated with land clearing	Average	Average									X		
69	Construction	Increased erosion of hydromorphic soils and sloping areas	Average	Average									X		
70	Preparation	Change in soil composition due to backfill	Low	Low									X		
71	Construction	Change in soil composition due to backfilling	Low	Low									X		
72	Preparation	Risk of soil quality degradation due to chemicals and waste	Low	Low									X		
73	Construction	Risk of soil quality degradation due to chemicals and waste	Medium	Average									X		
74	Operation/Maintenance	Risk of soil quality degradation due to chemicals and waste	Average	Average									X		
75	Preparation	Risk of increased suspended solids in water due to erosion - decline in water quality	Average	Average									X		X
76	Construction	Risk of increased MES in water due to erosion - decline in water quality	Average	Average									X		X
77	Operation/Maintenance	Risk of increased suspended solids in water due to erosion - decline in water quality	Average	Average									X		X
78	Preparation	Degradation of water quality due to accidental spillage of chemicals and waste	Average	Average									X		X
79	Construction	Degradation of water quality due to accidental spills of chemicals and waste	Average	Average									X		X
80	Operation/Maintenance	Degradation of water quality due to accidental spillage of chemicals and waste	Average	Average									X		X
81	Preparation	Project consumption of water abstracted from local groundwater or surface water resources	Average	Average									X		X
82	Construction	Project consumption of water abstracted from local groundwater or surface water resources	Average	Average									X		X
83	Operation/Maintenance	Project consumption of water abstracted from local groundwater or surface water resources	Average	Average									X		X
84	Construction	Improvement of water flow in watercourses crossed by the installation of new bridges and culverts	Average	High									X		X
85	Preparation	Modification of landscape views	Average	Low									X		
86	Construction	Modification of landscape views	Medium	Average									X		
87	Operation/Maintenance	Modification of landscape views	Average	Average									X		

Impact No.	Phase	Impact	Impact - Relative importance	Residual impact - Relative importance	PEPP	PAR	PRMS	PGPC	PG Migration (PGM)	PGES Construction	PASR	PGES O&M	PGEC	PG Biodiversity	Other PG Enviro
88	Preparation	Degradation and loss of natural terrestrial habitat	Average	Low										X	
89	Construction	Degradation and loss of natural terrestrial habitat	High	Low										X	
90	Exploitation/ Maintenance	Degradation and loss of natural terrestrial habitat	Medium	Low										X	
91	Preparation	Fragmentation of terrestrial habitats and disruption of connectivity	Medium	Low										X	
92	Construction	Fragmentation of terrestrial habitats and disruption of connectivity	High	Low										X	
93	Exploitation/ Maintenance	Fragmentation of terrestrial habitats and disruption of connectivity	Medium	Low										X	
94	Preparation	Degradation and loss of aquatic habitats	Medium	Low										X	
95	Construction	Degradation and loss of aquatic habitats	High	Low										X	
96	Exploitation/ Maintenance	Degradation and loss of aquatic habitats	Medium	Low										X	
97	Preparation	Fragmentation of aquatic habitats and disruption of connectivity	Medium	Average										X	
98	Construction	Fragmentation of aquatic habitats and disruption of connectivity	Average	Average										X	
99	Exploitation/ Maintenance	Fragmentation of aquatic habitats and disruption of connectivity	High	High										X	
100	Preparation	Loss of plant specimens of conservation interest	Medium	Low										X	
101	Construction	Loss of plant specimens of conservation interest	High	Low										X	
102	Exploitation/ Maintenance	Loss of plant specimens of conservation interest	Medium	Low										X	
103	Preparation	Localised disturbance of terrestrial fauna and risk of mortality	Medium	Low										X	

Impact No.	Phase	Impact	Impact - Relative importance	Residual impact - Relative importance	PEPP	PAR	PRMS	PGPC	PG Migration (PGM)	PGES Construction	PASR	PGES O&M	PGEC	PG Biodiversity	Other PG Enviro
104	Construction	Localised disturbance to terrestrial fauna and risk of mortality	Medium	Low										X	
105	Operation/Maintenance	Localised disturbance to terrestrial fauna and risk of mortality	Medium	Low										X	
106	Preparation	Impacts on animals of conservation interest	Medium	Low										X	
107	Construction	Impacts on animals of conservation interest	High	Low										X	
108	Exploitation/Maintenance	Impacts on animals of conservation interest	High	Low										X	
109	Preparation	Risk of dispersal of exotic and/or invasive species	Medium	Low										X	
110	Construction	Risk of dispersal of exotic and/or invasive species	Medium	Medium										X	
111	Operation/Maintenance	Risk of dispersal of exotic and/or invasive species	Medium	Medium										X	
112	Preparation	Impacts on an area recognised for its biodiversity	Average	Average										X	
113	Construction	Impacts on an area recognised for its biodiversity	Average	Average										X	
114	Operation/Maintenance	Impacts on an area recognised for its biodiversity	Significant	Significant										X	

13.1. Impact management measures

Impact management measures are organised and detailed in the following sub-sections according to each phase of the project and each of the management plans to which they relate.

The impact management measures detailed here follow the mitigation hierarchy aimed at anticipating and avoiding, or, where avoidance is impossible, minimising, and, in the event of residual impacts, offsetting the risks and impacts on workers, affected communities and the environment.

13.1.1. Impact management measures during the preparation phase

13.1.1.1. Physical environment

■ MP1. Development and implementation of a Site Environmental Management Plan (SEMP)

The aim of this measure is to minimise impacts on the physical environment during the preparation and construction phases. This PGEC must include the specific measures listed below:

MP1A1 Development and implementation of measures to address the visual impacts of quarries and borrow pits

The Project itself has little long-term visual impact, as it simply involves the construction of existing roads and tracks, but the necessary quarries and borrow pits may leave visible traces for a long time.

- Preferably choose sites that are not visible from the road (but no more than 100 metres away to reduce the impacts associated with the creation of a new access road).
- Check the choice of sites with the environmental and social team, residents and authorities.
- Rehabilitate sites as soon as possible, ensuring that conditions and uses are restored as closely as possible to their original state:
 - Separate and store soil, if present, before extracting sand, gravel and laterite.
 - Softening of slopes after extraction.
 - Replacement of soil, if possible.
 - Use local plant species for revegetation.
- Check the state of rehabilitation after closure and after 5 and 10 years.

MP1A2 Development and implementation of measures to protect air quality and the climate

Construction and maintenance work will have an impact by producing gas and particle emissions and atmospheric dust. The nuisance generated by construction and maintenance work must be controlled in order to limit any impact on the health or quality of life of workers and local populations, as well as on the surrounding flora and fauna.

Gas emissions from the construction site must comply with IFC standards (General EHS Guidelines: Environment - Air Emissions and Ambient Air Quality, 2007), in particular by implementing appropriate maintenance of machinery, lorries and any generators. The burning of waste will be prohibited.

The contractor shall take all reasonable measures to minimise air pollution, whether from exhaust emissions, construction processes, traffic on the site or site operations. The contractor shall at all times use its equipment and vehicles in such a way as to minimise exhaust emissions. If, in the opinion of the engineer in charge of monitoring and supervision, the exhaust emissions from any of the contractor's equipment or vehicles are excessive, whether due to poor engine adjustment, poor fuel quality, inefficient operating conditions or any other rectifiable cause, the engineer may order the shutdown of such equipment or vehicles until appropriate corrective measures are implemented, and the contractor shall comply with such instructions immediately.



Air quality levels resulting from project emissions shall comply with the World Bank/IFC's general environmental, health and safety guidelines (EHS, 2007), which are based primarily on WHO standards. The table below shows the standards according to the most recent WHO update (2021).

Table 135 : WHO 2021 reference thresholds for air quality (guidelines)

Pollutant	Period used to calculate averages	2021 reference threshold
PM_{2.5}, µg/m³	Year	5
	24 hours ^a	25
PM₁₀, µg/m³	Year	15
	24 hours ^a	50
O₃, µg/m³	Seasonal peak ^b	60
	8 hours ^a	100
NO₂, µg/m³	Year	10
	24 hours ^a	—
SO₂, µg/m³	24 hours ^a	40
CO, mg/m³	24 hours ^a	4

µg = microgram

^a 99th percentile (3 to 4 days of exceedance per year).

^b Average of the maximum daily 8-hour average O₃ concentration during the six consecutive months with the highest average O₃ concentration.

Note: Annual exposure and exposure during a seasonal peak are long-term exposures, while exposure over 24 hours and 8 hours are short-term exposures.

The guideline levels in the table above may be increased by considering intermediate targets that serve to guide efforts to reduce air pollution in order to quickly achieve the reference thresholds.

With regard to dust from road traffic and construction activities, speeds will be limited to 30 km/h on and around construction sites. Traffic speeds will be limited by concrete measures such as speed bumps or GPS monitoring. If necessary, regular watering of road surfaces in all sensitive areas will be carried out. In terms of material storage, dust-generating materials will be watered, particularly during periods of high wind.

The following specific measures will be observed:

- Avoid burning vegetation (cut or standing) during land clearing. This is a source of air pollution. Consider shredding and composting to improve soil quality.
- If necessary, wet the roads. One of the most significant sources of particulate matter in the air is vehicles on unpaved roads during the dry season. Wetting the roads is a useful approach to reducing dust, but care must be taken to ensure that the use of water does not deprive residents or aquatic organisms.



- Reduce vehicle speeds on unpaved roads to 40 km/h or less if possible, and to 30 km/h on construction sites. The volume of atmospheric particulates emitted by vehicles is clearly related to vehicle speed.
- Plan trips and journeys to reduce travel. Reducing the number of trips reduces particulate matter and gas emissions.
- Choose newer equipment and ensure that regular maintenance is carried out in accordance with the manufacturer's recommendations;
- Equip transport trucks and other equipment with standard emission control devices (i.e. catalysed diesel particulate filters).
- Keep machinery and vehicles in good working order. Machinery in good condition pollutes less.
- Switch off machinery and vehicles when they are not in use. Do not leave machinery idling when it is not in use. This reduces emissions, noise and diesel consumption.
- Ensure that operators are trained in efficient transport and handling techniques.
- Ensure that machinery and other equipment use low-sulphur diesel fuel wherever possible.
- Where possible, select sustainable aggregate materials for road surfaces that have been screened or washed to reduce the fraction of fine particles.
- When transporting road materials, use covered trucks to reduce atmospheric dust production.

A reforestation plan should also be included, taking into account the rehabilitation of sites developed for the construction project (base camp, storage car park, etc.) and a reforestation plan to offset the project's GHG emissions associated with the construction and operation of the upgraded RN 32 and the felling of tree species of concern. This could be done in coordination with the biodiversity loss compensation plan, but it is not typically accepted that the same reforestation can satisfy both GHG and biodiversity loss compensation.

MP1A3 Development and implementation of measures for noise pollution

Noise pollution affects workers, residents and animals

The measures to be employed are as follows:

- A noise reduction plan must be developed and incorporate all noise requirements
- Avoid working in the evening, especially near villages or areas sensitive to wildlife. Noisy work (explosives, lorry traffic on public roads) will be prohibited at night (between 7 p.m. and 7 a.m.). The supply of materials will be prohibited between 10 p.m. and 7 a.m., on Sundays and public holidays.
- Stop machinery and vehicles when they are not in use. Do not leave machinery idling when it is not in use. This reduces emissions, noise and diesel consumption.
- Plan journeys and trips to reduce travel. Reducing the number of journeys reduces noise.
- Maintain machinery and vehicles in good working order. Machinery in good condition makes less noise.
- All mobile equipment shall be fitted with effective noise control devices and these devices shall be in good working order. Some machinery has optional noise control devices.
- Assess the feasibility/availability of white noise reverse alarms for mobile equipment. For safety reasons, most construction machinery and lorries have reverse alarms. These increase the noise level on a construction site.
- Where possible, choose machines that make less noise.



MP1A4 Development and implementation of measures for materials management and earthworks

Before any operation requiring earthworks, an earthworks management plan must be drawn up. It must detail (i) the extraction areas, the planned permanent and temporary deposit areas, (ii) the characteristics of the deposits (height, slope, type of materials), (iii) measures to maintain or restore natural drainage, (iv) proposed anti-erosion measures, and (v) measures to restore deposits and extraction areas at the end of the project (type of proposed use, revegetation, erosion protection).

The following measures must also be included and developed in the earthworks management plan:

- Management of stripped topsoil: it will be necessary to differentiate between topsoil and inert soil in order to reuse the topsoil from the original site and ensure soil fertility at the end of the project. The management of topsoil stripped by any earthwork's activity must include its storage, replacement and, in the event of a proven surplus, its reuse in adjacent agricultural areas. The condition of the stored topsoil must be monitored in order to regularly check that it remains biologically functional.
- Deposit areas and protection of loose materials: Deposit areas for loose materials that will not be remobilised for six months shall be covered with a thin layer of topsoil to encourage the development of herbaceous vegetation. The slopes of other temporary deposit areas shall be protected with synthetic cover. Deposit bases must not be located too close to a riverbank. In addition, natural herbaceous or shrub vegetation must be maintained in this area to act as a natural filter for runoff water before it reaches the river.
- Management of surplus earthworks: The QGMI team will need to determine whether there is a surplus of material from soil stripping and excavation, but for the moment it appears that estimates indicate that the excavated material will be less than the backfill material required. In the event of a surplus, QGMI will have to propose measures to manage this potential surplus in order to minimise the footprint and the risk of erosion (recycling, final deposit in the reservoir footprint, etc.).

MP1A5 Development and implementation of measures for drainage and erosion control

Erosion control is a *prerequisite* for ensuring the stability of embankments, the implementation of site revegetation works and the quality of runoff water discharge from land exposed for construction purposes. Erosion control requires the management of drainage systems that channel and diverts water to protect exposed sites. Erosion control measures must be integrated into:

- The design of embankments and excavations, both in the permanent phase and during the temporary phases of the construction site.
- The working methods chosen for all earthworks and materials management.

Erosion control measures must be operational during the rainy season. To this end, the Contractor must anticipate their implementation as ground and embankment preparation work progresses, particularly in view of the length of roads planned for the project. The following measures must be included in the drainage, erosion and sedimentation control management plan (which is closely linked to the earthworks management plan):

- Maintenance of vegetation on sites where there is no earthworks: erosion control on the site must first and foremost involve minimising deforested and stripped areas. Where simple deforestation is sufficient, low vegetation cover and root systems will be maintained. The use of tracked vehicles will be prohibited for deforestation in these areas.
- Installation of drainage and sedimentation basins: Prior to any earthworks or material storage, the area concerned shall be defined and equipped with a drainage system along its perimeter, leading to a sedimentation basin designed to collect sediment before it is discharged into the river. A procedure for the appropriate sizing of the network and basins will be established by the Contractor. For this type of structure,



it must be demonstrated that it is capable of meeting the requirements resulting from 24-hour precipitation and a 2-year return period. The basin will be cleaned as soon as its active volume is reduced by 50% due to accumulated sediment.

- Implementation of erosion control measures on all stripped areas: The management of topsoil stripped by any earthworks activity must provide for its storage, replacement and, where appropriate, reuse in adjacent agricultural areas.

MP1A6 Development and implementation of measures for effluent discharge and water quality management

The challenge of discharge management is to protect the water quality of the watercourses in the study area. This objective also makes it possible to limit the impact of discharges on sensitive elements of the environment, such as fish fauna and surrounding human populations (health and economic activities). In accordance with good practice, the number of discharge outlets into the environment will be minimised. The following measures will need to be integrated and developed:

- Installation of wastewater treatment systems: A conventional sewerage network with wastewater treatment must be installed in all construction areas (particularly the site camp and quarry area). Where possible, infiltration into the ground will be preferred to surface discharge into the thalweg. The Contractor shall describe the measures taken to treat runoff water, including a description of the treatment units (location, design of the facilities, capacity, type of treatment, monitoring of the effectiveness of the facilities, particularly in the event of heavy rainfall, and monitoring of the quality of the effluent leaving the unit) and the expected results in terms of the quality of the discharge into the environment. Discharges into the natural environment must comply with Guinean regulations and international best practices (environmental, health and safety guidelines, section 1.6 waste management, IFC, 2007).
- Vehicle maintenance and refuelling area: Vehicle maintenance, washing and refuelling must be strictly limited to areas designated for this purpose. These areas will be equipped with a concrete slab and perimeter drainage to carry runoff water through an oil separator (QGMI already has a functional protocol in place for this).
- Prohibition on crossing watercourses outside specifically designated areas: In order to prevent water pollution, particularly through the suspension of sediment, crossing any watercourse is prohibited outside of specific, specially designed crossing points. The facilities will be adapted to the size of the watercourses and must not obstruct flow or cause erosion.
- Installation of sedimentation basins for the recovery of concrete-rich wash water.

MP1A7 Development and implementation of measures for river crossings

Watercourse crossings are one of the aspects that can have the most negative impact on the natural environment, along with work in watercourses, but they are also an aspect that can greatly improve the unimpeded passage of water and aquatic organisms.

Avoidance measures can reduce the problems associated with crossings and can take the following forms:

- Avoiding particularly difficult passages by changing the location of the structure. In some cases, it may be preferable to consider relocation to avoid certain very long crossings or those with very steep walls. Avoidance should also seek to minimise the loss of riparian vegetation.
- Detailed planning of the crossing construction site, keeping site elements as far away from the watercourse as possible (parking for machinery and vehicles, refuelling areas, material storage areas).
- Avoid any work in the water or on the banks by machinery unless absolutely necessary.



- Carry out work during the period when there is the least water in the watercourses. This generally avoids or greatly reduces many problems. This period obviously coincides with the season with the least rainfall, which also reduces soil erosion on adjacent slopes.

The type of structure installed will largely determine the impacts during installation, but also, and more importantly, the long-term impacts of the structure. Below are some considerations that may help with this choice.

- The size and positioning of culverts are critical to avoid problems with the passage of water and aquatic organisms. If they are undersized and poorly positioned, they will cause significant impacts.
- Bridges that are high enough to allow free passage of water, even during floods, aquatic animals, and even animals passing on the banks, are obviously preferable from an environmental point of view.
- The recommended structures from an engineering point of view should be reviewed with the environmental team.

In terms of permits, applications must be made for major or very major crossings. Article 26 of Guinea's Water Code (1994) states: "Art.26.- The installation of structures in the floodplain of a navigable watercourse or in a flood zone is subject to authorisation issued jointly by the Ministries responsible for water resources and transport respectively. The boundaries of the floodplain of a watercourse are determined by order of the Minister responsible for water resources." In order to make these applications, once the preliminary engineering studies have been completed, it may be necessary to carry out more detailed environmental studies and, if necessary, recommend realignments or specific protection measures. These more detailed studies will accompany the permit applications.

Permit applications will also have to be made for water abstraction: Water Code "Art.8.- Any natural or legal person governed by public or private law wishing to use water resources or modify an already permitted or granted use shall submit an application to the Minister responsible for water resources."

Work on watercourses is the source of several potential impacts. The protection of surface water quality depends in part on measures to reduce erosion and the increase in particles in the water, and measures to reduce accidental leaks of pollutants. The measures to be employed are as follows:

- Given the importance of measures to protect watercourses during the construction and maintenance of crossing structures, an environmental inspector from the administration must be on site to ensure that the measures are properly complied with:
- Quickly protect any stored soil from erosion;
- Build filter dams to minimise erosion of overburden and mudslides into watercourses;
- Stabilise banks and shoulders by planting shrubs, grass or other vegetation, or by laying paving stones along the edges of bridges;
- Create settling basins and/or lagoons to minimise disruption to the region's hydrographic network;
- Review and revise the hazardous materials management plan to ensure that all potential sources of contamination have been taken into account in the hazardous materials management plan;
- Carry out checks on machinery and vehicles to prevent accidental leaks and spills of hazardous materials (hydrocarbons, etc.);
- Perform maintenance work on machinery and mobile equipment off-site in a workshop if possible. All used oil will be collected in accordance with UNOPS standard procedures for hazardous waste;
- Refuel mobile equipment and machinery off-site if possible, or comply with safe practices if done directly in the field;
- Apply precautionary measures during the transport, handling and installation of equipment containing oil.



- Prevent any type of waste from accumulating at the work site. Recycle all metal waste and other recyclable materials.
- Send spoil contaminated by construction activities or oil spills to a decontamination site.
- Store materials and equipment in a temporary storage area built for this purpose as part of the Project;
- Ensure that all contractors (subcontractors of QGMI) comply with the environmental practices of this ESIA and EMSP;
- Maintain containment barriers to prevent hazardous waste from reaching the environment;
- Prohibit direct discharges, even if treated, and avoid discharges into watercourses and wetlands;
- Recover and reuse product losses to prevent them from entering watercourses;
- Monitor the hydrocarbon content of discharges;
- Consider the risk of pollution from concrete slurry during construction work;
- Manage water to reduce consumption and excessive discharges;
- Systematically dismantle temporary structures at the end of the project;
- Provide maintenance trucks to collect used oil;
- Provide absorbent products (anti-pollution kits) in maintenance vehicles and workshops;
- Keep spill kits on hand where hazardous materials (including oil and fuel) are handled;
- Provide sanitary facilities for people on construction sites, especially those near waterways.
- Develop an emergency plan in case of accidental oil pollution of waterways;
- Ensure that all water intakes do not pose a problem for residents or aquatic biodiversity.

MP1A8 Development and implementation of waste management measures

The waste management plan shall include procedures, in accordance with local regulations and international best practices (IFC EHS Guidelines), for the handling, transport, storage, treatment and disposal of waste according to its category:

- Non-hazardous waste (Group A): putrescible waste from camps and canteens, paper, cardboard, plastics, wood and vegetation, inert construction or demolition waste (concrete, scrap metal, bricks, breeze blocks, etc.);
- Hazardous waste (Group B): corrosive, explosive or toxic waste that poses a danger to humans or the ecosystem. This mainly includes used motor oil and hydraulic fluids, paint residues, solvents and resins, transformer fluids, hospital waste, septic tank sludge and various concrete additives (the latter being less hazardous).

For all types of waste, the Contractor shall take all necessary measures and, in particular, choose appropriate operating methods to reduce waste production at source. It shall be prohibited to burn waste on site (except in an incinerator used in accordance with best practice).

MP1A9 Development and implementation of measures for the management of accidental spills

In the event of an accidental spill, the objective of this plan is to have the appropriate human and material resources available in order to reduce response time and thus limit pollution to the smallest possible area. This plan will help to limit the impact on the physical and biological environment in the event of an accidental spill and to limit the indirect impact on the human environment, in particular the impact on health.



An anti-pollution programme must be put in place to define the procedures for responding to leaks or accidental spills of liquid products. This programme shall include: (i) identification of risks, (ii) a description of the planned response organisation and the roles of key personnel, (iii) a description of the pollution control equipment to be installed at storage sites (anti-pollution kits, fire extinguishers, safety data sheets, etc.), (iv) specific training on emergency response procedures, which will be provided to all employees.

The following measures shall be complied with:

- Review and revise the hazardous materials management plan to ensure that all potential sources of contamination have been taken into account in the management plan;
- Perform checks on machinery to prevent leaks and accidental spills of hazardous materials (hydrocarbons, etc.);
- Perform maintenance work on machinery and mobile equipment off-site in a workshop if possible. All used oil will be collected;
- Refuel mobile equipment and machinery in an appropriate location if possible, or comply with safe practices if refuelling is carried out directly on site.
- Take precautions during the transport, handling and installation of equipment containing oil;
- Prevent any type of waste from accumulating at the work site. Recycle all metal waste and other recyclable materials.
- Send spoil contaminated by construction activities or oil spills to a decontamination site.
- Store materials and equipment in a temporary storage area built for this purpose as part of the Project. This area will be fenced off and guarded by security personnel to prevent vandalism and theft, which can cause soil contamination;
- Ensure that all contractors (subcontractors of QGMI) comply with the EMSP's environmental practices;
- Maintain containment barriers to prevent hazardous waste from reaching the environment.
- Maintain spill kits where hazardous materials (including oils and fuel) are handled.

Summary of PGEC activities to be developed during the preparatory phase and for which partial implementation will begin.

Table136 : PGEC activities in the preparation phase

MP1A1	Development and implementation of measures for the visual impacts of quarries and borrow pits
MP1A2	Development and implementation of measures to protect air quality and the climate
MP1A3	Development and implementation of measures to address noise pollution
MP1A4	Development and implementation of measures for materials management and earthworks
MP1A5	Development and implementation of measures for drainage and erosion control
MP1A6	Development and implementation of measures for effluent discharge and water quality management
MP1A7	Development and implementation of measures for watercourse crossings
MP1A8	Development and implementation of measures for waste management
MP1A9	Development and implementation of measures for accidental spill management



13.1.1.2. *Biological environment*

■ **MB1. Development and implementation of a Biodiversity Management Plan (BMP)**

The BMP is the operational document. In accordance with IFC Guideline 6, "for all projects that are likely to convert or significantly degrade natural habitats and for projects implemented in critical habitats, these biodiversity actions must be consolidated in a Biodiversity Management Plan (BMP)".

The preparation of a BMP, in accordance with the requirements of IFC NP6 and the Guinean Environmental Assessment Authority, is a continuation of the work of the ESIA. It must be developed before the preparation phase, once all the technical elements of the project have been finalised.

The BMP is sometimes accompanied by a separate Biodiversity Action Plan (BAP). The PAB is a more strategic plan than the PGB and is used when there are complex issues of critical habitat and compensation that need to be taken into account. In particular, it addresses the issues of no net loss and net gains required by NP6. In this case, given the lack of critical habitat, a summary PAB included in the PGB will suffice.

The preparation of the PGB allows, in particular, for:

- Consolidate and compile the various complementary studies, mitigation measures, monitoring measures and action plans proposed in the ESIA into a single integrated plan;
- Define the specific actions to be taken, the expected results in terms of biodiversity management, the appropriate timelines and key milestones, and integrate them into the project's operations.

The content of the BMP should be structured as follows:

- Scope of the project: this section briefly describes the main characteristics of the project.
- Objectives in terms of biodiversity protection, in particular in this case, no net loss.
- Biodiversity framework – Policy and commitment: this section presents the institutional and regulatory framework related to biodiversity and ecosystem services, as well as the IFC's requirements with regard to biodiversity.
- Stakeholder engagement: the various stakeholders and their types of engagement for the successful implementation of the BMP and/or to create the right environment for the implementation of some of its actions are presented.
- Biodiversity context: this section outlines the biodiversity issues identified in the project study area.
- Identified impacts on biodiversity: summarises the expected impacts of the project on biodiversity and ecosystem services.
- Activities to be carried out, as well as the specific project requirements necessary to achieve the PGB objectives.
- The project requirements that the entities responsible for implementation must comply with in order to achieve the objectives of the PGB.
- Residual impacts and compensation strategy: this section assesses the residual impacts after implementation of mitigation measures and the need to implement compensation measures. Secondly, the principles of the compensation strategy are outlined in order to carry out, if necessary, a detailed compensation study, the results of which must be included in the PGB.
- Mitigation measures monitoring and evaluation plan: after presenting the framework for developing the monitoring and evaluation plan, the plan itself is presented, along with its list of state, pressure and response indicators. The procedures for data management and reporting of results are also detailed.

Implementation of the PGB: the PGB implementation timetable, human and logistical resources and the PAB budget are detailed in this section.

The PGB will consolidate and develop all the measures listed in the following sections:

- Micro-adjustments to line routes to avoid natural habitats as much as possible.



- Selection of construction site storage areas based on land use and the sensitivity of the environments present
- Selective clearing to preserve at-risk species
- Planning of works to avoid particularly sensitive periods
- Prevention and control of invasive plant species
- Management of social influxes to protect biodiversity
- Raising staff awareness of biodiversity issues and protection measures
- Rehabilitation and revegetation of sites
- Implementation of a programme to raise public awareness of biodiversity

Each measure may be developed in the form of a fact sheet in the PGB to facilitate its implementation. These fact sheets must contain the following information:

- Title of the measure and numbering
- Purpose of the measure: habitat or species targeted and impact addressed by the measure
- Implementation of the measure: phase of the project concerned, duration of the measure, description of the measure, person responsible for implementing the measure, technical or institutional support, target objective
- Estimated timetable
- Budget

The measures listed below must be developed during the preparatory phase and then implemented during the construction phase.

MB1A1 Development and implementation of avoidance measures

Avoidance is the most effective approach to biodiversity protection and the preferred approach according to the mitigation hierarchy. Avoidance in the choice of route for the RN32 and the access road to the quarry is limited as these roads already exist. However, avoidance also applies in the context of construction work. Construction work must be carried out within clearly defined work areas and access to neighbouring areas must be prohibited (with specific exceptions). The choice of the construction period can also help to avoid impacts.

The Contractor shall use the best available techniques to ensure that the areas to be cleared do not exceed the authorised limits. The measures to be used for spatial avoidance are as follows:

- Avoid, where possible, watercourses, existing gallery forests and remnants of dense forests;
- Clearly mark (with signs, barriers, fences) the work areas;
- Prohibit access outside work areas or paths leading to them, on foot or by vehicle. This is to reduce disturbance to animals, destruction of vegetation (crushing or fire risk) and soil compaction.
- Explanations given to all workers on the reasons for implementing these measures;
- In particularly sensitive areas, reinforce prohibitions with signs.

Another form of avoidance is avoidance over time. In tropical areas, species tend to be active all year round, but in regions with distinct dry seasons, such as here, there is a tendency for reproductive activity to decrease during the dry season. It is therefore important to carry out clearing during the dry season. Once cleared, the area will be less sensitive and other activities can continue without time restrictions. This obviously also applies to river crossings and wetlands.

- In very general terms, clearing work should be carried out between November and May (inclusive).
- All work in watercourses or wetlands must be carried out during the period when the water levels are at their lowest, i.e. during the dry season.

MB1A2 Development and implementation of access management measures for the protection of biodiversity



The opening of new access routes will mainly be linked to the quarry or a base camp. These developments will be limited and will focus on improving existing access rather than creating new access routes. However, any new access routes may later facilitate illegal access to natural resources and harm biodiversity (poaching and illegal gathering). A set of measures will need to be put in place to limit these effects:

- Limit access to that which is strictly necessary for site activities. All access will be controlled and authorised only for site personnel during working hours (QGMI already has specific protocols for controlling access to its sites).

MB1A3 Development and implementation of measures for land clearing

Land clearing is an activity that directly harms the animals and plants present.

The following measures should be taken:

- An environmental inspector must be present during land clearing. The inspector must ensure that the explicit measures are complied with. In addition, he or she must exercise caution in the event of unexpected discoveries (e.g. unexpected animals or archaeological specimens).
- It is essential to adhere to the specified width. If possible in certain sensitive areas, such as gallery forests, this width should be reduced.
- Clearly mark out the area to be cleared and the route for machinery on the ground.
- Ensure that these boundaries are respected. No work or even walking outside the boundaries is permitted. The presence of a large number of people in areas outside the work zone can have a negative impact on the wildlife around the site. Hunting or gathering natural products outside the work zone is strictly prohibited.
- Avoid clearing more than is absolutely necessary.
- Keep the area used by heavy machinery to the strict minimum required. Soil compaction outside the area to be worked on is harmful.
- Avoid driving heavy machinery too close to trees that are to be preserved.
- Take measures to prevent accidental fires in the vegetation.
- If trees need to be felled, the wood should be made available to nearby residents;
- The environmental inspector shall keep a record of felled trees, by species and diameter.
- Clearing must be carried out in such a way as to help animals move to areas that will not be cleared. In particular, the creation of temporary habitat islands must be avoided.
- Where possible in sensitive areas, carry out initial clearing by hand before using machinery. This will allow some animals to escape.
- During clearing, if it is obvious that animals are present (mammals, birds, reptiles, amphibians), try to scare them away, for example by making noise. For amphibians and lizards, capture them if possible and remove them from the area to be cleared. Do not do this for snakes, as there may be dangerous species present.
- Avoid deliberately killing animals during clearing.
- Take into account the recommendations of specialists who will conduct field visits prior to clearing.
- As specified in the mitigation measures for the physical environment and in the following section, take all necessary measures to prevent erosion and contamination of streams.

MB1A4 Development and implementation of measures to reduce bush fires

Bush fires are a significant risk to vegetation and animals in the region, and measures must be taken to avoid or minimise this risk.

The measures to be employed are as follows:



- Total ban on burning plant waste cut during land clearing;
- Prohibition on the use of fire during dry periods and in natural habitats (outdoor cooking fires, cigarettes);
- Obligation to report any outbreak of fire;
- Provision of means to fight bush fires for each field team;
- Training of employees on how to fight small bush fires safely;
- Evacuation of employees in the event of large fires.

MB1A5 Development and implementation of noise control measures

- General measures to reduce or control noise are given in the physical environment section. However, there are some measures specific to biodiversity protection that must be considered.
- The measures to be employed are as follows:
- Take into account sensitive areas near the site and ensure that work is carried out in such a way as to limit noise in important habitats (gallery forests, wooded areas). For example, by starting work in the most remote area. This will ensure a gradual increase in noise (perhaps allowing for habituation).
- Where possible, place noise-generating equipment in locations away from important habitats.
- Avoid making too much noise at night, early in the morning, and at dusk. These are key periods for many animals and they will be most affected. If possible, simply avoid all night work.

MB1A6 Development and implementation of air quality measures

General measures to reduce impacts are given in the physical environment section. However, there are some specific measures for biodiversity protection that must be considered.

The measures to be employed are as follows:

- Avoid burning vegetation (cut or standing during land clearing). This is a source of air pollution. Consider shredding and composting to improve soil quality during rehabilitation.
- Ensure that soil storage piles are well protected from the wind by stabilising them with vegetation.
- Ensure that areas that are no longer needed are rehabilitated as soon as possible. This reduces dust and rehabilitates habitats.

MB1A7 Development and implementation of specific measures associated with watercourse crossings

General measures to reduce impacts are given in the physical environment section. However, there are some specific measures for biodiversity protection that must be considered.

The choice of structure must be made taking into account the protection of aquatic species. Generally, the protection of large species, such as fish, also ensures the protection of smaller animals. The choice of structures must be made by applying standard crossing assessment systems such as the ONEMA report *Evaluating the crossing of obstacles by fish* (Baudoin et al, 2014).

The choice of structure should also take into account the issue of passages for terrestrial animals. With a relatively narrow road and relatively low traffic, many animals will cross the road directly. This poses a risk to both animals and vehicles. It is therefore prudent and beneficial for biodiversity to ensure that structures are large enough and have dry sections to allow terrestrial animals to pass through.

Engineers will need to discuss bridges and culverts with biologists when determining the details of dimensions and shapes.

Other specific measures to be employed are as follows:

- An environmental inspector must be present during any work in or near waterways;



- Avoid any work in the water or on the banks unless absolutely necessary;
- In particular, reduce the presence of machinery in the watercourse to a strict minimum and do not leave machinery stationary in the watercourse.
- Carry out work during the dry season to reduce these negative impacts.
- If field studies are carried out, avoid the spawning season of the fish species present. Normally this will not be a problem during the dry season.
- Avoid destroying vegetation on the banks as far as possible.
- Build filter dams to minimise erosion of overburden and mudslides into watercourses in the project area.
- Stabilise riverbanks and shoulders by planting shrubs, grass or other herbaceous plants, or by laying paving stones along the edges of bridges.
- Create settling and/or lagooning basins to minimise disruption to the region's hydrographic network.
- Provide maintenance trucks to collect used oil.
- Provide absorbent products (anti-pollution kits) in maintenance vehicles and workshops;
- Develop an emergency plan in case of accidental oil pollution.
- Move refuelling points away from watercourses;
- Monitor the hydrocarbon content of liquid discharges;
- Manage water to reduce consumption and excessive discharge;
- Prohibit direct discharges, even if treated, and avoid discharges into waterways and wetlands;
- Recover and reuse product losses to prevent them from entering waterways; and
- Systematically dismantle temporary structures at the end of the project.

MB1A8 Development and implementation of measures for quarries and borrow pits

Quarries and borrow pits are a source of various impacts, and reducing these impacts depends on good site selection and proper rehabilitation.

The quarry has already been the subject of a specific selection study, but it seems likely that there will be several possible options for borrow pits. When there are alternative options, it will be necessary to:

- Choose a site outside of any natural habitat if possible;
- Choose a site that requires the least amount of track construction to access it (less than 100 metres if possible);
- Avoid proximity to watercourses;
- Avoid proximity to sensitive habitats (gallery forests, bowés and riparian vegetation);
- Choose a site that is not visible from the road to reduce the impact on the landscape for road users, but it is also possible that depressions will retain water and could attract local wildlife, and it is better not to attract the attention of passers-by;
- Keep the area to be cleared to a minimum.

The clearing measures given above are applicable.

After closure, the sites will need to be rehabilitated:

- Follow the rehabilitation practices above.
- Return the site to its original use and condition.
- Close the access track to the site.

MB1A9 Development and implementation of measures for the base camp



Base camps are a source of various impacts, and reducing these impacts depends on choosing the right sites, managing them properly and rehabilitating them effectively.

When choosing the location of the base camp, if the current site cannot ultimately be used, the following factors should be taken into account in order to protect the biological environment:

- Choose a site outside a natural habitat if possible;
- Choose a site that requires the least amount of track construction to access it;
- Avoid proximity to watercourses;
- Avoid proximity to sensitive habitats;
- Minimise the area that may need to be cleared.

Clearing and other activities will be carried out in accordance with the above measures.

During the occupation of the base camp, it will be necessary to:

- Ensure proper waste management to avoid attracting animals. Install bins and rubbish bins at construction sites and base camps.
- Ensure proper management of dirty water to avoid pollution of waterways and wells. Install sanitary facilities (toilets and latrines) at construction sites and base camps.
- Not allow employees to hunt, fish or collect wood locally. Raise employee awareness of the problems of poaching and the penalties incurred.
- Prohibit the transport and consumption of wild animal products.

After the closure of the base camp, the site must be cleaned and rehabilitated:

- Follow the rehabilitation practices above.
- Return the site to its original use and condition.

MB1A10 Development and implementation of habitat rehabilitation measures

Habitat rehabilitation will be fairly limited in terms of surface area: crossing sites, car parks, base camp, borrow pits, quarries, etc. Ideally, the aim of rehabilitation is to restore the habitats that existed before the intervention and, in some cases, even to create habitats of higher environmental value.

The main challenge in this regard is to reduce any potential long-term impact caused by land use for construction purposes. These rehabilitation and revegetation measures are mainly to be implemented at the end of the construction project as it progresses. Nevertheless, the Contractor shall anticipate this phase of the project in order to ensure the availability of sufficient equipment and the supply of seeds and plants necessary for the revegetation work. The restoration of these habitats will, in particular, reduce the final compensation expected for natural habitats.

The Contractor shall reforest or rehabilitate all areas under its responsibility after dismantling the site. The species to be planted (local species only, favourable to endangered fauna and locally important flora) shall be approved by experts.

The measures to be taken are as follows:

- When areas are to be rehabilitated, separate the organic soil on the surface, if any, during earthworks to aid subsequent rehabilitation.
- Use local species that can contribute to the ecosystem value of the habitat.
- Replace the soil that was removed during the initial earthworks. This soil is a veritable seed bank of species adapted to local conditions.
- Carry out rehabilitation as quickly as possible.

The plan should include the following elements:



- A detailed schedule of actions to be taken (creation of the nursery, earthworks, etc.) and the human resources allocated to each phase.
- Identification and mapping of the areas to be restored and their characteristics (surface area, slopes, soil characteristics, etc.). The restoration options planned for each type of site. These options must be validated by experts and the project owner prior to the implementation of restoration or revegetation measures.

MB1A11 Development and implementation of compensation measures

According to IFC NP6, any loss of natural habitat is expected to be compensated for in order to ensure "no net loss of biodiversity". A biodiversity loss compensation mechanism will need to be designed and implemented to achieve measurable conservation results.

A compensation plan will need to be established to ensure this zero or preferably positive impact on biodiversity. It is clear that, despite the positive impacts of the new bridges and culverts, the project will have mostly negative impacts on biodiversity (loss of habitat, increased traffic, induced impacts). This therefore requires compensation measures, which will be the subject of a specific study (Biodiversity Management Plan, Biodiversity Action Plan if necessary).

MB1A12 Development and implementation of measures for employees to protect biodiversity

Staff will be prohibited from consuming bush meat or wild fish in order to encourage a reduction in local poaching practices. The following preventive measures are recommended:

- Formally prohibit all employees from hunting and fishing in the project area, as well as weapons and traps within the workers' camp and on construction sites.
- Formally prohibit the consumption of game within the project base camp; a regular supply of animal protein will compensate for bush meat and will be provided in the canteens and butcher's shop in the camp.
- Organise the supply of food for staff using local channels.
- Train all staff on the prohibition of gathering, fishing or hunting (particularly in view of local poaching practices).
- Raise awareness among all site staff about the fight against poaching in order to prevent the development of a local trade in bush meat or wild fish. This measure will be aimed particularly at local staff, who will be encouraged to convey this message and these practices to their families living near the project area.
- Implement enhanced controls on site (base camp, construction site area).

MB1A13 Development and implementation of measures to prevent and control invasive plant species

Specific measures to limit the spread of invasive flora must be implemented:

- Verification by the environmental inspector of the presence of invasive species;
- Before transporting construction machinery to the project site, thoroughly clean the machinery (inside and outside) at the departure site to ensure that there are no invasive plants;
- Check the exit and, if necessary, remove seedlings of invasive species from the construction site/structure area;
- Raise staff awareness of how to identify and eradicate invasive species;
- Regularly mow and cut back invasive species residues.
- Reforest and revegetate after dismantling the site, using only species that are naturally present in Guinea (native) and do not have invasive characteristics.

As a reminder, IFC NP6, paragraph 23, stipulates that "Where alien species are already present in the country or region hosting the proposed project, the client shall take appropriate precautions to prevent their spread to areas where they are not yet present. Where possible, the client shall take measures to eradicate these species from natural habitats over which it has control."



MB1A14 Development and implementation of measures to raise staff awareness of biodiversity issues and protection measures

A programme to raise awareness among all personnel working on site (including subcontractors, local and non-local employees) and to provide information on biodiversity shall be developed and implemented. This training shall be carried out before any work on site (e.g. during induction). The aim is to establish a code of conduct for the protection of biodiversity.

MB1A15 Development and implementation of measures to reduce collisions

The risk of collisions is particularly high during the construction phase when there will be a greater number of lorries on the road. Certain general measures should be considered and may also be applicable in other situations and even during the operational phase.

The measures to be used are as follows:

- Specify and strictly enforce a speed limit for all project vehicles. For large lorries, the ideal speed at night would obviously be lower. Clearly, a speed limit can only be effective if it is respected.
- Implement specific speed restrictions when working on crossings over large waterways.
- Provide driving courses for drivers that include awareness of environmental issues in general and collision risks in particular.
- Drivers will be required to keep a log of sightings of large animals (dead or alive) and collisions with large animals. The inspector will be notified as soon as possible in the event of a dead animal so that information can be collected (photos, measurements, samples, etc.).

Summary of activities to be developed for the PGB during the preparatory phase and for which partial implementation will begin.

Table137 : PGB activities in the preparation phase

MB1A1	Development and implementation of avoidance measures
MB1A2	Development and implementation of access management measures for biodiversity protection
MB1A3	Development and implementation of measures for land clearing
MB1A4	Development and implementation of measures to reduce bush fires
MB1A5	Development and implementation of noise control measures
MB1A6	Development and implementation of measures for air quality
MB1A7	Development and implementation of specific measures related to river crossings
MB1A8	Development and implementation of measures for quarries and borrow pits
MB1A9	Development and implementation of measures for the base camp
MB1A10	Development and implementation of habitat rehabilitation measures
MB1A11	Development and implementation of compensation measures
MB1A12	Development and implementation of measures for employees to protect biodiversity



MB1A13	Development and implementation of measures to prevent and control invasive plant species
MB1A14	Development and implementation of measures to raise staff awareness of biodiversity issues and protection measures
MB1A15	Development and implementation of measures to reduce collisions



13.1.1.3. Human environment

■ MH1. Development and implementation of a Stakeholder Engagement Plan (SEP) and a Complaints Management Mechanism (CMM)

The main objective of this measure is to manage the social risks associated with a lack of communication and stakeholder engagement in accordance with the Guinean legal framework and IFC NP 1. Late communication complicates project development: the most effective communication channels are not identified and mobilised, communication costs are poorly assessed, and affected populations may show misunderstanding, mistrust or even rejection of the project, its promoter, the project manager and subcontractors.

Specific measures will be put in place to ensure the inclusion of vulnerable people in information and consultation activities.

The Prefectural E&S Monitoring Committees (CPSES) will be responsible for the environmental and social monitoring activities of the Project. The functions and roles of the committee are specified in the section on Responsibilities in the implementation and monitoring of the implementation of the PGES.

The section 11 presents the project's PEPP and MGP.

The following activities will be developed.

Table138 : Stakeholder engagement activities during the preparation phase

MH1A1	Development of the Stakeholder Engagement Plan
MH1A2	Development of the Complaints Management Mechanism
MH1A3	Recruitment of Community Relations Staff
MH1A4	Establishment of Prefectural E&S Monitoring Committees (CPSES)
MH1A5	Launch and socialisation of the MGP among all stakeholders
MH1A6	Execution and monitoring of the implementation of the Project's PEPP

■ MH2. Development and implementation of a Resettlement Action Plan (RAP) and Livelihood Restoration Plan (LRP)

The objective of this measure is to manage the physical and economic displacement, whether temporary or permanent, caused by the Project in accordance with the Guinean legal framework and IFC NP 5. The main objective of the RAP and PRMS is to ensure that eligible persons affected by economic (PAPs who have lost their homes) and physical (PAPs whose economic activities have been affected) resettlement impacts receive compensation for the loss of their property, structures or land. Furthermore, the objective of the PAR and PRMS is to maintain or even improve the living conditions of those affected, including economic conditions.

The consistency of compensation strategies between the different sections of the project is ensured by the prior formulation of a Resettlement Policy Framework (RPF) applicable to the entire Project, which was being drafted at the time of this report's production.

The PAR and PRMS will incorporate the following measures during their development:

- **Minimising impacts:** minimising the footprint and loss of activities by adapting the project design and schedule.
- **Consult and engage stakeholders:** establish a resettlement committee with the participation of all stakeholders; provide PAPs with a complaint management mechanism; communicate the final project design to the population as early as possible; communicate the compensation strategy for persons affected by involuntary resettlement as early as possible and have it validated by local stakeholders; choose resettlement sites with local authorities and displaced communities; ensure that PAPs validate the resettlement site; consult local authorities and host communities as early as possible in the process, in particular to avoid exacerbating



conflicts between gold miners and local communities over access to a gold mining site partially affected by the project, or between livestock farmers and crop farmers in the event of resettlement or "diversion" of transhumance corridors ; consult displaced communities on the restoration activities they would like to see; work closely with the government departments responsible for the affected infrastructure to ensure that they commit to providing staff and maintenance for the new structures; communicate the duration of the works.

- **Compensate for all permanent and temporary losses:** once impacts have been avoided or reduced, inventory and compensate in kind or monetarily for all losses at their full replacement value; inventory and rebuild lost community infrastructure; consult stakeholders on options for replacing lost ecosystem services and compensate for so-called "orphan" plots after the route has been completed.
- **Propose a compensation strategy that ensures the restoration of livelihoods, including those of the most vulnerable:** compensate, as far as possible, for land losses with replacement land with characteristics equivalent to the lost land; inventory and compensate for lost economic activities; monitor the living conditions of all PAPs and their households to ensure that their livelihoods have been restored; establish personalised monitoring of the most vulnerable households, whether for permanent or temporary losses; ensure that women and young people are taken into account.
- **Pay particular attention to transparency in land rights bundles** to limit future conflicts: facilitate land titling by ensuring that all PAPs have received the areas of land corresponding to their losses.

Taking these measures into account when developing the PAR-PRMS will help to avoid negative impacts that may occur during the project's preparation, construction and operation phases.

The development and implementation of the PAR and PRMS will take place during the project preparation phase. The implementation of the PRMS may continue during the construction and operation phases **until the PAPs have restored their livelihoods**. However, all PAPs must have been compensated for property losses before the project can release the right-of-way. The following activities will be developed.

Table139 : Resettlement and livelihood restoration activities for affected persons during the preparation phase

MH2A1	Revision of the Project design and minimisation of impacts related to resettlement
MH2A2	Dissemination of the MGP to PAPs
MH2A3	Informing and consulting with PAPs on resettlement arrangements and restoration of desired livelihoods
MH2A4	Development of the PAR/PRMS
MH2A5	Compensation and resettlement of persons affected by the Project
MH2A6	Implementation and monitoring of livelihood restoration activities

■ MH3. Development and implementation of a Cultural Heritage Management Plan

The objective of this measure is to protect and respect customs and traditions, beliefs, burial sites, historical sites and sacred sites of importance, in accordance with the Guinean legal framework and IFC NP 8. The development and implementation of the cultural heritage management plan aims to protect cultural heritage from the negative impacts of Project activities and support its preservation. In other words, it provides a framework for consulting with communities, relocating these cultural sites or ensuring that communities continue to have access to them. It also proposes a chance discovery procedure, which must be applied when archaeological artefacts are subsequently discovered, to ensure that they are not damaged.

The Cultural Heritage Management Plan must include at least the following measures when it is drawn up:

- **Minimising impacts:** minimising impacts on cultural heritage by adapting the project design so as not to disturb sacred sites that cannot be relocated and avoiding their relocation as much as possible.



- **Consult stakeholders:** consult traditional and religious authorities to accurately identify all sites potentially affected by the project that could not be identified during fieldwork, and propose appropriate protection and mitigation measures for each site (site marking, relocation after ceremonies and offerings, maintaining access, etc.). Some sites are likely to be frequented by several villages or even sub-prefectures, and where applicable, transhumant communities will also need to be consulted to ensure that their cultural heritage (particularly graves and cemeteries) is taken into account. All of these consultations can take place during the implementation of the Resettlement Action Plan.
- **Propose management procedures for affected cultural sites:** the management plan will specify the measures to be implemented to ensure that each affected site is managed in accordance with the requests of local populations. For each site to be relocated, the relocation site must be identified and the traditional ceremonies required for the relocation must be described and budgeted for. Cultural heritage sites close to the right-of-way will be marked to prevent their accidental desecration or damage by machinery and workers. All measures for managing affected cultural sites must be finalised before work begins to prevent any desecration, damage or destruction.
- **Include a procedure for the accidental discovery of archaeological artefacts.** The plan shall propose a procedure that requires work to be stopped in the event of the discovery of archaeological remains to allow for investigation by knowledgeable experts. The procedure shall be known to all site workers.

The measures of the Cultural Heritage Management Plan to be implemented during the construction phase must be included in the site's Environmental Management Plan (see measure MH8).

Taking these measures into account when developing the Cultural Heritage Management Plan will help to avoid negative impacts that may occur during the preparation and construction phases of the Project. The following activities will be developed.

Table140 : Activities concerning the preservation of cultural heritage during the preparation phase

MH3A1	Revision of the project design and minimisation of impacts on cultural heritage
MH3A2	Dissemination of the MGP to cultural heritage stakeholders
MH3A3	Recruitment of a cultural heritage management expert or mobilisation of internal resources at QGMI for the development and implementation of the cultural heritage management plan
MH3A4	Informing and consulting stakeholders on cultural heritage management
MH3A5	Development of the Cultural Heritage Management Plan, including a procedure for chance discoveries
MH3A6	Execution and monitoring of the implementation of the Cultural Heritage Management Plan



13.1.2. Impact management measures during the construction phase

13.1.2.1. *Physical environment*

■ **MP2. Implementation of the Environmental Management Plan for the Construction Site**

The Environmental Management Plan for the Construction Site, described in section 13.1.1.1, will be implemented throughout the construction phase.

13.1.2.2. *Biological environment*

■ **MB2. Implementation of the Biodiversity Management Plan**

The Biodiversity Management Plan described in section 13.1.1.2 will be implemented throughout the construction phase.

13.1.2.3. *Human environment*

■ **MH4. Updating of the Stakeholder Engagement Plan (SEP) and the Complaints Management Mechanism (CMM)**

At the start of the construction phase, it will be necessary to review and update the PEPP and CMM through a stakeholder consultation process. In particular, it will be essential to ensure that the CMM is functional, i.e. that complaints are effectively and properly received and processed. If no complaints have been received during the entire preparation phase, this will probably mean that the mechanism is not working properly and it will be necessary to review the channels proposed for registering complaints. With regard to the PEPP, it will be important to complete the identification of stakeholders by integrating new actors if necessary, to review the stakeholder mapping, bearing in mind that their position on the Project may have changed, and finally to update the activities of the strategy to adapt it to the construction phase. Updating the strategy could lead to a change in the resources allocated and, in particular, the need to recruit additional staff. It will be necessary to update this document annually during the construction phase.

The following activities will therefore be developed each year.

Table 141 : Stakeholder engagement activities during the construction phase

MH4A1	Review and update of the Stakeholder Engagement Plan
MH4A2	Review and update of the Complaints Management Mechanism
MH4A3	Potential recruitment of additional staff for stakeholder engagement
MH4A4	Dissemination of the updated CGM to all stakeholders
MH4A5	Execution and monitoring of the implementation of the Project's PEPP

■ **MH5. Updating of the Livelihood Restoration Plan (LRP)**

When the construction phase begins, all PAPs in a construction section must have been resettled and compensated for their losses in accordance with the compensation strategy validated by the stakeholders and proposed in the PAR and PRMS. However, it is highly likely that livelihood restoration activities will have only just begun and that PAPs will still need support. It will be appropriate to conduct an in-depth analysis of the living conditions of PLBD at this point to assess the relevance of the activities carried out to restore their livelihoods. The conclusions of this assessment will be used to update the PRMS. The participation of stakeholders in both the assessment and the updating of the PRMS will be essential.

The following activities will be developed.



Table142 : Livelihood restoration activities for affected people during the construction phase

MH5A1	Evaluation of the results of the resettlement and livelihood restoration strategy
MH5A2	Review and update of the PRMS
MH5A3	Dissemination of the updated PRMS
MH5A4	Execution and monitoring of the implementation of the updated PRMS

■ **MH6. Development and implementation of the Migration Management Plan**

The aim of this measure is to propose a management plan for migration linked to job creation on the construction site and new economic opportunities associated with the construction site, such as small businesses or catering activities. It will be developed in accordance with World Bank best practices⁴⁰.

The Migration Management Plan will present the current situation, stakeholders' perceptions of migration, the various possible scenarios for the evolution of migration flows, and will propose measures to support migration, as well as a system for monitoring the implementation of the plan.

The Migration Management Plan must include at least the following measures when it is drawn up:

- **Consult stakeholders.** The plan will be developed after gathering the opinions of local and traditional authorities and affected communities. Stakeholders must have had the opportunity to share their fears and expectations regarding the reception of non-locals, and to propose measures to limit the negative impacts and optimise the positive impacts of this influx of people.
- **Prioritise local employment.** As a minimum, the management plan must propose a transparent and concerted recruitment procedure as a measure to manage tensions between indigenous and non-indigenous people. This procedure will give priority to distributing jobs to young people and PAPs who will be more tempted to emigrate after receiving compensation. This procedure will also give priority to selecting suppliers from among local businesses. It will specify the communication strategy planned to ensure clear communication on real employment prospects, relying on local, municipal and prefectural authorities and groups that structure local communities (women's associations, youth associations, elders' associations, and, if necessary, farmers' associations, gold miners' associations, fishermen's associations, livestock breeders' associations, artisans' associations, etc.). The measures to prioritise local employment that will be proposed in the migration management plan must be included in the human resource management plans of the ESMPs developed during the construction and operational phases.
- **Strengthen community infrastructure.** The plan should also propose guidelines for strengthening local infrastructure and services in areas subject to migration flows, in order to limit pressure on existing community infrastructure and prevent the deterioration of living conditions for local communities. At a minimum, this programme should include the strengthening of health, education and water infrastructure.

Taking these measures into account when developing the Migration Management Plan will help to prevent and mitigate any negative impacts that may occur during all phases of the Project. The following activities will be developed.

Table143 : Migration management activities in the preparation phase

MH6A1	Consultations with stakeholders on expectations and concerns regarding migration management related to the Project
MH6A2	Development of the Migration Management Plan, including a local recruitment policy

⁴⁰ Reference document: Managing the risks of adverse impacts on communities from temporary project-induced labour influx, World Bank, 2016. Available at the following link:

<https://thedocs.worldbank.org/en/doc/497851495202591233-0290022017/original/ManagingRiskofAdverseimpactfromprojectlaborinflux.pdf>



MH6A3	Dissemination of the Migration Management Plan to stakeholders
MH6A4	Execution and monitoring of the implementation of the Migration Management Plan

■ **MH7. Development and implementation of the Road Safety Action Plan (PASR)**

The Road Safety Action Plan will assess the expected traffic levels for each section of the works based on the activities on site and will propose mitigation measures to limit the impact on the movement of people and goods. The relevant local administrative authorities will receive information on the routes, right-of-way and traffic impacts (schedules, frequency of passage, size and weight of trucks, materials transported) in order to issue the relevant authorisations. Particular attention will be paid to implementing measures to minimise traffic around urban areas and on national roads near industrial zones (particularly on the Conakry-Koumana route, in order to minimise the cumulative impacts associated with the movement of mining company vehicles) during peak hours.

The plan should also include measures to divert tracks, roads and transhumance corridors whose route will be disrupted during the construction phase, including ad hoc signage.

The plan should also include road safety measures covering at least the following aspects: speed limits, appropriate signage, verification of drivers' licences (valid and appropriate for the vehicles), medical checks for drivers (including vision tests), random speed and alcohol checks for drivers, regular maintenance and safety checks for vehicles and machinery, equipping vehicles with first aid kits, fire extinguishers and warning triangles, covering of trucks transporting fragile materials, and accident management procedures.

A plan to raise awareness among staff, subcontractors and local communities will provide information on road safety instructions and measures to be taken in the event of accidents. Communication materials will be shared in French and local languages.

The following activities will be developed.

Table144 : Road safety management activities during the construction phase

MH7A1	Development of the PASR: identification of constraints and risks related to road safety along the project route, definition of allocated roads, speed limits and temporary traffic management in construction zones.
MH7A2	Dissemination of the PASR to the company in charge of the works and subcontractors, as well as local authorities and external stakeholders
MH7A3	Execution and monitoring of the implementation of the PASR

■ **MH8. Development and implementation of the Construction Site ESMP**

The objective of the Construction Site ESMP is to minimise the negative impact of the construction site on the environment and people (workers and local communities).

The tender documents for the construction of the project's infrastructure will include environmental and social clauses specifying the obligation for subcontractors to formulate and implement a site ESMP in line with the requirements of this ESMP. Construction companies responding to the tender documents must formulate their bids taking these specifications into account. The companies selected to carry out the work will be required to develop their site ESMP after signing the contract with the project owner. **Work cannot commence without the project owner's written approval of the site ESMP.** Inspections and audits will be carried out periodically to detect possible non-compliance.

In the event of a critical non-compliance situation in which damage is observed to a specifically protected sensitive resource (water, fauna or flora), or in which damage has been caused or is imminent to the health and/or safety of workers, company personnel or local communities, the work concerned will be suspended until the situation observed returns to compliance and/or may result in suspension of payment to the main contractor until the non-compliance is resolved.

With regard to social impact management, the site ESMP will include the plans below. It is important to note that these plans are closely related to each other and to the environmental management plans. They should be considered as a



set of measures necessary to ensure adequate management of the social impacts of the site. For example, the code of conduct required in the Human Resources Management Plan is also an important element in raising awareness among workers and subcontractors of safe and respectful behaviour in the workplace, thereby limiting the risks addressed in the Occupational Health, Safety and Hygiene Management Plan and the Community Health and Safety Plan.

- **Human Resources Management Plan**

The Human Resources Management Plan will apply to workers employed by companies that have signed a contract with the project owner and to their subcontractors. It will ensure decent working conditions for workers in accordance with World Bank Group good practices and applicable regulations in Guinea, including workers' rights relating to wages, working hours, rest and holidays, overtime, minimum age, regular payments, compensation and benefits, equal opportunities and non-discrimination, and best practices in human resources management and occupational safety. In particular, it will be essential for the plan to ensure that workers are registered with the CNPS so that they have access to health insurance.

The company will also comply with the fundamental conventions of the International Labour Organisation (ILO), to which Guinea is a signatory. The following principles will be respected: prohibition of forced labour, child labour and discrimination in any form; respect for freedom of association and protection of the right to organise collective bargaining; and equal pay for all workers regardless of gender.

The human resources management plan will propose operational affirmative action measures to promote the use of local goods and services and the recruitment of local workers, as well as to promote female employment. Targets will be proposed in terms of the recruitment of women and local people. The local recruitment rate will be defined as the percentage of positions actually allocated to persons residing in the sub-prefectures affected by the Project. The rate of use of local services will be defined as the percentage of contracts actually awarded to companies registered in the sub-prefectures affected by the Project. The plan will include at least the measures to promote local employment proposed in the migration management plan. In particular, it will be essential for the human resources management plan to provide for a system for communicating job opportunities (posters, radio, meetings, etc.) in appropriate locations (town hall, youth centre, mosque, traditional chieftdom, etc.).

The management plan will include a specific section on security personnel management to prevent any abuse of force and enable constructive relations with local communities. It will include mandatory training for security personnel on appropriate behaviour and the use of force and will prevent such personnel from carrying lethal weapons.

The human resources management plan will propose a code of conduct to define and illustrate the different types of behaviour expected of workers and those to be prohibited, detailing the system of sanctions in the event of non-compliance with the rules laid down. In particular, it shall stipulate the prohibition of all types of harassment at work and GBV/EAS-HS/VCE, as well as the prohibition of working under the influence of alcohol or drugs, under penalty of severe sanctions. This code shall be explained in a language appropriate for each worker and appended to the employment contract.

Finally, the plan shall describe the complaint management mechanism made available to workers by the construction company, enabling them to raise concerns about the workplace. Workers shall be informed of the existence of this mechanism at the time of recruitment. They shall also have access to the project's MGP (see measure MH1).

- **Site installation plan**

The site installation plan aims to minimise the environmental and social impacts of the site by optimising the installation sites and ensuring their restoration once the work is completed.

This plan will justify the choice of site for the construction site, the workers' living quarters or residential area, and temporary structures based on social and environmental optimisation criteria. The land occupied should primarily be land that is not used for agricultural or other economic activities that are socio-economically important to local households and that has no particular ecological value. The areas occupied by temporary facilities should be kept to a strict minimum and should not exceed the boundaries of the area subject to land acquisition.

The plan shall also present the measures taken to demarcate activity areas (construction sites, temporary installations, etc.) and protect adjacent areas. The proposed measures shall include clear and unambiguous marking of activity



areas and sensitive areas by means of differentiated methods (tape, signs, stakes, etc.), the securing of activity areas with barriers, fences, tape or wire fencing around the entire perimeter of the areas, and compensation for owners of crops or resources that may be destroyed by the passage of construction machinery in the event of non-compliance with the right-of-way areas.

The plan must document the condition of the work areas prior to construction through photographs and GPS data, with the aim of restoring the land to its original condition at the end of the work. New and existing access routes will be included in this inventory.

The plan shall also include measures proposed to ensure the safety of the work areas and the site facilities in order to limit damage to outsiders, but also to prevent intrusions, accidents and theft of materials. These measures shall include controlling access to these areas and denying access to any unauthorised persons, installing security and alarm systems, etc.

Finally, the plan must propose measures for the rehabilitation of the activity areas at the end of the construction work and before the provisional acceptance of the work. These measures will include the rehabilitation of sections of roads damaged during the construction phases of the project, the removal of all structures built, manufactured or buried (e.g. pipes or septic tanks) for the purposes of the works, the disposal of waste in accordance with the provisions of the waste management procedure, levelling the ground to ensure drainage of runoff water without soil erosion or water stagnation, and scarifying overly compacted soil.

- **Occupational health, safety and hygiene plan**

The occupational health, safety and hygiene management plan aims to prevent occupational risks and protect the health and safety of workers and subcontractors involved in the Project. This plan is specifically designed to identify, assess and control risks related to work and the working environment on the construction site and temporary project facilities. It ensures that the Project complies with national regulations and international conventions on occupational health and safety. It should also facilitate communication and training on risks and safety measures to be taken for all those involved in the construction site.

It is important to note that measures to reduce environmental pollution (soil, air and water), which also impacts the health and safety of workers, are developed in environmental management plans.

The occupational health and safety management plan will analyse the specific risks on the construction site, such as working at height, operating heavy machinery, the risk of electrocution, exposure to hazardous substances, etc., and will propose prevention and protection measures tailored to different groups of workers (including pregnant women and people with disabilities). The plan shall, as a minimum, address the risks and include the prevention and protection measures identified in section 13 of this document on risk and accident assessment and management. A safety training and awareness programme shall ensure that these measures are communicated to workers and subcontractors.

The plan will also propose measures to promote worker hygiene, including at least the construction of decent, safe changing rooms and sanitary facilities (toilets and washbasins) in sufficient numbers for the number of people who have to work there (including separate facilities for women), sufficient supply of drinking water to all workers and the provision of clean eating areas with access to low-cost or free meals for workers. It shall propose a strategy for informing workers about basic hygiene standards (hand washing, drinking water consumption, etc.).

A section will specify emergency procedures in the event of an accident, including evacuation routes, assembly points, emergency service contacts (project clinic, nearby health centres and referral hospital for the medical evacuation of seriously injured or ill persons), the establishment of an infirmary and first aid team on the construction site and a clinic at the base camp, and the training of workers as first aiders at work.

The plan will also outline procedures for reporting and analysing incidents and accidents in order to implement corrective measures.

- **Community Health and Safety Plan**

The community health and safety plan aims to avoid or reduce the project's impact on the health and safety of communities during the construction phase. The main risks are related to the community's exposure to traffic accidents or accidents on the construction site during the works, and to the deterioration of the community's sanitary conditions



due to an influx of workers, leading to a potential increase in the prevalence of various diseases such as STIs/STDs and HIV/AIDS.

The plan will propose measures to:

- Collaborate with communities in managing road risk in line with the measures proposed in the PASR;
- Collaborate with communities in securing construction sites and residential areas in line with the construction site installation plan;
- Collaborate with communities in managing inappropriate behaviour by construction site workers in line with the measures proposed in the human resources management plan;
- Collaborate with communities in managing environmental nuisances (dust, noise, vibration) in line with the relevant environmental management plans.

The plan will also include measures to raise awareness among local communities about hygiene and health, including awareness-raising activities on risky practices and measures to avoid and prevent STIs/STDs (HIV/AIDS/hepatitis, etc.) and unwanted pregnancies.

- **Plan for managing chance discoveries**

This plan, which is a procedure within QGMI, will be aligned with the requirements and recommendations of the Cultural Heritage Management Plan developed during the preparation phase (see measure MH3). It will specify that work will be halted in the event of the discovery of archaeological remains to allow for investigation by qualified experts. The company will then be responsible for cordoning off the site with barriers to protect it before the experts intervene. The procedure may authorise the project manager to determine whether the physical cultural property can be transported elsewhere in order to continue the work, for example if the object discovered is a coin.

The following activities must be carried out:

Table145 : PGES activities during the construction phase

MH8A1	Inclusion of E&S requirements in the tender documents for the construction of infrastructure
MH8A2	Recruitment of E&S expertise for the supervision of the PGES construction site
MH8A3	Development of the site PGES
MH8A4	Validation of the site ESMP by the AGEE and the prefectural E&S monitoring committees (CPSES)
MH8A5	Dissemination of the site PGES and MGP to stakeholders
MH8A6	Execution and monitoring of the implementation of the PGES construction site
MH8A7	Final audit of the construction site ESMP and contract closure



13.1.3. Impact management measures during the operational phase

13.1.3.1. *Physical environment*

■ **MP3. Implementation of the recommendations of the compensation study**

This measure will be defined as part of the reforestation study carried out during the preparation phase. It will be implemented during the operational phase.



Biological environment

■ **MB3. Implementation of the recommendations of the compensation study**

This measure will be defined as part of the compensation study carried out during the preparation phase. It will be implemented during the operational phase.

■ **MB4. Programme to raise public awareness of biodiversity**

Awareness campaigns can be carried out in communities among various target groups, for example in schools. Educating children, combined with awareness-raising involving the authorities and traditional leaders, would certainly be an effective way of promoting biodiversity conservation.

In an optimistic scenario, educating and training people would encourage their commitment to conservation and raise their awareness of the essential role of wildlife in the functioning of ecosystems, its ethical and economic value, and its recreational and aesthetic importance. The training programme proposed as part of the project could be an interesting asset to develop in order to mobilise local communities around the environment, particularly with regard to priority species for conservation. The positive aspects for biodiversity of the new bridges and culverts and the compensation measures should be highlighted.



Human environment

■ MH9. Updating the Stakeholder Engagement Plan (SEP) and the Complaints Management Mechanism (CMM)

At the start of the operational phase, the PEPP and CMM will need to be reviewed and updated again through a stakeholder consultation process. It will again be essential to ensure that the CMM is functional and widely known, i.e. that complaints are properly received and processed. If no complaints have been received during the entire construction phase, this will probably mean that the mechanism is not working properly and it will be necessary to review the channels available for filing complaints. With regard to the PEPP, it will be important to complete the identification of stakeholders by integrating new actors if necessary, to review the stakeholder mapping, bearing in mind that their position on the Project may have changed, and finally to update the activities of the strategy to adapt it to the operational phase. Updating the strategy could lead to a change in the resources allocated and, in particular, a reduction in staffing requirements. This update should be carried out every two years during the operational phase.

The following activities will therefore be carried out every two years:

Table146 : Stakeholder engagement activities during the operational phase

MH9A1	Review and update of the Stakeholder Engagement Plan
MH9A2	Review and update of the Complaints Management Mechanism
MH9A3	Reduction in staff dedicated to stakeholder engagement
MH9A4	Dissemination of the updated Complaints Management Mechanism
MH9A5	Execution and monitoring of the implementation of the Project's PEPP

■ MH10. Updating of the Livelihood Restoration Plan (PRMS)

When the operational phase begins, temporary land acquisitions will have been completed and PAPs will be in the process of restoring their livelihoods. The PRMS will therefore need to continue its implementation phase (minimum 3 years). It will be worthwhile to take advantage of the transition from the construction phase to the operational phase to conduct another in-depth assessment of the living conditions of the PAPs and review the relevance of the activities carried out under the PRMS. At the start of the operational phase, this may involve the closing audit required to finalise the livelihood restoration process. The conclusions of this assessment or audit will enable the final corrective measures to be proposed to complete the restoration of livelihoods. The participation of stakeholders in both the assessment and the updating of the PRMS will once again be essential.

The following activities will be developed.

Table147 : Livelihood restoration activities for affected persons in the operational phase

MH10A1	Assessment of the results of the livelihood restoration strategy and development of recommendations
MH10A2	Review and update of the PRMS
MH10A3	Dissemination of the updated PRMS
MH10A4	Implementation of the updated PRMS

■ MH11. Updating of the Migration Management Plan

At the start of the operational phase, the Migration Management Plan will need to be revised. The start of the operational phase will mark the departure of workers following the dismantling of the construction site and the arrival of people attracted by the recent opening up of this area. The update of the management plan will need to take these new migratory flows into account and adapt its strategy and proposed measures. Stakeholder participation will be essential to the revision process.



The following activities will be developed.

Table 148 : Migration management activities during the construction phase

MH11A1	Review and update of the migration management plan
MH11A2	Dissemination of the updated migration management plan
MH11A3	Implementation of the updated Migration Management Plan

■ MH12. Development and implementation of the O&M ESMP

The contract with the company responsible for the operation and maintenance (O&M) of the RN 32, its engineering structures and toll stations will include environmental and social clauses specifying the obligation for the main company and its subcontractors to formulate and implement an O&M ESMP in line with the requirements of this ESMP. The company will be required to develop an **O&M ESMP, which must be validated by the project owner before its activities can begin in the field**. Inspections and audits will be carried out periodically to detect possible non-compliance.

The entity responsible for the operation and maintenance of the Project's infrastructure, as well as any associated operators, shall comply with the measures proposed in the ESMP, which shall have contractual value.

The O&M PGES will be divided into several plans, as outlined below. These plans are closely related and must be coordinated with the environmental management plans.

• Human Resources Management Plan

The Human Resources Plan will apply to workers hired by the project's infrastructure maintenance and operation operators. Its content must be aligned with that of the site PGES (see MH8), but may be significantly simplified given that the number of workers will be much lower.

As a reminder and as already described in the previous measures, the plan will describe the complaint management mechanism available to workers and subcontractors. Workers will be informed of the existence of this mechanism at the time of hiring. They will also have access to the project's complaint management mechanism (see measure MH1).

• Occupational health and safety plan

The Occupational Health and Safety Plan aims to prevent occupational risks and protect the health and safety of workers during operations and maintenance activities. Although subject to some adjustments related to the nature of the project's infrastructure maintenance and operation activities, this plan is similar to the construction site ESMP (see MH8) and includes at least the following aspects:

- Its objective is to identify, assess and control risks related to work and the working environment on the structures;
- It ensures that the Project complies with national regulations and international conventions on occupational health and safety;
- It provides a specific analysis of the risks associated with the operation and maintenance of a national road and its associated structures;
- It must facilitate communication and training on the risks and safety measures to be taken during the various operation and maintenance activities;
- It shall ensure that prevention and protection measures are proposed that are appropriate for the various groups of workers (including pregnant women and persons with disabilities);
- It addresses risks and includes the prevention and protection measures on risk and accident assessment and management;
- It shall propose measures to promote worker hygiene (changing rooms, sufficient sanitary facilities, some of which are exclusively reserved for women), guarantee a sufficient supply of drinking water and access to low-cost meals;



- It includes emergency procedures in the event of an accident (infirmary, evacuation routes, etc.) as well as procedures for reporting and analysing incidents and accidents in order to implement corrective measures.
- **Traffic and Road Safety Management Plan**

The TRMP will be directly integrated into a specific section of the ESMP O&M.

The Traffic and Road Safety Management Plan will be adapted to maintenance and operational activities that will affect traffic and require the implementation of road safety measures for recruited workers, similar to those in the construction phase (see MH7): speed limits, installation of appropriate signage, verification of drivers' licences (valid and corresponding to the vehicles), medical checks on drivers (including vision tests), random speed or alcohol checks on drivers, regular maintenance and securing of vehicles and machinery, equipping vehicles with first aid kits, fire extinguishers and warning triangles, covering of trucks transporting fragile materials, and accident management procedures.

A plan to raise awareness among staff, subcontractors and local communities will provide information on road safety instructions and measures to be taken in the event of accidents. Communication materials will be shared in French and local languages.

- **Community health and safety plan**

The community health and safety plan aims to prevent or reduce the project's impact on the health and safety of communities during the operational phase. For communities, the main hazards associated with the operation of the RN 32 and its associated structures are the risk of road traffic accidents and risky behaviour by workers.

The plan will therefore propose, as a minimum, measures to:

- Limit the risk of road accidents by working with communities to implement the measures proposed in the traffic and road safety management plan;
- Limit the risk of accidents for the population living near the structures: Signpost and secure risk areas, develop, if necessary, a Prevention and Emergency Response Plan integrated into the maintenance and operation plan: based on an identification of all possible emergency situations, this plan will define the prevention measures, response procedures and reporting procedures to be followed in the event of an emergency or natural disaster.
- Limit risky behaviour among workers by implementing measures such as organising awareness-raising sessions for communities living near the project, strengthening HIV/AIDS prevention efforts targeting young women through awareness-raising in schools, setting up anonymous and voluntary screening campaigns, and providing condoms in health facilities.

The following activities will need to be developed.

Table149 : PGES O&M activities during the operational phase

MH12A1	Inclusion of E&S requirements in tender documents for infrastructure operation and maintenance
MH12A2	Recruitment of E&S expertise by the project owner to supervise the O&M PGES
MH12A3	Development of the O&M PGES by the company awarded the contract
MH12A4	Validation of the O&M ESMP by the AGEE and the prefectural ES monitoring committees (CPSES)
MH12A5	Dissemination of the O&M ESMP and MGP to stakeholders (including communities and workers)
MH12A6	Execution and monitoring of the implementation of the O&M ESMP
MH12A7	Final audit of the O&M ESMP and contract closure.



13.2. Programme for implementing measures to improve, mitigate and offset impacts

13.2.1. Summary of Environmental and Social Plans to be developed as part of the implementation of the ESMP

QGMI will develop project-specific plans, procedures, and processes to support the implementation of the commitments made in this ESMP, as outlined in the Table 150. These plans and procedures may be developed directly by QGMI or with the assistance of specialist consultants if deemed necessary.

It should be noted that the names of the E&S management documents presented in the Table 150 are only provisional. All management documents will be part of the project's integrated management system (IMS - see sections 7.7 and 7.8). The development of the project IMS may identify synergies between different documents, which could lead to a merging of processes for simplification purposes and a change in document names.

Furthermore, although the development of the project MIS, including the project EMEP, may initially be carried out in English to facilitate review by third parties (e.g., the IESC, if requested by lenders), the finalisation and implementation of the project MIS will be carried out in French, as this is the official language of Guinea. The translation from English to French may also result in minor changes to the names of plans and procedures.

All of the environmental and social plans recommended in this ESMP are summarised in the table below:

Table 150 : Supporting E&S Management Documents

Documents	Categories			
	Design/Engineering	Environment	Communities	Health & Safety
Integrated Management System Manual and QGMI Corporate Management Procedures	X	X	X	X
Guidelines for Environmental, Safety and Health Monitoring		X		X
Design Change and Management of Change Process	X	X	X	X
Emergency Preparedness and Response Plan (EPRP)	X	X	X	X
Waste and Wastewater Management Plan		X		
Stakeholder Engagement Plan			X	
Chance Finds Procedure			X	
Traffic Management Plan and Road Safety Action Plan			X	X



Occupational Health and Safety Management Plan					X
Internal/Worker Grievance Mechanism			X	X	
Community Grievance Mechanism			X		
Community Health, Safety and Security Plan			X	X	
Migration Management Plan			X	X	
Noise and Vibration Management Plan	X	X	X	X	
Dust Emission Management Plan	X	X	X	X	
Site Restoration Plan	X	X			
Soil Management Plan		X			
Cultural Heritage Management Plan			X		
Resettlement Action Plan including Livelihood Restoration Plan	X		X		
Worker Code of Conduct			X		
Human Resources Management Plan			X	X	
Contractor and Supplier Management Plan			X	X	
Biodiversity Management Plan		X			

13.2.2. Responsibilities in the implementation of the ESMP

The effective implementation of the measures proposed in the ESMP requires a clear definition of the responsibilities of the various actors involved in the execution of the project.

■ Project owner: the Guinean State – MITP/AGEROUTE

The project owner is the Guinean government, represented by the Ministry of Infrastructure and Public Works. The project owner will ensure compliance with the environmental and social measures set out in this study. It will be involved in the environmental and social monitoring of the project.

■ Company in charge of the preparation and construction phases

QGMI is the company in charge of the technical design of the project and the rehabilitation and construction of the RN 32, its engineering structures and toll stations.

The company in charge of the works must comply with the terms of the contract in all aspects of the construction works, including in particular the environmental specifications.



With regard to the environmental aspect of the works, it is recommended that the company have a manager responsible for the environmental and social aspects of the contract, who will be identified and known to all parties involved in the Project. The Company's Environmental Manager (CEM) must have a good understanding of environmental issues in general and proven competence in Environmental Impact Assessment (EIA). This will enable them to understand the EIA and EMAP reports before monitoring their implementation in the field.

The role of the CEM is to monitor the implementation of the various environmental and social measures in the field on a daily basis. He or she is the primary contact for the HSE manager and the monitoring mission.

The company must draw up an Environmental and Social Management Plan (ESMP) for the site, which must be approved by the inspection team. This plan must include at least one of the following:

- Human resources management plan;

- Traffic and road safety management plan (through the PASR);

- Site installation plan;

- Occupational health, safety and hygiene plan;

- Community health and safety plan;

- Materials and earthworks management plan;

- Drainage and erosion control plan;

- Effluent discharge and water quality management plan;

- Waste management plan;

- Spill management plan;

- Noise and dust emissions management plan;

- Deforestation plan;

- Rehabilitation and revegetation plan;

- Biodiversity Management Plan for the Construction Site, including, among other things, an access management plan, a biodiversity protection plan, and a plan for controlling and preventing invasive plant species.

The environmental and social specifications of the contract, the company's site ESMP approved by the AGEE and the prefectural E&S monitoring committees (CPSES) will therefore be the reference documents to be implemented by the company during the works. The company in charge of the activities is responsible for implementing the site ESMP.

The typical organisational structure of a project under the QGMI is illustrated at Figure 64. This structure has been defined based on the QGMI's experience with environmental and social management requirements in construction projects in Africa and identified through the ESIA process.

Employees are assigned specific tasks and responsibilities to ensure effective management of the project's environmental, social and reputational performance. Selected contractors will have additional responsibilities and will be assigned appropriate E&S responsibilities under the PGEE.



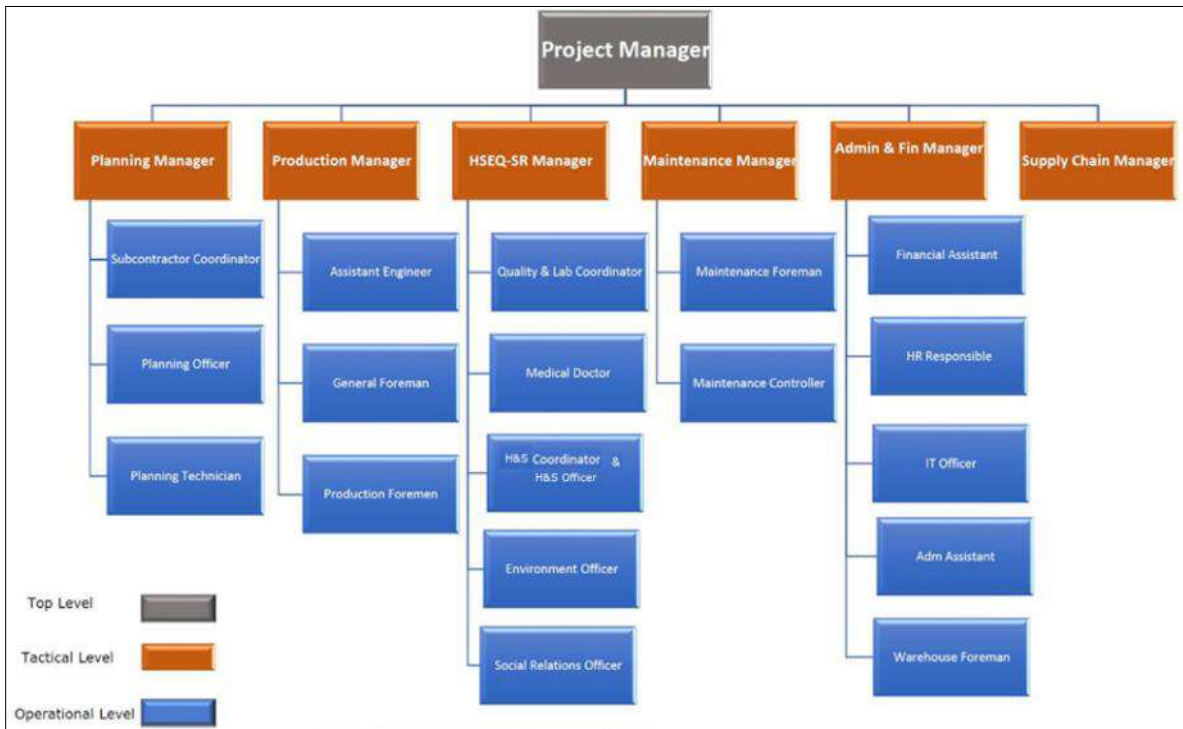


Figure64 : Typical QGMI organisational chart during the construction phase

151 outlines the key roles and responsibilities of employees with regard to environmental and social performance. The specific responsibilities for each role should be defined in each of the environmental and social management plans developed for this purpose.

151 : Key roles and responsibilities of QGMI staff

Role	General responsibilities
Senior Management	
Project Manager SUOPE - Operational Contract Manager	- Responsible for managing all activities related to project implementation, ensuring its effectiveness throughout the various phases of the project; - Responsible for ensuring that the team is familiar with and complies with the rules and specificities of the country where the project is being implemented, as well as coordinating the planning, monitoring and evaluation of all processes; - Developing the project's operational plan and, in partnership with the team, guaranteeing the quality of the undertaking and compliance with corporate and legal requirements; - Optimise the use of resources; and - Ensuring compliance with the company's management system.
Tactical level	
Health, Environment, Social Safety, Quality and Responsibility	Manage and ensure compliance with national and international standards and other requirements relating to the environment, occupational health,



(HSEQSR) Manager (also known as the Sustainable Development Manager)	safety, quality management and social responsibility, in agreement with the planning manager; • Ensure that QGMI employees and other partners comply with company guidelines, develop and implement standards and procedures, and support the company's department in accident prevention and compliance with project-related HSE requirements; • Promote the well-being and adequate working conditions for employees and other partners, while preserving the interests of the project in its relations with communities; • Monitor and comply with applicable legislation and other requirements, communicate the integrated management system policy within the project, prepare monthly HSEQSR reports; promote HSE training; • Ensure that the team under his/her supervision carries out activities in accordance with company rules and procedures, using the necessary uniforms and personal protective equipment (PPE) appropriately, participating in campaigns and training, and fulfilling all duties and responsibilities in accordance with HSE requirements; • Critically analyse the SMG to ensure its ongoing suitability, the effectiveness and efficiency of systems, and to keep management informed of progress; and • Manage and monitor key performance indicators.
REMAN – Maintenance Manager	• Responsible for managing and executing mobile and industrial equipment maintenance activities, developing and implementing maintenance policies and performance indicators, controlling costs, and managing logistics and storage processes to ensure that the company's fleet achieves the best operating cost with the performance expected in strategic planning, in accordance with HSE guidelines.
Financial and Administrative Manager READI – Administrative Manager	• Responsible for administrative, financial, accounting, tax, human resources and employee management (including grievance management), purchasing, information technology, communications, budgeting and local community relations, in order to comply with internal guidelines, standards and policies, as well as applicable legislation, and to preserve the institution's reputation.
Planning Manager REPLAN – Planning Manager	• Responsible for planning, monitoring and tracking project results and performance, providing useful and strategic information and analysis that is reliable and timely, in order to assist managers in their decision-making process. • Responsible for the execution of pre-construction and construction activities for the project, establishing, in collaboration with engineering and planning, the work execution plan and the allocation of necessary resources; and
Production Manager REPRO – Production Manager	• Complies with quality standards, established quantities, costs and deadlines, provides support in the material inspection and quality control process, leads studies to improve/revise the production process, defines pre-construction and construction procedures, controls general expenses in the area and the need for corrective guidance, in order to ensure the achievement of the project scope and profitability agreed with shareholders.



Supply Chain Manager

- Liaise with finance and planning departments to ensure that E&S measures are included in supply chain procurement contracts; and
- Conduct supply chain audits and assessments to monitor compliance with applicable requirements based on the supplier/subcontractor and identified risks.

Operational level - HSEQSR**Health and Safety Coordinator**

- Assist the HSEQSR Manager in implementing the integrated management system;
- Develop the required procedures and assist the HSEQSR Manager and SUOPE in maintaining the risk register;
- Conduct internal inspections and assessments;
- Monitor internal occupational health and safety indicators and report to project management on accident rates, accidents, near misses, lost time injuries, etc.;
- Assist the production manager in managing the occupational health and safety of subcontractors;
- Manage OHS training for workers and management, including orientation sessions and information meetings; and
- Manage H&S officers, H&S support and health and safety inspectors in the conduct of their activities, planning and adjusting schedules with the production manager according to project requirements.

Quality and Laboratory Coordinator

- Assist the HSEQSR Manager in implementing the integrated management system;
- Develop the required procedures and assist the HSEQSR Manager and Project Manager in managing project and product quality;
- Assist the HSEQSR Manager in the periodic review of the integrated management system and management documents;
- Help specialists in the field propose changes to management system documents to senior management;
- Manage the laboratory technician and laboratory support;
- Produce product quality reports, coordinate analyses and assist the production manager in carrying out quality controls; and
- Verify that work complies with specifications.

Doctor

- Assist the HSEQSR manager in implementing the integrated management system;
- Manage the healthcare provider responsible for fitness-for-work testing;
- Develop plans, procedures and measures to prevent illness and treat illness and injury in the workplace;
- Provide first aid support to workers;
- Manage the implementation of health-related training, including information sessions and induction training;
- Develop and implement the occupational health programme; and
- Guide and treat employees at all levels and ensure that occupational health and safety is well maintained.



Head of Environment and Social Relations	• Support the HSEQSR Manager in implementing the integrated management system; • Manage the environmental and social aspects of the project; • Support implementation and share responsibilities with the HSEQSR/Sustainable Development Manager for the implementation of the project's environmental and social commitments (ESMP, IMS, RELAP, etc.); • Coordinate the monitoring programme and develop procedures to manage E&S commitments; • Manage applicable environmental and social permits, licences and registrations; • Assist the HSEQSR Manager in preparing reports for external and internal stakeholders; • Apply methodologies to minimise environmental impacts; • Apply and analyse analytical parameters for air, water and soil quality, as well as noise and visual pollution; • Participate in environmental management system audits; • Participate in the preparation of the environmental performance report; • Participate in the development of the environmental control plan; • Empower workers to respond to environmental emergencies; and • Conduct training and awareness campaigns.
Health and Safety (H&S) Manager	• Inspect the safety devices and components of machinery and equipment and, where possible, propose additional safety requirements that may be necessary to prevent accidents; • Assist the H&S coordinator in conducting inspections and audits of subcontractors' facilities and equipment to prevent risks and accidents; • Verify the correct use of personal and collective protective equipment. • Inspect fire-fighting systems and other protective equipment; • Prepare qualitative and quantitative reports on site inspections; • Conduct campaigns, training and coordinate the publication of educational material on health and safety at work; and • Ensure the implementation of company health and safety procedures, policies and rules.
Other HSEQ-SR roles not included in Figure 64	
Health and safety (H&S) assistance	• Assist with activities developed by the Health and Safety (H&S) Manager.
Quality and Laboratory Manager	• Ensure quality control is recorded in the database; • Carry out inspections, take material samples and coordinate activities with the team of quality assurance inspectors; • Consult, establish, modify and provide training on analytical methodologies and laboratory operations based on references; • Verify product compliance, monitor the specific maintenance of all equipment in the establishment (calibrations, measurements, maintenance records, operating methods); and



		Issue certificates of analysis and analytical reports, verify those from suppliers, develop and implement internal audit, documentation and organisational programmes.
	Environmental support in the field	- Assist with activities developed by the environmental manager. During the pre-construction and construction phases, the HQMI RR will be responsible for communicating with stakeholders on a daily basis. This will include working closely with the community livelihoods committee. The criteria required for community liaison staff who communicate with stakeholders on a daily basis are as follows: - Staff with good communication and listening skills; - Angolan personnel from local areas, fluent in local languages, where applicable; - Open-mindedness and respect for the opinions of others, regardless of age, gender and ethnicity; - Ability to receive, document and manage complaints from the community; - Proactive mindset and good problem-solving skills; - High level of integrity and reliability; - Commitment to the position and understanding of the developer's objectives; and - Approach to governance.
Relationship (RR)	Manager	
	All staff/workers	All staff/workers employed for the project are required to perform their duties in accordance with the ESMS and ESMP.

■ Company in charge of implementation phase activities

MITP will be responsible for operating the road and its associated infrastructure.

During the operational phase, the project will be owned, maintained and operated by AGEROUTE and MITP. The organisational structure to be put in place by AGEROUTE and MITP for the RN32 project will be integrated into their overall structure for road maintenance works in Guinea.

The procedures to be implemented by AGEROUTE and MITP during the operational phase will be based on their current management system, which will incorporate the management requirements identified in the ESIA. This will be facilitated by a transfer process between QGMI and AGEROUTE/MITP, which will be put in place in good time before AGEROUTE/MITP begins operations.

■ Prefectural E&S Monitoring Committees (CPSES)

The CPSES is tasked with providing local monitoring for certain environmental and social components, as well as managing complaints and preventing conflicts between the project and companies operating in their territories.

■ Guinean Environmental Assessment Agency (AGEE)

A public institution under the supervision of Guinea's Ministry of Environment and Sustainable Development, it provides technical support to local authorities, communities and civil society, and promotes and implements the national environmental assessment system, including impact studies, strategic environmental assessments and environmental audits.

With regard to the implementation of the PGES, the measures proposed in the EIES are subject to a PGES monitoring agreement between the project promoter and the AGEE. The Environmental Audit Certificate (CAE) is issued by the



Minister of the Environment after technical advice from the AGEE for a maximum period of three years. The Environmental Authorisation and the Environmental Compliance Certificate are renewed on the basis of a project ESMP, an ESMP implementation report incorporating the environmental and social action plan (ESAP) for the following year, and a report monitoring the implementation of the ESMP on site. Where the measures proposed in the ESMP prove to be unsuitable or insufficient, the developer is required to take the necessary corrective measures.

As part of this mission, AGEE will validate the ESIA and monitor the implementation of the project's ESMP.

■ **Monitoring mission**

A consultant or engineering firm will be hired by QGMI to carry out an audit of site preparation and construction work.

The monitoring mission is responsible for checking that the construction company complies with the environmental, social, health and safety practices stipulated in the contract, and that the environmental, social, health and safety aspects of the work comply with the specifications. The environmental, social, health and safety specifications of the contract and the company's site ESMP approved by the monitoring mission will be the reference documents for environmental and social monitoring. The monitoring mission will therefore provide environmental experts who will periodically monitor the implementation of measures on site.

The monitoring mission's reports will enable QGMI to report to donors on compliance with the environmental, social, health and safety practices implemented.

■ **Local authorities (rural municipalities in this case)**

Local authorities will be responsible for informing all local residents about the progress and duration of the works so that they can take all necessary measures to minimise disruption to their activities.

The project affects each rural municipality differently. Therefore, the information disclosed must be tailored to each community.

■ **Technical services, ministries responsible for the environment and civil society**

The implementation of environmental measures may require the expertise of other structures, technical services or resource persons. To this end:

- The support of village, traditional and religious authorities, representatives of different social groups and opinion leaders will be necessary in mobilising the population for information and awareness-raising sessions. These various authorities will also contribute to facilitating the release of land. They will also promote social cohesion between project managers, site personnel and local populations in order to avoid any conflict.
- The prefectural and sub-prefectural services in charge of the environment will monitor the implementation of the measures contained in the ESMP through environmental inspection missions. In the event of a breach, they will ensure that the Project takes the prescribed corrective measures into account;
- Other technical departments will also be involved, according to their area of expertise, in evaluating the actions carried out by the various actors responsible for implementing the ESMP. To this end, environmental and social monitoring reports will be sent to them for information. In addition, they will ensure that the Project operates in accordance with the regulations in force.

Other technical departments, NGOs and service providers deemed necessary may also be called upon during the implementation of environmental monitoring and follow-up activities on the construction site.



3.1.1. Planning for the implementation of impact management measures

Table 152 : Implementation of the ESMP during the Project preparation phase

Environment	Activity code	Activities	Responsible for execution	Period	Objective
Physical	MP1A1	Implementation of measures to address the visual impact of quarries and borrow pits	QGMI	Finalised before the start of site preparation (Project Activity 5)	Availability of a complete PGEC
Physical	MP1A2	Implementation of measures to protect air quality and the climate	QGMI	Finalised before the start of site preparation (Project Activity 5)	Availability of a complete PGEC
Physical	MP1A3	Implementation of measures for noise pollution	QGMI	Finalised before the start of site preparation (Project Activity 5)	Availability of a complete PGEC
Physical	MP1A4	Implementation of measures for materials management and earthworks	QGMI	Finalised before the start of site preparation (Project Activity 5)	Availability of a complete PGEC
Physical	MP1A5	Implementation of measures for drainage and erosion control	QGMI	Finalised before the start of site preparation (Project Activity 5)	Availability of a complete PGEC
Physical	MP1A6	Implementation of measures for effluent discharge management and water quality	QGMI	Finalised before the start of site preparation (Project Activity 5)	Availability of a complete PGEC
Physical	MP1A7	Implementation of measures for river crossings	QGMI	Finalised before the start of site preparation (Project Activity 5)	Availability of a complete PGEC
Physics	MP1A8	Implementation of waste management measures	QGMI	Finalised before the start of site preparation (Project Activity 5)	Availability of a complete PGEC
Physical	MP1A9	Implementation of measures for the management of accidental spills	QGMI	Finalised before the start of site preparation (Project Activity 5)	Availability of a complete PGEC
Biological	MB1A1	Implementation of avoidance measures	QGMI	Finalised before the start of site preparation (Project Activity 5)	Availability of a complete PGB
Biological	MB1A2	Implementation of access management measures for biodiversity protection	QGMI	Finalised before the start of site preparation (Project Activity 5)	Availability of a complete PGB
Biological	MB1A3	Implementation of measures for land clearing	QGMI	Finalised before the start of site preparation (Project Activity 5)	Availability of a complete PGB

Environment	Activity code	Activities	Responsible for execution	Period	Objective
Biological	MB1A4	Implementation of measures to reduce bush fires	QGMI	Finalised before the start of site preparation (Project Activity 5)	Availability of a complete PGB
Biological	MB1A5	Implementation of noise measures	QGMI	Finalised before the start of site preparation (Project Activity 5)	Availability of a complete PGB
Biological	MB1A6	Implementation of air quality measures	QGMI	Finalised before the start of site preparation (Project Activity 5)	Availability of a complete PGB
Biological	MB1A7	Implementation of specific measures associated with watercourse crossings	QGMI	Finalised before completion of design work for bridges and culverts	Availability of a complete PGB
Biological	MB1A8	Implementation of measures for the quarry and borrow pits	QGMI	Finalised before the start of site preparation (Project Activity 5)	Availability of a complete PGB
Biological	MB1A9	Implementation of measures for the base camp	HQMI	Finalised before the start of site preparation (Project Activity 5)	Availability of a complete PGB
Biological	MB1A10	Implementation of habitat rehabilitation measures	QGMI	Finalised before the start of site preparation (Project Activity 5)	Availability of a complete PGB
Biological	MB1A11	Implementation of compensation measures	QGMI	Finalised before the start of site preparation (Project Activity 5)	Availability of a complete PGB
Biological	MB1A12	Implementation of measures for employees to protect biodiversity	QGMI	Finalised before the start of site preparation (Project Activity 5)	Availability of a complete BMP
Biological	MB1A13	Implementation of measures to prevent and control invasive plant species	QGMI	Finalised before the start of site preparation (Project Activity 5)	Availability of a complete PGB
Biological	MB1A14	Implementation of measures to raise staff awareness of biodiversity issues and protection measures	QGMI	Finalised before the start of site preparation (Project Activity 5)	Availability of a complete PGB
Biological	MB1A15	Implementation of measures to reduce collisions	QGMI	Finalised before the start of site preparation (Project Activity 5)	Availability of a complete PGB
Human	MH1A1	Implementation of the PEPP	HQMI	Finalised before the start of land acquisition (Project Activity 2)	Effective availability of a PEPP
Human	MH1A2	Implementation of the MGP	QGMI	Finalised before the start of land acquisition (Project Activity 2)	Effective availability of an MGP and its committee
Human	MH1A3	Recruitment of personnel responsible for E&S aspects	HQMI	Finalised before the start of land acquisition (Project Activity 2)	Contracts signed with personnel responsible for E&S aspects

Environment	Activity code	Activities	Responsible for execution	Period	Objective
Human	MH1A4	Creation of prefectural E&S monitoring committees (CPSES)	HQMI	Finalised before the start of land acquisition (Project Activity 2)	CPSES created to monitor the E&S management of the Project
Human	MH1A5	Launch and dissemination of the MGP to all stakeholders	QGMI	Finalised before the start of land acquisition (Project Activity 2)	MGP communicated to stakeholders throughout the project area
Human	MH1A6	Execution of the Project's PEPP	HQMI	Carried out continuously during the preparation phase	Stakeholder information/consultation
Human	MH2A1	Project design review and minimisation of relocation impacts	QGMI	Done at the start of land acquisition (Project Activity 2)	Social optimisation of project design in terms of resettlement
Human	MH2A2	Dissemination of the MGP to PAPs	QGMI	Done at the start of land acquisition (Project Activity 2)	MGP communicated to PAPs in all affected villages/neighbourhoods
Human	MH2A3	Information and consultation with PAPs	QGMI	Carried out during land acquisition (Project Activity 2)	PAP informed and consulted on the resettlement/compensation process in all affected villages
Human	MH2A4	Implementation of the PAR/PRMS	QGMI	Completed during land acquisition (Project Activity 2)	PAR/PRMS developed and validated
Human	MH2A5	Compensation and resettlement of PAPs	QGMI/Project Owner	Finalised before the start of site preparation (Project Activity 5)	100% of PAPs resettled/compensated
Human	MH2A6	Implementation and monitoring of livelihood restoration activities	QGMI/Project Owner	Initiated before the start of site preparation (Site Activity 5)	100% of economically displaced persons benefiting from the PRMS
Human	MH3A1	Revision of the project design and minimisation of impacts on cultural heritage	QGMI	Done at the beginning of land acquisition (Project Activity 2)	Social optimisation of the design in relation to cultural heritage
Human	MH3A2	Dissemination of the MGP to stakeholders in relation to cultural heritage	QGMI	Done at the start of land acquisition (Project Activity 2)	MGP communicated to authorities and stakeholders involved in cultural heritage
Human	MH3A3	Recruitment of a cultural heritage management expert or mobilisation of internal resources at QGMI for the development, implementation and management of the cultural heritage management plan	QGMI	Done at the start of land acquisition (Project Activity 2)	Contracts signed with the cultural heritage expert
Human	MH3A4	Information and consultation with stakeholders on cultural heritage management	QGMI	Carried out during land acquisition (Project Activity 2)	100% of traditional authorities consulted on measures for managing their cultural sites

Environment	Activity code	Activities	Responsible for execution	Period	Objective
Human	MH3A5	Implementation of the Cultural Heritage Management Plan	QGMI	Completed during land acquisition (Project Activity 2)	Cultural Heritage Management Plan developed and approved
Human	MH3A6	Implementation and monitoring of the Cultural Heritage Management Plan	QGMI	Finalised before the start of site preparation (Project Activity 5)	100% of cultural sites relocated and/or secured



Table153 : Implementation of the ESMP during the construction phase of the Project

Environment	Activity code	Activities	Responsible for execution	Period	Objective
Physical	MP2	Execution and monitoring of the implementation of the Project's PGEC	QGMI	Carried out continuously during the construction phase	A project following the PGEC measures
Organic	MB2	Execution and monitoring of the implementation of the Project's PGB	QGMI	Carried out continuously during the construction phase	A project following the PGB measures
Human	MH4A1	Review and update of the PEPP	QGMI	Finalised before site preparation (Project Activity 5)	A PEPP adapted to the construction phase
Human	MH4A2	Revision and update of the MGP	QGMI	Finalised before site preparation (Project Activity 5)	An MGP adapted to the construction phase
Human	MH4A3	Potential additional recruitment of complementary staff for stakeholder engagement	HQ	Finalised before site preparation (Project Activity 5)	Contracts signed with personnel in charge of E&S aspects
Human	MH4A4	Dissemination to all stakeholders of the updated MGP	QGMI	Carried out at the start of the occupation of the living quarters/installation of non-local workers (Project Activity 6)	Updated MGP shared with stakeholders throughout the Project area
Human	MH4A5	Execution and monitoring of the implementation of the Project's PEPP	HQMI	Carried out continuously during the construction phase	Information/consultation of stakeholders
Human	MH5A1	Evaluation of the results of the resettlement and livelihood restoration strategy	HQMI/Project Owner	Finalised prior to site preparation (Project Activity 5)	Detection of non-compliance in the livelihood restoration process
Human	MH5A2	Review and update of the PRMS	QGMI/Project Owner	Finalised before site preparation (Project Activity 5)	A PRMS better suited to the needs of PAPs
Human	MH5A3	Dissemination of the updated PRMS	QGMI/Project Owner	Carried out at the start of the occupation of the living quarters/installation of non-local workers (Activity 6 of the project)	Updated PRMS shared with stakeholders throughout the project area
Human	MH5A4	Execution and monitoring of the implementation of the updated PRMS	QGMI/Project Owner	Carried out continuously during the construction phase	100% of economically displaced persons benefiting from the PRMS

Environment	Activity code	Activities	Responsible for execution	Period	Objective
Human	MH6A1	Consultations with stakeholders on migration management	QGMI	Finalised before site preparation (Project Activity 5)	100% of districts in the project area informed and consulted on migration management
Human	MH6A2	Implementation of the Migration Management Plan	QGMI	Finalised before site preparation (Project Activity 5)	Effective availability of a Migration Management Plan
Human	MH6A3	Dissemination of the Migration Management Plan to stakeholders	QGMI	Completed at the start of the occupation of the living quarters/installation of non-local workers (Project Activity 6)	Migration Management Plan shared with stakeholders throughout the Project area
Human	MH6A4	Execution and monitoring of the implementation of the Migration Management Plan	QGMI	Carried out continuously during the construction phase	Implementation of measures proposed in the migration management plan
Human	MH7A1	Implementation of the PASR: identification of road safety constraints and risks along the project route, definition of allocated roads, speed limits and temporary traffic management in construction zones.	QGMI	Finalised before the start of recruitment of workers and subcontractors for the construction of structures (Project Activity 3)	Effective availability of the PASR
Human	MH7A2	Dissemination of the PASR to the company in charge of the works and subcontractors, as well as local authorities and external stakeholders	QGMI	Initiated before the start of transport of equipment and materials to sites, heavy vehicle traffic (Project Activity 4)	PASR shared with external stakeholders and local authorities throughout the Project area, as well as with the company in charge of the works and subcontractors
Human	MH7A3	Execution and monitoring of PASR implementation	HQMI	Carried out continuously during the construction phase	Implementation of measures proposed in the PASR (including speed control and potential strengthening of the skills of local National Police officers)
Human	MH8A1	Inclusion of E&S requirements in the tender documents for infrastructure construction	QGMI	Achieved during the preparation of the tender documents	Tender documents including E&S clauses aligned with the project's PGES
Human	MH8A2	Recruitment of E&S expertise to supervise the site PGES	HQ	Finalised prior to worker recruitment (Project Activity 3)	Contracts signed with personnel in charge of E&S aspects
Human	MH8A3	Development of the site ESMP	Construction company	Finalised before the recruitment of workers (Project Activity 3)	A site ESMP tailored to the construction phase and aligned with

Environment	Activity code	Activities	Responsible for execution	Period	Objective
					the requirements of the Project ESMP
Human	MH8A4	Validation of the site's PGES by the AGEE and the prefectural E&S monitoring committees (CPSES)	AGEE and CPSES	Finalised before the recruitment of workers (Project Activity 3)	A site ESMP validated by Project stakeholders
Human	MH8A5	Dissemination of the site PGES and MGP to stakeholders	Construction company	Finalised before the recruitment of workers (Project Activity 3)	Construction site PGES shared with stakeholders throughout the Project area
Human	MH8A6	Execution and monitoring of the implementation of the construction site PGES	Construction company	Carried out continuously throughout the construction phase	Implementation of measures proposed in the site ESMP
Human	MH8A7	Final audit of the site PGES and contract closure	Construction company	Finalised at the end of the construction phase	Verification of the proper implementation of all measures in the site PGES
Human	MH4A1	Review and update of the PEPP	QGMI	Finalised before site preparation (Project Activity 5)	A PEPP adapted to the construction phase

Table154 : Implementation of the PGES during the project's operational phase

Environment	Activity code	Activities	Responsible for execution	Period	Objective
Organic	MB3	Implementation of the recommendations of the compensation study	Project owner	Carried out continuously during the operational phase	Achieve at least zero impact on natural habitats as required by NP6 and reduce the project's carbon footprint
Biological	MB4	Programme to raise public awareness of biodiversity	Project owner	Carried out continuously during the operational phase	Improve understanding of the impacts on biodiversity and the means used by the project to reduce its impacts
Human	MH9A1	Review and update of the PEPP	Project owner	Finalised before the start of recruitment of workers for O&M activities (Project Activity 9)	A PEPP adapted to the operational phase
Human	MH9A2	Revision and update of the MGP	Project owner	Finalised before the start of recruitment of workers for O&M activities (Project Activity 9)	An MGP adapted to the construction phase
Human	MH9A3	Reduction in staff involved in stakeholder engagement	Project owner	Finalised before the start of recruitment of workers for O&M activities (Activity 9 of the project)	Contracts signed with personnel in charge of E&S aspects
Human	MH9A4	Dissemination of the updated MGP to all stakeholders	Project owner	Finalised recruitment of workers for O&M activities (Project Activity 9)	Updated MGP shared with stakeholders throughout the project area
Human	MH9A5	Execution and monitoring of the implementation of the Project's PEPP	Project Owner	Carried out continuously during the operational phase	Information/consultation of stakeholders
Human	MH10A1	Evaluation of the results of the resettlement and livelihood restoration strategy	HQMI/Project Owner	Carried out at the start of O&M activities (Project Activity 9)	Detection of non-compliance in the livelihood restoration process
Human	MH10A2	Revision and update of the PRMS	QGMI/Project Owner	Carried out at the start of O&M activities (Project Activity 9)	A PRMS better suited to the needs of PAPs
Human	MH10A3	Dissemination of the updated PRMS	QGMI/Project Owner	Carried out at the start of O&M activities (Project Activity 9)	Updated PRMS shared with stakeholders throughout the project area
Human	MH10A4	Execution and monitoring of the implementation of the updated PRMS	QGMI/Project Owner	Carried out continuously during the operational phase until livelihoods are restored	100% of economically displaced persons with living conditions similar to or better than those prior to the Project

Environment	Activity code	Activities	Responsible for execution	Period	Objective
Human	MH11A1	Review and update of the migration management plan	Project owner	Carried out at the start of O&M activities (Activity 9 of the project)	A migration management plan adapted to the operational phase
Human	MH11A2	Dissemination of the updated migration management plan	Project owner	Carried out at the start of O&M activities (Project Activity 9)	Updated management plan shared with stakeholders throughout the project area
Human	MH11A3	Implementation of the updated Migration Management Plan	Project Owner	Carried out continuously during the operational phase	Implementation of measures proposed in the migration management plan
Human	MH12A1	Inclusion of E&S requirements in the tender documents for infrastructure operation and maintenance	Project owner	Carried out during the preparation of O&M tender documents	O&M tender documents including E&S clauses aligned with the Project's PGES
Human	MH12A2	Recruitment of E&S expertise to supervise the O&M PGES	Project Owner	Finalised prior to the recruitment of O&M workers (Project Activity 9)	Contracts signed with personnel in charge of E&S aspects
Human	MH12A3	Development of the O&M ESMP by the company awarded the contract	O&M company	Finalised before the recruitment of O&M workers (Project Activity 9)	An O&M ESMP adapted to the construction phase and aligned with the requirements of the Project ESMP
Human	MH12A4	Validation of the O&M ESMP by the AGEE and the prefectural E&S monitoring committees (CPSES)	AGEE and CPSES	Finalised prior to the recruitment of O&M workers (Project Activity 9)	An O&M ESMP validated by Project stakeholders
Human	MH12A5	Dissemination of the O&M PGES and MGP to stakeholders	O&M company	Finalised prior to the recruitment of O&M workers (Project Activity 9)	O&M ESMP shared with stakeholders throughout the Project area
Human	MH12A6	Execution and monitoring of O&M PGES implementation	O&M company	Carried out continuously throughout the operational phase	Implementation of measures proposed in the O&M ESMP
Human	MH12A7	Finalisation audit of the O&M ESMP and contract closure.	O&M company	Finalised at the end of the operational phase	Verification of the proper implementation of all O&M ESMP measures

13.3. Monitoring and follow-up programme

Ensure the implementation of the necessary programmes to ensure that the terms and conditions of the relevant government authorities' authorisations are complied with and to carry out monitoring activities to measure and evaluate the effectiveness of mitigation measures (NP1 § 8 NO 26).

Establish procedures to monitor and measure the effectiveness of its management programme, as well as the project's compliance with legal and/or contractual obligations and regulatory requirements (NP1 § 22).

The main objective of the monitoring and follow-up programme is to ensure that QGMI complies with its commitments and obligations in terms of environmental and social protection throughout the phases of the project that concern it, and that measures to mitigate negative impacts and enhance positive impacts are effectively implemented.

Environmental monitoring and follow-up is an analytical and scientific operation used to measure the actual impacts of a project's implementation and to evaluate the performance of the mitigation measures proposed in an impact study. It involves observing changes in certain components of the environment and makes it possible to verify the accuracy of predictions, measure the actual impacts of the project and evaluate the effectiveness of the proposed mitigation and compensation measures.

Monitoring thus establishes an intervention programme and defines indicators that follow-up operations make operational through data collection according to a precisely defined schedule.

This programme will include at least:

- The identification of actions and components to be monitored;
- A description of the activities and means planned to monitor the actual effects;
- The sampling and analysis methods required, as well as indicators;
- The timetable for implementing the monitoring;
- The persons responsible, the mechanisms and the frequency of execution and dissemination of the results of the environmental monitoring programme.

Monitoring of the implementation of the ESMP will be carried out jointly by the AGEE and the CPSES through audits and site inspection visits. This monitoring will be based in particular on the monitoring plans shared by QGMI with the authorities on a periodic basis.

During the preparation and construction phases, monitoring will be carried out on a quarterly basis due to the significance of the impacts to be managed. During the operational phase, the impacts will be less significant and monitoring of the ESMP will be carried out every two years (to be confirmed by the MITP).



Table155 : Environmental and social monitoring programme – preparation phase

Environm ent	Code	Activities	Period	Objective	Monitoring method	Monitoring indicator	Monitoring manager	Frequency
Physical	MP1	Development and implementation of the PGEC, including actions MP1A1-MP1A9	Finalised before the start of site preparation (Project Activity 5)	Effective availability of a PGEC	PGES activity report	Availability and content of the PGEC – comparison with the measures described in Section13.1.3.1 .	Local authorities/AG EE	Monthly monitoring of progress until the indicator is 100% achieved
Biological	MB1	Development and implementation of the PGB, including actions MB1A1-MB1A15	Finalised before the start of site preparation (Project Activity 5)	Effective availability of a PGB	PGES activity report	Availability and content of the PGB – comparison with the measures described in Section0 .	Local authorities/AG EE	Monthly monitoring of progress until the indicator is 100% achieved
Human	MH1 A1	Implementation of the PEPP	Finalised before the start of land acquisition (Project Activity 2)	Effective availability of a PEPP	ESMP activity report	Availability and content of the PEPP	Local authorities/AG EE	Monthly monitoring of progress until the indicator is 100% complete
Human	MH1 A2	Implementation of the MGP	Finalised before the start of land acquisition (Project Activity 2)	Effective availability of an MGP and its committee	Activity report PGES, CR, attendance list, committee composition	Availability and content of the MGP and its committee's statutes	Local authorities/AG EE	Monthly monitoring of progress until the indicator is 100% achieved
Human	MH1 A3	Recruitment of staff responsible for E&S aspects	Finalised before the start of land acquisition (Project Activity 2)	Contracts signed with personnel responsible for E&S aspects	PGES activity report, contracts signed	Number of people employed (disaggregated by gender)	Local authorities/AG EE	Monthly monitoring of progress until 100% of the indicator is achieved
Human	MH1 A4	Creation of prefectural E&S monitoring committees (CPSES)	Finalised before the start of land acquisition (Project Activity 2)	CPSES created to monitor the E&S management of the Project	PGES activity report, minutes, attendance list, CPSES rules	Number of people participating in CPSES (broken down by gender and entity)	Local authorities/AG EE	Monthly monitoring of progress until 100% of the indicator is achieved
Human	MH1 A5	Launch and dissemination of the MGP to all stakeholders	Finalised before the start of land acquisition (Project Activity 2)	MGP communicated to stakeholders throughout the project area	PGES activity report, minutes and attendance lists, communication materials	Number of meeting participants (disaggregated by gender and village), materials distributed	CPSES/AGEE	Monthly monitoring of progress until all stakeholders identified in the PEPP are reached
Human	MH1 A6	Project implementation of the PEPP	Carried out continuously during the preparation phase	Information/consultation of stakeholders	PGES activity report, minutes and attendance lists, communication materials	Number of meeting participants (broken down by gender and village), materials distributed	CPSES/AGEE	Monthly monitoring of progress throughout the preparation phase

Environment	Code	Activities	Period	Objective	Monitoring method	Monitoring indicator	Monitoring manager	Frequency
Human	MH2 A1	Review of project design and minimisation of resettlement impacts	Done at the start of land acquisition (Project Activity 2)	Social optimisation of the project design in terms of resettlement	PGES activity report, social optimisation report	Number of physical and economic PAPs affected and avoided	CPSES/AGEE	Monthly monitoring of progress until 100% of the indicator is achieved
Human	MH2 A2	Dissemination of the MGP to PAPs	Done at the start of land acquisition (Project Activity 2)	MGP communicated to PAPs in all affected villages/neighbourhoods	PGES activity report, minutes and attendance lists, communication materials	Number of participants in meetings (disaggregated by gender and village), materials distributed	CPSES/AGEE	Monthly monitoring of progress until all affected villages are reached
Human	MH2 A3	Information and consultation with PAP	Carried out during land acquisition (Project Activity 2)	PAP informed and consulted on the resettlement/compensation process in all affected villages	PGES activity report, minutes and attendance lists, communication materials	Number of meeting participants (disaggregated by gender and village), materials distributed	CPSES/AGEE	Monthly monitoring throughout the land acquisition process
Human	MH2 A4	Development of PAR/PRMS	Carried out during land acquisition (Project Activity 2)	PAR/PRMS developed and validated	PGES activity report	Availability and content of PAR/PRMS validated by displaced communities and host communities	CPSES/AGEE	Monthly monitoring of progress until 100% of the indicator is achieved
Human	MH2 A5	Compensation and resettlement of PAPs	Finalised before the start of site preparation (Project Activity 5)	100% of PAPs resettled/compensated	ESMP activity report, payment register, signed agreements	Number of PAPs compensated, number of PAPs resettled/compensated	CPSES/AGEE	Monthly monitoring of progress until 100% of the indicator is achieved
Human	MH2 A6	Implementation and monitoring of livelihood restoration activities	Initiated before the start of site preparation (Site Activity 5)	100% of economically displaced persons benefiting from the PRMS	PGES activity report, CR and attendance lists, communication materials	Number of participants in RMS activities (disaggregated by gender and village), materials distributed	CPSES/AGEE	Monthly monitoring of progress throughout the preparation phase
Human	MH3 A1	Review of project design and minimisation of impacts on cultural heritage	Done at the start of land acquisition (Project Activity 2)	Social optimisation of the design in relation to cultural heritage	ESMP activity report, social optimisation report	Number of cultural sites affected and avoided	CPSES/AGEE	Monthly monitoring of progress until the indicator is 100% achieved
Human	MH3 A2	Dissemination of the MGP to stakeholders in connection with cultural heritage	Done at the start of land acquisition (Project Activity 2)	MGP communicated to authorities and stakeholders	PGES activity report, minutes and attendance lists, communication materials	Number of meeting participants (broken down by gender and	CPSES/AGEE	Monthly monitoring of progress until all relevant authorities have been reached

Environment	Code	Activities	Period	Objective	Monitoring method	Monitoring indicator	Monitoring manager	Frequency
				involved in cultural heritage		village), materials distributed		
Human	MH3 A3	Recruitment of a cultural heritage management expert or mobilisation of internal resources at QGMI to support the development and implementation of the cultural heritage management plan	Completed at the start of land acquisition (Project Activity 2)	Contracts signed with cultural heritage expert	PGES activity report, signed contract, expert CV	Contract signed with a cultural heritage management expert	CPSES/AGEE	Monthly monitoring of progress until 100% of the indicator is achieved
Human	MH3 A4	Information and consultation with stakeholders on cultural heritage management	Achieved during land acquisition (Project Activity 2)	100% of traditional authorities consulted on measures to manage their cultural sites	PGES activity report, minutes signed by the authorities and attendance lists	Number of participants in meetings (broken down by gender and village)	CPSES/AGEE	Monthly monitoring of progress until all relevant authorities have been reached
Human	MH3 A5	Development of the Cultural Heritage Management Plan	Carried out during land acquisition (Project Activity 2)	Cultural Heritage Management Plan developed and approved	ESMP activity report	Availability and content of the Cultural Heritage Management Plan validated by traditional authorities	CPSES/AGEE	Monthly monitoring of progress until 100% of the indicator is achieved
Human	MH3 A6	Implementation and monitoring of the Cultural Heritage Management Plan	Finalised before the start of site preparation (Project Activity 5)	100% of cultural sites relocated and/or secured	PGES activity report, payment register, signed agreements	Number of sites that have received the treatment requested by the populations	CPSES/AGEE	Monthly monitoring of progress until 100% of the indicator is achieved

Table156 : Environmental and Social Monitoring Programme – construction phase

Environment	Code	Activities	Period	Objective	Monitoring method	Monitoring indicator	Monitoring manager	Frequency
Physical	MP2	Execution and monitoring of the implementation of the PGEC, including actions MP1A1-MP1A9	Carried out continuously during the construction phase	Effective implementation of the PGEC	PGES activity report	Monthly PGEC reports – indicating activities and results for actions MP1A1-MP1A9 and the degree of completion of the actions.	CPSES/AGEE	Monthly monitoring of progress until 100% of the indicator is achieved
Biological	MB2	Execution and monitoring of the implementation of the PGB, including actions MB1A1-MB1A15	Carried out continuously during the construction phase	Effective implementation of the PGB	PGES activity report	Monthly PGB reports – indicating activities and results for actions MB1A1-MB1A15 and the degree of completion of the actions.	CPSES/AGEE	Monthly monitoring of progress until 100% of the indicator is achieved
Human	MH4 A1	Revision and update of the PEPP	Finalised before site preparation (Project Activity 5)	A PEPP adapted to the construction phase	PGES activity report	Availability and content of the updated PEPP	CPSES/AGEE	Monthly monitoring of progress until the indicator is 100% complete
Human	MH4 A2	Review and update of the MGP	Finalised before site preparation (Project Activity 5)	An MGP adapted to the construction phase	PGES activity report	Availability and content of the updated MGP	CPSES/AGEE	Monthly monitoring of progress until the indicator is 100% complete
Human	MH4 A3	Potential additional recruitment of complementary staff for stakeholder engagement	Finalised before site preparation (Project Activity 5)	Contracts signed with personnel in charge of E&S aspects	PGES activity report, contracts signed	Number of people employed (disaggregated by gender)	CPSES/AGEE	Monthly monitoring of progress until 100% of the indicator is achieved
Human	MH4 A4	Dissemination to all stakeholders of the updated MGP	Completed at the start of the occupation of the living quarters/installation of migrant workers (Project Activity 6)	Updated MGP shared with stakeholders throughout the project area	PGES activity report, minutes and attendance lists, communication materials	Number of meeting participants (broken down by gender and village), materials distributed	CPSES/AGEE	Monthly monitoring of progress until all stakeholders identified in the PEPP are reached
Human	MH4 A5	Execution and monitoring of the implementation of the Project's PEPP	Carried out continuously during the construction phase	Information/consultation of stakeholders	PGES activity report, minutes and attendance lists, communication materials	Number of meeting participants (broken down by gender and village), materials distributed	CPSES/AGEE	Monthly monitoring of progress throughout the construction phase



Environment	Code	Activities	Period	Objective	Monitoring method	Monitoring indicator	Monitoring manager	Frequency
Human	MH5 A1	Evaluation of the results of the livelihood relocation and restoration strategy	Finalised prior to site preparation (Project Activity 5)	Detection of non-compliance in the livelihood restoration process	PGES activity report, PRMS evaluation report, minutes and attendance lists	Availability and content of the PRMS evaluation report	CPSES/AGEE	Monthly monitoring of progress until 100% of the indicator is achieved
Human	MH5 A2	Review and update of the PRMS	Finalised before site preparation (Project Activity 5)	A PRMS better suited to the needs of PAPs	PGES activity report	Availability and content of the updated PRMS	CPSES/AGEE	Monthly monitoring of progress until the indicator is 100% complete
Human	MH5 A3	Dissemination of the updated PRMS	Completed at the start of the occupation of the living quarters/installation of migrant workers (Project Activity 6)	Updated PRMS shared with stakeholders throughout the project area	PGES activity report, minutes and attendance lists, communication materials	Number of meeting participants (broken down by gender and village), materials distributed	CPSES/AGEE	Monthly monitoring of progress until all affected villages are reached
Human	MH5 A4	Execution and monitoring of the implementation of the updated PRMS	Carried out continuously during the construction phase	100% of economically displaced persons benefiting from the PRMS	PGES activity report, CR and attendance lists, communication materials	Number of participants in RMS activities (disaggregated by gender and village), materials distributed	CPSES/AGEE	Monthly monitoring of progress throughout the construction phase
Human	MH6 A1	Stakeholder consultations on migration management	Finalised before site preparation (Project Activity 5)	100% of districts in the project area informed and consulted on migration management	PGES activity report, minutes and attendance lists, communication materials	Number of meeting participants (broken down by gender and district), materials distributed	CPSES/AGEE	Monthly monitoring of progress until 100% of the indicator is achieved
Human	MH6 A2	Development of the Migration Management Plan	Finalised before site preparation (Project Activity 5)	Effective availability of a Migration Management Plan	ESMP Activity Report	Availability and content of the Migration Management Plan	CPSES/AGEE	Monthly monitoring of progress until the indicator is 100% complete
Human	MH6 A3	Dissemination of the Migration Management Plan to stakeholders	Completed at the start of the occupation of the living quarters/installation of foreign workers (Activity 6 of the project)	Migration Management Plan shared with stakeholders throughout the project area	PGES activity report, minutes and attendance lists, communication materials	Number of meeting participants (broken down by gender and village), materials distributed	CPSES/AGEE	Monthly monitoring of progress until all stakeholders identified in the PEPP are reached
Human	MH6 A4	Execution and monitoring of the implementation of the Migration Management Plan	Carried out continuously during the construction phase	Implementation of measures proposed in the migration management plan	PGES activity report, CR and attendance lists, communication materials	Number of participants in activities (disaggregated by gender and village), materials distributed	CPSES/AGEE	Monthly monitoring of progress throughout the construction phase

Environment	Code	Activities	Period	Objective	Monitoring method	Monitoring indicator	Monitoring manager	Frequency
Human	MH7 A1	Development of the PASR: identification of road safety constraints and risks along the project route, definition of allocated roads, speed limits and temporary traffic management in construction zones.	Finalised before the start of recruitment of workers and subcontractors for the construction of structures (Project Activity 3)	Effective availability of the PASR	PGES activity report	Availability and content of the PASR	CPSES/AGEE	Monthly monitoring of progress throughout the construction phase
Human	MH7 A2	Dissemination of the PASR to the company in charge of the works and subcontractors, as well as local authorities and external stakeholders	Initiated before the start of transport of equipment and materials to sites, heavy vehicle traffic (Project Activity 4)	PASR shared with external stakeholders and local authorities throughout the Project area, as well as with the company in charge of the works and subcontractors	PGES activity report, minutes and attendance lists, communication materials	Number of meeting participants (disaggregated by gender and village), materials distributed	CPSES/AGEE	Monthly monitoring, throughout the construction phase, of awareness-raising sessions for targeted stakeholders and all on-site workers of the company in charge of the works and subcontractors (during QHSSE training and refresher courses for workers)
Human	MH7 A3	Execution and monitoring of PASR implementation	Carried out continuously during the construction phase	Implementation of the measures proposed in the PASR (including speed control and potential skills enhancement for local National Police officers)	PGES activity reports, CRs and attendance lists, communication materials	Number of participants in activities (broken down by gender and village), materials distributed	CPSES/AGEE	Monthly monitoring of progress throughout the construction phase
Human	MH8 A1	Inclusion of E&S requirements in the tender documents for infrastructure construction	Carried out during the preparation of the construction tender documents	Tender documents for works including E&S clauses	ESMP activity report, tender documents	Availability and content of the tender documents	CPSES/AGEE	Monthly monitoring of progress until 100% of the indicator is achieved

Environment	Code	Activities	Period	Objective	Monitoring method	Monitoring indicator	Monitoring manager	Frequency
				aligned with the Project's PGES				
Human	MH8 A2	Recruitment of E&S expertise to supervise the PGES construction site	Finalised before the recruitment of workers (Project Activity 3)	Contracts signed with personnel in charge of E&S aspects	ESMP activity report, contracts signed	Number of people employed (disaggregated by gender)	CPSES/AGEE	Monthly monitoring of progress until 100% of the indicator is achieved
Human	MH8 A3	Development of the PGES for the construction site	Finalised before the recruitment of workers (Project Activity 3)	A construction site ESMP tailored to the construction phase and aligned with the requirements of the Project ESMP	ESMP activity report	Availability and content of the site PGES	CPSES/AGEE	Monthly monitoring of progress until 100% of the indicator is achieved
Human	MH8 A4	Validation of the site PGES by the AGEE and the prefectural E&S monitoring committees (CPSES)	Finalised before the recruitment of workers (Project Activity 3)	A site ESMP validated by the Project stakeholders	ESMP activity report, minutes and attendance list for the validation meeting	Number of people participating in the PGES validation meeting (broken down by gender and entity)	CPSES/AGEE	Monthly monitoring of progress until 100% of the indicator is achieved
Human	MH8 A5	Dissemination of the site ESMP and the MGP to stakeholders	Finalised before worker recruitment (Project Activity 3)	Construction site PGES shared with stakeholders throughout the Project area	ESMP activity report, minutes and attendance lists, communication materials	Number of meeting participants (disaggregated by gender and village), materials distributed	CPSES/AGEE	Monthly monitoring of progress until all stakeholders identified in the PEPP are reached
Human	MH8 A6	Execution and monitoring of the implementation of the PGES construction site	Carried out continuously throughout the construction phase	Implementation of measures proposed in the construction site ESMP	ESMP activity report, minutes and attendance lists, communication materials	Number of participants in activities (broken down by gender and village), materials distributed	CPSES/AGEE	Monthly monitoring of progress throughout the construction phase
Human	MH8 A7	Final audit of the PGES construction site and contract closure	Finalised at the end of the construction phase	Verification of the proper implementation of all measures in the site PGES	ESMP activity report, audit report, minutes and attendance lists	Availability and content of the final audit of the site PGES	CPSES/AGEE	Monthly monitoring of progress until 100% of the indicator is achieved

Table 157 : Environmental and social monitoring programme – operational phase

Environment	Code	Activities	Period	Objective	Monitoring method	Monitoring indicator	Monitoring manager	Frequency
Biological	MB3	Implementation of the recommendations of the compensation study	Implementation within the first 5 years of operation, but annual monitoring for 40 years	Achieve at least zero impact on natural habitats as required by NP6 and reduce the project's carbon footprint	PGES activity report	For the initial implementation of compensation measures: annual reports plus a final report in year 5 proving the completion of reforestation and other measures in the compensation study. For long-term monitoring over 40 years, annual reports showing the survival and progress of reforestation	CPSES/AGEE	Annual monitoring for up to 40 years
Biological	MB4	Programme to raise public awareness of biodiversity	Carried out during the first 5 years of operation	Improve understanding of the impacts on biodiversity and the means used by the project to reduce its impacts	ESMP activity report	Implementation of at least two actions per year during the first five years of operation	CPSES/AGEE	Annual monitoring for 5 years
Human	MH9 A1	Review and update of the PEPP	Finalised before the start of worker recruitment for O&M activities (Project Activity 9)	A PEPP adapted to the operational phase	PGES activity report	Availability and content of the updated PEPP	CPSES/AGEE	Quarterly monitoring of progress until the indicator is 100% achieved
Human	MH9 A2	Revision and update of the MGP	Finalised before the start of recruitment of workers for O&M activities (Project Activity 9)	An MGP adapted to the construction phase	PGES activity report	Availability and content of the updated MGP	CPSES/AGEE	Quarterly monitoring of progress until the indicator is 100% achieved
Human	MH9 A3	Reduction in staff involved in stakeholder engagement	Finalised before the start of recruitment of workers for O&M activities (Project Activity 9)	Contracts signed with personnel in charge of E&S aspects	PGES activity report, contracts signed	Number of people employed (disaggregated by gender)	CPSES/AGEE	Quarterly monitoring of progress until 100% of the indicator is achieved
Human	MH9 A4	Dissemination to all stakeholders of the updated MGP	Finalised upon recruitment of workers for	Updated MGP shared with stakeholders	PGES activity report, CR and attendance lists, communication materials	Number of meeting participants (disaggregated by	CPSES/AGEE	Quarterly monitoring of progress until all stakeholders

Environment	Code	Activities	Period	Objective	Monitoring method	Monitoring indicator	Monitoring manager	Frequency
			O&M activities (Project Activity 9)	throughout the project area		gender and village), materials distributed		identified in the PEPP are reached
Human	MH9 A5	Execution and monitoring of the implementation of the Project's PEPP	Carried out continuously during the operational phase	Information/consultation of stakeholders	PGES activity report, minutes and attendance lists, communication materials	Number of meeting participants (broken down by gender and village), materials distributed	CPSES/AGEE	Quarterly monitoring of progress throughout the operational phase
Human	MH10 A1	Evaluation of the results of the resettlement and livelihood restoration strategy	Conducted at the start of O&M activities (Project Activity 9)	Detection of non-compliance in the livelihood restoration process	PGES activity report, PRMS evaluation report, minutes and attendance lists	Availability and content of the PRMS evaluation report	CPSES/AGEE	Quarterly monitoring of progress until 100% of the indicator is achieved
Human	MH10 A2	Review and update of the PRMS	Completed at the start of O&M activities (Project Activity 9)	A PRMS better suited to the needs of PAPs	PGES activity report	Availability and content of the updated PRMS	CPSES/AGEE	Monthly monitoring of progress until 100% of the indicator is achieved
Human	MH10 A3	Dissemination of the updated PRMS	Completed at the start of O&M activities (Project Activity 9)	Updated PRMS shared with stakeholders throughout the project area	PGES activity report, minutes and attendance lists, communication materials	Number of meeting participants (disaggregated by gender and village), materials distributed	CPSES/AGEE	Monthly monitoring of progress until all affected villages are reached
Human	MH10 A4	Execution and monitoring of the implementation of the updated PRMS	Carried out continuously during the operational phase until livelihoods are restored	100% of economically displaced persons with living conditions similar to or better than those before the Project	PGES activity report, PRMS monitoring report, final PRMS audit	Living standards of economically displaced persons (disaggregated by gender and village)	CPSES/AGEE	Quarterly monitoring of progress until 100% of the indicator is achieved
Human	MH11 A1	Revision and updating of the migration management plan	Completed at the start of O&M activities (Project Activity 9)	A migration management plan adapted to the operational phase	PGES activity report	Availability and content of the updated migration management plan	CPSES/AGEE	Quarterly monitoring of progress until the indicator is 100% achieved
Human	MH11 A2	Dissemination of the updated migration management plan	Completed at the start of O&M activities (Project Activity 9)	Updated management plan shared with stakeholders	PGES activity report, minutes and attendance lists, communication materials	Number of meeting participants (broken down by gender and village), materials distributed	CPSES/AGEE	Quarterly monitoring of progress until all stakeholders identified in the PEPP are reached

Environment	Code	Activities	Period	Objective	Monitoring method	Monitoring indicator	Monitoring manager	Frequency
				throughout the project area				
Human	MH11 A3	Implementation of the updated Migration Management Plan	Carried out continuously during the operational phase	Implementation of measures proposed in the migration management plan O&M tender documents	Activity report PGES, CR and attendance lists, communication materials	Number of participants in activities (disaggregated by gender and village), materials distributed	CPSES/AGEE	Quarterly monitoring of progress throughout the operational phase
Human	MH12 A1	Inclusion of E&S requirements in tender documents for infrastructure O&M	Carried out during the preparation of O&M tender documents	including E&S clauses aligned with the Project's PGES	ESMP activity report, O&M tender documents	Availability and content of O&M tender documents	CPSES/AGEE	Monthly monitoring of progress until 100% of the indicator is achieved
Human	MH12 A2	Recruitment of E&S expertise to supervise the O&M PGES	Finalised before the recruitment of O&M workers (Project Activity 9)	Contracts signed with personnel in charge of E&S aspects	ESMP activity report, contracts signed	Number of people employed (disaggregated by gender)	CPSES/AGEE	Quarterly monitoring of progress until 100% of the indicator is achieved
Human	MH12 A3	Development of the O&M ESMP by the company awarded the contract	Finalised before the recruitment of O&M workers (Project Activity 9)	An O&M ESMP adapted to the construction phase and aligned with the requirements of the Project ESMP	ESMP activity report	Availability and content of the O&M ESMP	CPSES/AGEE	Quarterly monitoring of progress until 100% of the indicator is achieved
Human	MH12 A4	Validation of the O&M ESMP by the AGEE and the prefectural E&S monitoring committees (CPSES)	Finalised before the recruitment of O&M workers (Project Activity 9)	An O&M ESMP validated by Project stakeholders	ESMP activity report, minutes and attendance list for the validation meeting	Number of people participating in the ESMP validation meeting (disaggregated by gender and entity)	CPSES/AGEE	Quarterly monitoring of progress until 100% of the indicator is achieved
Human	MH12 A5	Dissemination of the O&M PGES and MGP to stakeholders	Finalised before the recruitment of O&M workers (Project Activity 9)	O&M ESMP shared with stakeholders throughout the Project area	PGES activity report, minutes and attendance lists, communication materials	Number of meeting participants (disaggregated by gender and village), materials distributed	CPSES/AGEE	Quarterly monitoring of progress until all stakeholders identified in the PEPP are reached

Environment	Code	Activities	Period	Objective	Monitoring method	Monitoring indicator	Monitoring manager	Frequency
Human	MH12 A6	Execution and monitoring of the implementation of the PGES O&M	Carried out continuously throughout the operational phase	Implementation of measures proposed in the O&M ESMP	ESMP activity report, minutes and attendance lists, communication materials	Number of participants in activities (broken down by gender and village), materials distributed	CPSES/AGEE	Quarterly monitoring of progress throughout the construction phase
Human	MH12 A7	Final audit of the O&M PGES and contract closure.	Finalised at the end of the operational phase	Verification of the proper implementation of all O&M ESMP measures	ESMP activity report, audit report, minutes and attendance lists	Availability and content of the O&M PGES finalisation audit	CPSES/AGEE	Quarterly monitoring of progress until 100% of the indicator is achieved

13.4. Capacity Building Programme

The ESMP provides a detailed description of institutional arrangements, identifying the entity responsible for implementing mitigation and monitoring measures, including corrective measures, financing, reporting and staff training.

The process of capacity building for stakeholders in the implementation of environmental and social management measures will take the form of training and will focus on environmental and social management: environmental monitoring and surveillance operations, conducting property surveys and assessments, organising awareness-raising meetings, monitoring the implementation of accompanying measures and monitoring the accounting of environmental activities on site, etc.

The stakeholders concerned are:

- CPSES members;
- QGMI agents and subcontracting construction companies responsible for implementing environmental and social measures.

In order to ensure the proper implementation of the recommendations of this ESIA, it is important to strengthen the capacities of construction personnel. Therefore, the training and awareness-raising topics presented in Table c below must be implemented.

Table158 : Training and awareness topics

Topics	Target audience
QHSE department tools, systems and working procedures	QHSE team, including community liaison officers
Deployment of the Emergency Plan	All staff, including subcontractor teams
Complaints management mechanism, including the specific GBV/EAS-HS/VCE procedure	All staff, including subcontractor teams Communities and local authorities
Awareness-raising on GBV/EAS-HS/VCE prevention	All staff, including subcontractor teams Local communities and authorities
Code of conduct (including sanctions system)	All staff, including subcontractor teams
Risk analysis	Operations, safety and production staff
Training First response team members, second response team members and workplace first aiders	Two team members and one first-aid responder for every eight people
Electrical accreditation training	Electricians
Awareness of the need to wear personal protective equipment	Operations and maintenance personnel
Defensive driving training	Drivers
Training in eco-friendly practices	All personnel, including subcontractor teams
Training and awareness-raising on environmental and risk management (including awareness-raising on combating invasive plant species)	All staff, including subcontractor teams
Training on the concept of archaeological heritage and procedures in the event of an accidental discovery	All staff, including subcontractor teams
Awareness of customs and traditions	All staff, including subcontractor teams



13.5. Additional initiatives

The project will generate indirect impacts that cannot be sufficiently mitigated within the scope of this project alone, particularly due to multiple causes.

These impacts are:

- Pressure on essential and ecosystem services linked to migration due to the project opening up the area (impacts nos. 37 and 42);
- Land inflation caused by the proximity of the RN32 (impact no. 9).

The definition and implementation of a Corporate Social Responsibility Plan (CSR Plan) will aim not to offset these induced impacts, but to carry out activities that extend the positive impacts associated with the project. The purpose of this plan is to ensure that the Project contributes to the well-being of local communities. Community development initiatives will be defined according to the available and allocated budget. These initiatives, which are eagerly awaited by the population and local authorities, may take the form of contributions in various priority areas: rehabilitation of school infrastructure (construction of fences), sanitation, access to water, etc.

Collaboration with local communities and authorities to define and develop community development initiatives and their long-term management strategy will be crucial to ensuring the sustainability of the "use" that will be made of these initiatives.

13.6. Monetary estimation of protective and accompanying measures

Include compensation and/or mitigation costs for significant residual impacts in project costs (NES 1 paragraph 27 footnote 26).

The table below summarises the costs of the main environmental and social measures in the ESMP. These costs are estimates and are provided for information purposes only. They do not include compensation costs for the biological environment, which will be determined at a later date by the compensation study.



Table159 : Costs of proposed environmental measures

Main components	Cost in GNF and EUR		Justification
Preparation phase (6 months)	2,650,000,000 GNF	€260,856	
Development and implementation of the PEPP and MGP	330,000,000 GNF	€32,484	Recruitment of a consulting firm to oversee, or mobilisation of internal resources at QGMI to implement the PEPP and MGP
	220,000,000 GNF	€21,656	Estimated budget for the preparation phase (radio spots, town criers, posters, image boxes, billboards, etc.).
Development and implementation of the PAR	To be defined		Recruitment of a consulting firm to develop the PAR
	To be defined		Estimated budget for loss compensation
Development and implementation of the PRMS	To be defined		Recruitment of a consulting firm to develop the PRMS
	To be defined		Estimated budget for livelihood restoration activities
Development and implementation of the Cultural Heritage Management Plan	160,000,000 GNF	€15,750	Recruitment of a consulting firm or individual consultant to develop the management plan
	110,000,000 GNF	€10,828	Estimate for implementation, but will depend on the plan developed, which will detail the activities and their cost (rituals, offerings, meetings, travel, etc.)
Development of the capacity-building plan	220,000,000 GNF	€21,656	Recruitment of a consulting firm in charge of, or mobilisation of internal resources at QGMI to implement the training plan
HSE monitoring	1,000,000,000 GNF	€98,436	HSE and CLO manager covering the entire project area
Operation of CPSES	170,000,000 GNF	€16,734	Meeting expenses, per diem, travel
Development of a Site Environmental Management Plan (PGEC)	220,000,000 GNF	€21,656	Recruitment of a consulting firm to develop the PGEC, or mobilisation of internal resources at QGMI to develop the PGEC
Development of a Biodiversity Management Plan (BMP)	220,000,000 GNF	€21,656	Recruitment of a consulting firm to oversee, or mobilisation of internal resources at QGMI to implement the BMP
Construction phase (30 months)	10,150,000,000 GNF	€999,129	
Updating of the PEPP and MGP and implementation	330,000,000 GNF	€32,484	Recruitment of a consulting firm to update the PEPP and MGP, or mobilisation of internal resources at QGMI
	730,000,000 GNF	€71,859	Estimated budget for the construction phase (radio spots, town criers, posters, image boxes, billboards, etc.).
Updating of the PRMS and implementation	To be defined		Recruitment of a consulting firm to assess the living conditions of PAPs and update the PRMS, or mobilisation of internal resources at QGMI for this purpose.
	To be defined		Complementary livelihood restoration activities (agriculture, livestock farming, trade, etc.)
Development and implementation of the Migration Management Plan	330,000,000 GNF	€32,484	Recruitment of a consulting firm to oversee the management plan or mobilisation of internal resources at QGMI to implement the plan
	500,000,000 GNF	€49,218	Depending on the plan developed, which will detail the activities and their cost (awareness-raising, construction, training, etc.)

Development and implementation of the PGES project	1,110,000,000 GNF	€109,264	
Development and implementation of the PASR	440,000,000 GNF	€43,312	
Implementation of the Capacity Building Plan	1,000,000,000 GNF	€98,436	Recruitment of a consulting firm responsible for, or mobilisation of internal resources at QGMI to provide training for workers and subcontractors
HSE monitoring	3,330,000,000 GNF	€327,793	HSE and CLO manager covering the entire project area
Operation of the CPSES	380,000,000 GNF	€37,406	Meeting expenses, per diem, travel
Implementation of the Construction Site Environmental Management Plan (PGEC)	1,000,000,000 GNF	€98,436	Monitoring and partial costs of implementing the PGEC
Reforestation for carbon offsetting and biodiversity	To be defined		Cost to be determined based on the actual infrastructure footprint, particularly the base camp, based on twice the number of hectares of the footprint (for carbon offsetting and biodiversity) at a price of 10,000 GNF/plan and 1,000 trees/ha.
Implementation of the Biodiversity Management Plan during the construction phase (PGB)	1,000,000,000 GNF	€98,436	Monitoring and partial costs of implementing the PGB
Operational phase (15 years)	17,920,000,000 GNF	€1,763,980	
Updating of the PEPP and MGP and implementation	330,000,000 GNF	€32,484	Recruitment of a consulting firm to update the PEPP and MGP
	2,430,000,000 GNF	€239,200	Estimated budget for the operational phase (radio spots, town criers, posters, image boxes, billboards, etc.).
Updating of the PRMS and implementation	To be defined		Recruitment of a consulting firm to assess the living conditions of PAPs and update the PRMS
	To be defined		Additional livelihood restoration activities (agriculture, livestock farming, construction, etc.)
Updating of the Migration Management Plan and implementation	110,000,000 GNF	€10,828	Recruitment of a consulting firm to update the plan
	220,000,000 GNF	€21,656	Additional migration management activities during the operational phase
Development and implementation of the O&M PGES	2,470,000,000 GNF	€243,138	
Implementation of the Capacity Building Plan	1,000,000,000 GNF	€98,436	Recruitment of trainers to conduct periodic training for workers and subcontractors
HSE monitoring	7,400,000,000 GNF	€728,429	Part-time HSE manager for a period of 70 years



Operation of CPSES	760,000,000 GNF	€74,812	Meeting expenses, per diem, travel (one quarterly meeting for 70 years)
Awareness and training programme for the population on environmental protection	200,000,000 GNF	€19,687	Carried out during the first five years of operation
Implementation and monitoring of the recommendations of the compensation study	3,000,000,000 GNF	€295,309	Implementation within the first 5 years of operation, but annual monitoring for 40 years
TOTAL PGES	30,720,000,000 GNF	€3,023,966	



13.7. QGMI standards

The project's design and construction comply with QGMI's internal policies and international best practices. QGMI is committed to sustainable development and strict compliance procedures and, as such, has published a number of procedures and commitments that are accessible to the public. These include:

Commitment to sustainable development based on the following pillars:

- <https://ggmi.eu/environment/>;
- Innovation ([Innovation – QGMI Corporate](#));
- Local communities ([Local communities – QGMI Corporate](#));
- Integrated management system ([Integrated management system – QGMI Corporate](#)); and
- Certifications ([Sustainability Certifications – QGMI Corporate](#)).

Commitment to compliance is another key aspect of QGMI's internal policies. It is based on seven pillars, which are presented in the



Figure65 . Among the list of policies that are part of the Code of Ethics and Compliance Book ([Code of Ethics and Compliance Policy Book – QGMI Corporate](#)) are the following:

- Code of Ethics;
- Code of Ethics for Third Parties (Rev. 03, 2024);
- Anti-Corruption and Anti-Bribery (Rev. 01, 2024);
- Gifts, Presents and Entertainment Policy (Rev. 02, 2022);
- Conflict of Interest Policy (Rev. 02, 2025);
- Ethics Channel Policy (Rev. 05, 2023);
- Donations and Sponsorship Policy (Rev. 02, 2020);
- Third-party relations policy (Rev. 00, 2025);
- Data Protection and Information Security Policy (Rev. 01, 2024);
- Antitrust Policy (Rev. 01, 2020); and
- Partnerships and Associations Policy (Rev. 01, 2020).





Figure65 : QGMI's Commitment to Compliance

13.8. QGMI Integrated Management System Policy

QGMI has developed an Integrated Management System (IMS) policy covering quality, safety, occupational health, social responsibility and environmental aspects. QGMI's IMS policy is committed to continuously improving processes, products and services, as well as consolidating the company's objectives, as shown in Figure66.



INTEGRATED MANAGEMENT SYSTEM POLICY

At QGMI we ground our strategic actions to achieve the business objectives under the management system: Quality, Occupational Safety and Health, Socioenvironmental.

Besides, QGMI is committed to continuous improvement of processes, products, and services. For that, always consider:

- Reliability, Loyalty, Quality, and Work are non-negotiable values;
- Maintain an ethical and transparent business environment, being a social agent catalyst for sustainable development in the countries where we operate;
- Compliance with applicable legislation and regulations as a fundamental basis for the commitment to quality, occupational safety and health, and socioenvironmental in the continuous search for good international industry practices;
- Hazard elimination and reduction of risks in carrying out activities to prevent occupational injuries and diseases, with the commitment of all, seeking to provide safe and healthy working conditions;
- Participation and consultation of workers on issues pertinent to the occupational health and safety system;
- Contribute to the improvement of the quality of life of people to expand our positive contribution to society in addition to practising protection, participation, and social inclusion in our projects;
- Environmental protection, including management of generated waste and prevention of pollution, promoting rational use of natural resources, and thus guaranteeing the protection of biodiversity and ecosystems;
- Analysis and application of measures to minimize the impact of our activities in terms of climate change; and
- Satisfaction of stakeholders and meeting their needs by ensuring engagement with management of excellence, costs and due social improvement.



Gustavo Dantas Guerra
CEO

Rev 03



Figure66 : QGMI's IMS policy



14. Closure Plan

It should be noted that although requested generically in an impact assessment, the project closure phase was not considered as such in this impact assessment.

Indeed, with the implementation of a sustainable financing mechanism through toll stations to fund the upkeep and maintenance of the RN 32 and its associated structures beyond the operational phase, coupled with the handover to the Guinean State from the operational phase onwards for the operation and maintenance of the project, it seems highly unlikely that the RN 32 will deteriorate significantly at the end of the project's average 15-year lifespan and that the project will therefore generate any impacts beyond the **extension of those already analysed during the operational phase**.



15. Conclusion

The RN 32 rehabilitation and construction project, for which MITP is the project owner and QGMI the project manager, will enable greater integration of the rural communities located between Koumana and Niandankoro into the socio-economic fabric of the Kankan administrative region and, more broadly, into that of the country. This physical and economic opening up will have many direct and indirect positive impacts: creation of direct and indirect jobs and development of the local economy during the construction and operational phases, improvement in the movement of goods and people by reducing travel time and increasing the traffic capacity of these facilities, and improved access to basic social services during the operational phase, etc.

Negative direct, indirect or induced socio-environmental impacts may also arise, and appropriate avoidance, mitigation and compensation measures will need to be put in place. For the physical environment, these impacts include, for example, normal construction nuisances and additional GHG and other gas emissions due to increased traffic. For the biological environment, these impacts include, for example, the loss of natural habitat and disturbance to animals. On the other hand, the new bridges and culverts will improve the passage of watercourses and aquatic organisms. For the human environment, these impacts include, for example, temporary and permanent loss of land, property and AGR, leading to physical and economic resettlement, traffic disruption due to construction activities, risks of road accidents and construction site accidents, tensions related to recruitment, risky behaviour among project workers, disruption to water supply networks, power lines and fibre optic cables, and pressure on essential services during the construction and operational phases.

The following management plans will therefore need to be developed to incorporate measures to manage positive and negative impacts:

- Stakeholder Engagement Plan (SEP)
- Complaints Management Mechanism (CMM)
- Resettlement Action Plan (RAP)
- Livelihood Restoration Plan (LRP)
- Cultural Heritage Management Plan
- Migration Management Plan
- Road Safety Action Plan
- PGES Construction Site, including, among other things, emergency response plans
- O&M PGES
- PGEC
- Biodiversity Management Plan (including, among other things, a compensation study)
- Public awareness and training programme on environmental conservation

A monitoring and follow-up programme will be developed to ensure that QGMI complies with its commitments and obligations in terms of environmental and social protection throughout the phases of the project that concern it, and that measures to mitigate negative impacts and enhance positive impacts are effectively implemented.

The development and implementation of the various E&S management plans for the project (excluding PAR-PRMS) will require an estimated budget of GNF 2,650,000,000 for the preparation phase, GNF 10,150,000,000 for the construction phase and GNF 17,920,000,000 for the operational phase.



