

FINAL REPORT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

FOR

FEEDER ROADS CONSTRUCTION AND REHABILITATION

***GAMBIA INCLUSIVE AND RESILIENT AGRICULTURAL VALUE
CHAIN DEVELOPMENT PROJECT (GIRAV)***

(P173070)

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LIST OF ACRONYM

AF	Additional Financing
ANR	Agriculture and Natural Resources
AQS	Air Quality Standard
AASHTO	American Association of State Highway and Transportation Official
AWPB	Annual work plan and budget
ADT	Average Daily Traffic
BMP	Best management practices
CBR	California Bearing Ratio
CFI	Capacity of financial institutions
CO	Carbon monoxide
CPCU	Central Projects Coordinating Unit, Ministry of Agriculture
CRR	Central River Region
CoC	Code of conducts
CEP	Community Engagement Plan
CF	Community Forestry
CDMP	Construction Dust Management Plan
CERC	Contingency Emergency Response subcomponent
CPM	Critical Path Method
CEDAW	Convention on the Elimination of all Forms of Discrimination Against Women
GCAV	Gambia Commercial Agriculture and Value Chain Management Project
GPPA	Gambia Public Procurement Authority
GAP	Gender Action Plan
GBV	Gender Based Violence
GNS	Global Navigation Satellite Systems'
GM	Grievance Mechanism
GER	Gross Enrolment Ratio
GEAP	Gambia Environmental Action Plan

GIRAV	Gambia Inclusive and Resilient Agricultural Value Chain Development Project
IDA	International Development Association
LMP	Labor Management Plan
LRR	Lower River Region
MG	Matching grant
MECCNAR	Ministry of Environment Climate Change and Natural Resources
NAPA	National Adaptation Plan of Action
NEA	National Environment Agency
NEMA	National Environment Management Act
NEMC	National Environment Management Council
NTP	National Transport Policy
NER	Net Enrolment Rate
NRW	Non-Revenue Water
NBR	North Bank Region
OHS	Occupational Health and Safety
PM	Particulate Matter
PAH	Polycyclic aromatic hydrocarbons
PAD	Project Appraisal Document
PDO	Project Development Objective
PSC	Project Steering Committee
PA	Protected Areas
RF-NDP	Recovery Focused National Development Plan
RAP	Resettlement Action Plan
SDG	Sustainable Development Goals
SEA	Strategic Environment Assessment
SME	Small and Medium Enterprises
TDS	Total Dissolved Solid
TMP	Traffic Management Plan

UNFCCC

UN Framework Convention on Climate Change

UNCBD

United Nations Convention on Biological Diversity

UNCCD

United Nations Convention to Combat Desertification

URR

Upper River Region

Executive Summary

Introduction: The Government of The Gambia has secured US\$40 million from the World Bank for the implementation of The Gambia Inclusive and Resilient Agricultural Value Chain Development Project (GIRAV) to further support agricultural value chain development and to move from subsistence to a more market-oriented agriculture.

Project Development Objective (PDO): The development objective for GIRAV is to promote the development of inclusive and competitive agriculture value chains, focusing on smallholder farmers and agribusinesses in Project targeted areas.

Project Components: To achieve the PDO, the project consists of three interlinked technical components, in addition to the Project Implementation and Coordination Components, organized to address the key binding constraints for the development of the agriculture and agribusiness sector:

Component 1: Improving the business environment for commercial agriculture development.

The objective of this component is to support establishing an enabling environment that can foster competitive and sustainable development of a commercial agriculture/agribusiness sector in the Gambia.

Component 2: Building a productive and climate-resilient agri-food system.

This component aims to increase agricultural productivity through climate-smart intensification of selected production systems, focusing on enhancing water management and fostering access to improved technologies and innovations.

Component 3: Mobilizing productive private investments along the value chains.

This Component aims to support private investments in productive activities and related services by addressing the major market failures that constrain the financing of investments in agricultural value chains.

Project Intervention Areas: The Gambia Inclusive and Resilient Agricultural Value Chain Development Project (GIRAV) Feeder Roads project is planned for the construction rehabilitation, upgrading, and maintenance of the selected feeder roads across the six (6) Agricultural Regions in the country namely in (WCR, LRR, NBR, CRR-S, CRR-N and URR).

Rationale for the ESIA: Construction or rehabilitation of road infrastructures are categorized as 'Class A' projects under the NEMA and EIA Procedures, which means a full ESIA study is to be conducted. Thus, it is required that the GIRAV Project look for the services of an environmental consultancy firm to develop an ESIA, the draft report of which will be sent to the World Bank for review and approval before submission to the National Environment Agency (NEA) in consideration of reviewing and granting of environmental approval for the proposed development.

Objective of ESIA: To predict, assess and evaluate the potential environmental and social impacts of the various activities of the GIRAV rural feeder roads construction and rehabilitation to develop a robust ESMP that can be adopted to reduce or eliminate the adverse effects as well as maximize the potential benefits of the project.

Scope of ESIA: The total number of new feeder roads to be constructed by the GIRAV project under this ESIA study is twenty-three (23) roads, all of which are currently earth roads. Additionally, six (6) gravel roads in WCR will be upgraded to single surface dressing.

Methodology: The assessment was conducted using a mixed method approach to data collection using both quantitative and qualitative approaches. Therefore, both primary and secondary data collection were used to collect the data required for the assessment.

Secondary data collection: Desk review of relevant project documents such as the GIRAV safeguard documents (i.e. ESMF, SEP, GM, LMP etc), Project Appraisal Document (PAD), World Bank ESS and road feasibility study to obtain an in-depth understanding of the project activities. Thereafter, national acts, policies and regulations, as well as international conventions relevant to the project were reviewed and presented in Chapter 3 of the report. In addition, during the baseline analysis secondary data on climate and weather (rainfall, humidity, temperature, wind etc) were acquired from the Meteorology unit at the Department of Water Resources.

Primary data collection: Numerous field visits were conducted to collect primary data on the physical, biological, and socio-economic environment of the project intervention areas. Furthermore, stakeholder consultations were carried out in 71 communities and 10 institutions. The main purpose of the consultations was to discuss the proposed project with key stakeholders both at community and institution level as well as gauging their perspective about the project.

Assessment of potential environmental and social impacts: To identify and assess potential impacts associated with or resulting from Project activities, the ESIA team used data collected from the field consultations, professional judgment, and desktop analysis to identify potential impacts and their interactions. The significance of potential impacts that may result from the proposed Project were determined to assist in preparing recommendations for the proposed Project evaluation.

Development of mitigation measures: In developing mitigation measures, the first focus was on measures that prevent or minimize impacts through the design and management of the Project rather than on reinstatement and compensation measures. A ‘hierarchy’ of mitigation measures for planned activities and unplanned events is outlined as: (a) avoid at source; (b) abate on site; (c) abate at receptors; (d) repair or remedy; (e) compensate in kind; (f) control; (g) reducing the consequence; and (h) recovery/remediation.

Development of ESMP: After the assessment and evaluation of all the significant environmental and social impacts, a management plan was formulated to effectively implement the recommended enhancement and mitigation measures. Furthermore, the monitoring plan for the implementation of the ESMP were also developed by preparing indicator parameters for the proposed measures and highlighting the monitoring method and frequency as well as authorities responsible for the execution of the monitoring plan. A budget was developed for the implementation of the ESMP and monitoring plan.

Project Description: This chapter provides the detailed project description from the project overview to the description of the proposed feeder roads to be constructed, rehabilitated or upgraded, and the various project activities to be undertaken. The following activities are to be done during the road construction/rehabilitation/upgrading phase of the project:

Site establishment - The Contractor is mandated to establish and maintain a comprehensive site establishment for the efficient execution of the project, including a main office, camps, stores, tanks, and workshops. These facilities must cater to the needs of the staff and provide clean, safe conditions, with workshops equipped for major repairs and stores offering ventilated and secured storage.

Traffic provision - The provision and maintenance of traffic accommodation during construction and maintenance periods are essential for ensuring the safe and easy passage of public traffic, which includes the construction of detours, bypasses, barricades, signs, deployment of flagmen as necessary and liaison with the traffic police. These measures are vital for minimizing disruptions to the flow of traffic and maintaining public safety throughout the construction process.

Earthworks - The earthworks involve a comprehensive preparation and manipulation of the site to facilitate the application of pavement layers. This initial phase of construction includes a wide range of activities such as clearing and grubbing, removal of trees and obstructions, and the relocation of services, all aimed at preparing the ground for the construction of roadways, embankments, and necessary infrastructure. The use of heavy machinery is pivotal in achieving the desired excavation levels and in managing materials on-site.

Pavement works - The construction of pavement layers is a critical phase in road works, requiring planning, execution, and quality control to ensure the durability and functionality of the road. Before commencing any pavement layer operations, it is essential that all drainage works are completed for the section in question, unless an exception is made by the Consultant. This stage involves several key steps: spreading the materials evenly across the prepared surface, adjusting moisture content for optimal compaction, and achieving the specified density through systematic compaction efforts.

Surfacing - The surfacing process emphasizes the quality of materials, from the aggregate's grading to the bitumen's viscosity and flash point, ensuring all components meet standards for a durable, high-performance road surface. The application of prime coat protects the completed base layer and prepares the surface, enhancing the adhesion between the existing road layer and the new surface material.

Civil and drainage works - Drainage works, integral to the construction of roads and infrastructure projects, require attention to slopes and levels to ensure effective water management and prevent waterlogging or erosion. The excavation and backfill processes form the foundation of constructing concrete drains, masonry repairs, and culvert installations, adhering strictly to the specifications and design drawings or as directed by the Consultant. The work encompasses all necessary procedures to achieve the desired outcome, including drainage, and pumping activities, ensuring the backfill reaches the original ground or finished surface level.

Road furniture and pavement markings - The installation and maintenance of road furniture, particularly traffic signs, emphasizes the significance of quality and visibility for the safety and guidance of vehicular and pedestrian traffic. Traffic signs are to be installed in compliance with standards, ensuring

they are reflective, well-positioned, and constructed from durable materials like galvanized steel and aluminum alloy sheets. Road markings play a crucial role in traffic management, requiring reflectorized paint or thermoplastic reflectorized paint for enhanced visibility. The application involves sophisticated equipment and processes that ensure uniformity, adherence to specified thicknesses, and immediate effectiveness post-application.

Demobilization and handing over - Demobilization process marks the transition from active construction to the final handover of the project. This involves the systematic withdrawal of construction machinery, equipment, and personnel from the site, ensuring that the area is left in a safe and environmentally friendly state. The handover process is planned and executed, involving thorough inspections, completion of any outstanding work, and confirmation that the road meets all safety, functional, and aesthetic requirements as per the contract.

Legal and Institutional Context: This chapter presents the relevant legal tools essential to the development of the ESIA and implementation of the proposed project activities. Institutional arrangements were also provided on the mandates and responsibilities of relevant stakeholder institutions towards the implementation of the proposed project.

Relevant National Laws, Acts & Policies - Selected legal tools that guided the development and implementation of this ESIA essentially consist of the following:

- *The National Environmental Management Act 1994*
- *The Biodiversity and Wildlife Act (2003)*
- *Land Acquisition and Compensation Act (1991)*
- *The Forestry Act (2018)*
- *The Gambia Environmental Action Plan (GEAP III 2021-2030)*
- *National Transport Policy (2018 – 2027)*
- *Road Safety Strategy (2021 – 2030)*
- *The National Health Policy (2012-2020)*
- *The Wildlife Sector Policy and Strategy (2013)*
- *The National Biodiversity Strategy and Action plan (2015 – 2020)*
- *National Forest Policy (2023 – 2032)*

Institutional arrangements: The Ministry of Agriculture is responsible for overall project implementation. It collaborates closely with the Ministry of Transport, Works and Infrastructure and its respective agency, NRA on the execution of the GIRAV feeder roads subproject.

Environmental and Social Baseline Information: This chapter details the existing environmental and social conditions of the project intervention areas. Summary of relevant environmental and social aspects of the project are as follows:

Water Quality - Generally, most of the water quality parameters tested were found to be within the recommended guideline values of the World Health Organization (WHO) for good drinking quality. However, the low pH values and Faecal Coliform bacteria registered have probably been due to the poor environmental management and dilapidated water facilities.

Air quality - The key findings of the baseline air quality monitoring revealed that the air quality in all the selected sites in URR, LRR and NBR were healthy with PM_{2.5} and PM₁₀ within the WHO Air Quality Standard (AQS). The results further unveiled the air quality (PM_{2.5} and PM₁₀) along the Bondali Bundakunda – Jorem Bundakunda road in WCR and Sinchu Alagie – Pateh Sam road in CRR were found to be unhealthy.

Noise Monitoring - The noise level of all the selected sites was found to be between 45.7 – 59.67 dB which is within the accepted limit.

Forest cover - According to the GIRAV project intervention sites of the feeder roads corridors, *Terminalia macroptera*, *Daniella oliveiri*, *Combretum glutinosum*, *Khaya senegalensis*, *Parkia biglobosa*, *Elaeis Guinness*, *Combretum nigrans*, *Pterocarpus erinaceus*, and *Cordyla Africana* are the most found tree species across all regions. Other important species for the extraction of non-wood forest products (NWFP) include *Saba senegalensis*, *Detarium senegalensis*, *Elaeis guinensis*, *Borassus aeithiopum*, and *Moringa oleifera*. Nonetheless, there are at least four Community Forests within the GIRAV project intervention sites of the road corridor that are less than 10 meters from the edge of the roads: Fass-Njage Choi (16.23 hectares), co-management of Sukuta, Duta Walli, Banni (80.4 hectares); Kuwonku-ba (259 hectares); and Kafencheng (30 hectares). It has been noted that the road expansion will encroach or destroy the forest boundaries.

On the other hand, farmland, fallow lands, forest reserves, or "open forest" are said to be commonly found within the GIRAV project intervention sites along the corridors, since the species mentioned above found along the edges of the feeder roads.

Wildlife species: the most common wildlife species seen at the GIRAV project intervention sites are the baboon, monkey, bush pig, squirrel, snake, lizard, and rat.

Socio-economic environment: The socio-economic baseline data from 5 regions and 15 districts are presented by region and district, since data at community level were challenging to obtain. The road conditions of the proposed sites and other relevant socio-economic baseline information are summarized in the subsequent sections.

Demographic Characteristics - The population structures of all the project intervention districts depict a youthful population structure with a broad base and a narrow top (GBoS, 2020). There is a high dependency in all the districts as the 0–14 and 65+ year-olds (50% and above) are highly dependent on the working population (less than 50%), except for Foni Kansala (50.4%), Illiasa (51.0%), Lower Niuni (51.2%), Jarra West (51.7%), Kombo South (54.1%), and Kombo North (55.0%) districts where the working populations are slightly higher. The average household size

in the districts is 8 people per household. Sex disaggregation data is not available for all the districts, However, for those available, the females (52.8 - 59.3%) are more than males (47.2 – 40.7%).

Education - The percentage distribution of persons aged 3+ years who ever attended school is more than 50% in only four districts, Foni Bondali (55.5%), Foni Kansala (60%), Kombo South (61.3%), and Kombo North (66.5%) while Kiang Central has the highest percentage who never attended school (78.7%). More people have primary level of education than secondary level in all the districts. In some of the districts, 27.3% – 73.1% cited religion as the reason for never attending school, while 50.5% in Kiang Central the unusefulness of education as their reasons. In terms of the net enrolment rate (NER), females have higher proportions at all levels of education except the tertiary in all the districts (GBoS, 2020).

Health - In all the districts, not more than 16.3 per cent of the people were reported to be ill or injured two weeks prior to the 2020 IHS. In terms of sex distribution, females have a higher morbidity rate than males, except in Foni Kansala and Kombo South. The most common illnesses reported were fever, cough, abdominal pain, and headache. More than 70 per cent of the individuals reported consulting a health care practitioner when sick or for other reasons in six of the districts. A greater proportion (at least 57.7%) of households access a health facility within 30 minutes in all district except in Jarra West and Jokadu where it takes more than 60 minutes for the majority of the population. The proportion of births assisted by nurses or midwives was at least 73% in all the districts.

Housing and Housing Characteristic - The most common source of cooking fuel in most households is firewood (at least 75.1%) followed by charcoal. Less than one per cent of households in all the district use gas when cooking (GBoS, 2020). The most common sources of lighting are NAWEC-supplied electricity and solar power. No household reported use of a kerosine lamp (GBoS, 2020). Living in healthy and clean environments also includes proper disposal of refuse and waste. In most households burning is the most common form of solid waste disposal. Similarly, burying and bush or open space dumping are also common in all the district (GBoS, 2020).

Poverty - The poverty rates are high in all the districts ranging from 57.9% to 87.2%, except for Kombo North district, which has a rate of 30.0% per cent.

Stakeholder Consultation: As part of the stakeholder consultation, the consultant team undertook a community engagement/consultation with the 71 communities identified for the ESIA. The summarized key findings of the community engagements are provided beneath:

- ✚ The communities express profound appreciation and enthusiasm for the proposed project, anticipating that it will significantly enhance their lives and livelihoods in several ways:
 - Improve public health through better access to healthcare services.
 - Increase income opportunities through improved infrastructure and economic development.
 - Enhance livelihoods by providing support for sustainable agriculture and other income-generating activities.

- Reduce accidents by upgrading road infrastructure and improving transportation safety.
- Minimize grievances within the community by addressing key challenges and enhancing social cohesion.
- Decrease post-harvest losses through improved transportation and storage facilities.
- Enhance accessibility to markets, facilitating trade and economic growth.
- Lower the cost of food items by improving transportation networks and market access.
- Promote investment in the area by creating a more conducive business environment.
- Improve access to various opportunities, fostering overall development and well-being within the community.

✚ The communities expressed the following potential negative environmental and social impacts of the proposed project:

- The road construction project will result in significant dust pollution in the surrounding areas.
- As part of the road construction efforts, trees are to be cut down, which will impact the local ecosystem.
- Noise pollution is anticipated to occur during the road rehabilitation works which might cause disturbance to the inhabitants of those communities.
- Farmland encroachment will result to the threatening of the agricultural sustainability within the communities.
- There is potential of farmers being displaced from their lands.
- The potential for road accidents is a major safety concern for communities.
- The migration patterns of animals could be disrupted during the construction of the proposed project.
- Access roads may be obstructed during road construction activities.
- The establishment of a laterite mining site could significantly impact community farmlands, forcing a shift in livelihood activities and potentially disrupting local economies.
- The Influx of people has the potential of influencing the lifestyles of youths residing in the communities.
- There are potentials for gender-based violence, sexual harassment, abuse, and rape cases to occur within these communities.

✚ The key recommendation presented by the communities during the consultation exercise are as follows:

- The communities recommend that road rehabilitation or construction works be scheduled during the dry season rather than the rainy season to ensure the construction of a high-quality road and to prevent damage to crops in their farmlands.
- They advocate for the implementation of a compensation mechanism for individuals directly or indirectly affected by the project.
- Furthermore, they suggest that the contractor prioritize the employment of local youths over outsiders to reduce the unemployment rate in these communities.
- Constructing drainage systems and Irish crossings can indeed help reduce soil erosion and improve road safety, particularly in areas prone to heavy rainfall.

- Rehabilitating the road linked to the women's garden demonstrates a commitment to supporting local livelihoods and community initiatives.
- Community members recommended thorough orientation for workers to adhere to community rules and avoid unlawful behavior.
- They emphasized the importance of contractor-community discussions prior to commencing work.
- Maintaining proper communication with the community during construction works, ensuring that the rehabilitated road can withstand heavy vehicle usage, and the creation of more job opportunities for the residents.
- Ensuring timely completion of the road rehabilitation project and the need for regular maintenance of the rehabilitated road, as well as ensuring the participation of community members in decision-making processes.
- Community members express concern about potential abuse and harassment incidents during road construction.

This chapter also highlights the key findings from the consultation with 10 relevant institutions/stakeholders about their roles and their mandates including their perceptions about the GIRAV projects in terms of their engagement as well as social and environment impacts the project is likely to have during implementation and their recommendations.

Potential Impacts and Mitigation measures: The poor rural feeder roads have adversely impacted the development of the rural communities, resulting in increased poverty, high post-harvest loss, expensive commodities, increased transportation time and cost. Furthermore, access to healthcare services and education is challenging due to the poor road conditions. Therefore, proposed GIRAV rural feeder roads construction will yield the following positive impacts:

- Improved Access to Markets
- Enhanced Transportation
- Enhanced Socio-Economic Development
- Increased Agricultural Productivity
- Job Creation
- Enhanced Access to Education
- Increased Tourism and Cultural Exchange
- Healthcare Accessibility
- Stimulated Local Businesses
- Social Integration and Cohesion
- Infrastructure Development
- Empowerment of Women and Vulnerable Groups
- Boost to local industrial activities

- Improve Drainage and its Environmental Benefits
- Improved Road Safety

Notwithstanding, the potential positive impacts of the construction of rural feeder roads are coupled with numerous negative impacts both before and during the construction phase of the roads. The Table beneath presents the potential negative impacts and their respective mitigation measures.

Potential Negative Impact	Mitigation Measures
Loss of Flora/vegetation	<ul style="list-style-type: none"> • Consult and take advice from biodiversity authorities/wildlife specialists before vegetation removal from proposed project site. • Limit vegetation clearing to approved widths and, as practicable, to minimum required. • If possible, initiate actions to enhance regrowth or revegetation of the site with appropriate species consistent with operation requirement. • Careful planning of phasing and timing of activities. • Demarcation and avoidance of areas of conservation interest (high value species, feeding or breeding sites, migration routes, etc.) where possible, and wildlife rescue and translocation where appropriate, under expert supervision. • Prohibit the use of fire in work areas. • Provide and train workers on fire extinguishers at the work areas and the life base. • Educate workers on the protection of natural resources and wildlife (i.e., they should be informed of the guidelines for hunting wildlife).
Loss of fauna	<ul style="list-style-type: none"> • Vegetation clearance should be minimum and within the designated areas.

	<ul style="list-style-type: none"> • Noise mitigation measures should be followed, and machinery with lesser noise production should be used. • Nighttime work should be limited, and the use of lights at night should not disrupt the movement of nocturnal wildlife. • Workers should not do any harm or death to wildlife. • Rescue, rehabilitation, and relocation should be done for terrestrial fauna in cooperation with the Department of Parks and Wildlife Management when required. Disturbance and/or injury or death due to accidental events to wildlife should be monitored regularly
Dust pollution	<ul style="list-style-type: none"> • Minimize cleared vegetation areas to those that are needed to be used. • Area should be dampened within suitable intervals to prevent a dust nuisance and this frequency should be increased during hotter days. • Cover or wet construction materials such as sand, gravel to prevent dust pollution. • Where unavoidable, construction workers working in dusty areas should be provided and fitted with dust mask (N95 respirators) • Vehicles carrying earth materials should be covered. • In the case of any demolitions, employ control demolition technique. • Reduce vehicle speed along the access earth/untarred road.
Gaseous emissions	<ul style="list-style-type: none"> • Ensure that all vehicles involved in the transport of construction material and staff, and machinery used in construction is properly maintained and services. • Reduce the idling of vehicles that may occur and thus reduce the gaseous emission from vehicles in the area. • Low-sulfur diesel should be used in diesel-powered equipment.

	<ul style="list-style-type: none"> • Promote the use of fuel-efficient construction machinery or equipment with the proper emission standards and more eco-friendly fuel type. • Vehicle/equipment exhausts observed emitting significant black smoke in their exhausts will be serviced/replaced. • Solid waste burning at the project site is prohibited.
Water pollution	<ul style="list-style-type: none"> • Environmentally sound management of land development activities especially near wetlands and ecologically sensitive areas. • In flood-prone areas of the road corridors, work must be subject to ongoing supervision and environmental and social monitoring, and the contractor must ensure that construction and mitigation measures comply with the ESMP-Contractor • Limit equipment access into flood-prone areas of the road corridors, where possible. • Collection of waste oil for recycling • Avoid placing spoil on drainage paths. • In the event of a spill on water bodies, the contractor in charge of the work shall immediately notify the person responsible for the environmental monitoring of the work and take measures to stop the leak, contain the product and recover it. • The contractor will be required to have emergency equipment on site in the event of an accidental spill. • Appropriate solid and liquid waste storage to limit the risk of pollution.
Runoff and flooding	<ul style="list-style-type: none"> • Develop engineering solutions for areas that have inadequate drainage and are vulnerable to flooding. • Culverts should be located strategically to avoid discharge into property. • Locals should be consulted during the field investigation to support in identifying the natural drain areas and the drainage history of the area for due consideration.

	<ul style="list-style-type: none"> • Diversions will be constructed during the dry season, with adequate drainage facility, and will be completely removed before the onset of the rainy season. • Debris generated due to the excavation of foundation or due to the dismantling of existing structures will be removed from the water course. • Temporary silt fencing to be provided on the mouth of discharge into natural streams where available. • Construction work close to water bodies will be avoided during the rainy season. • Camps will be located away from water bodies. • Car washing / workshops near water bodies will be avoided.
<p>Soil contamination & Geology</p>	<ul style="list-style-type: none"> • For operating new quarries, the materials shall be obtained from quarries only after the consent of relevant authorities such as the Geology Department and NEA. Extraction sites will need to be assessed before commencement, and approval (including mining and reclamation plans) be sought from these institutions. • Copy of licenses should be displayed on site, or produced on request by the relevant national authorities. • Quarries must be officially closed after the works, and communities given the responsibility of reporting to the authorities (NEA, GD) of any illegal mining activities. • Gravel and sand borrow pits must be reclaimed to return the sites to as close as possible to the natural state. • Only established transportation routes and diversions must be used to limit destruction and ensure reclamation is done at the end of the works. • Contractor must be cautioned through relevant clauses in the works agreements to use only certified sand and gravel suppliers that have been approved by the NEA and Geology Department. • Vegetation removal must be carefully carried out to avoid major soil disturbance and only existing transportation routes used to avoid destruction of virgin land.

<p>Solid waste disposal</p>	<ul style="list-style-type: none"> • Preparation of waste management plan following the waste hierarchy and ensure proper implementation, supported by staff training. • Adequate skips and bins should be strategically placed within the campsite and construction site. • The skips and bins at the construction and operation phase should be adequately designed and covered to prevent access by vermin and minimize odor. • Waste segregation in different bins should be practiced and ensure that workers adhere to the practice. • The skips and bins at both the construction and operation phase should be emptied regularly to prevent overfilling. • Disposal of the contents of the skips and bins should be done at an approved disposal site. • Reuse waste plastic materials (deform bottle containers) as feedstock for plastic product production. • Debris generated due to the dismantling of the existing culverts and other concrete structures and cutting materials shall be suitably reused in the proposed construction as fill materials for embankments. • A well-organized internal supervision and monitoring system will ensure waste reduction and proper management. • All hazardous waste is to be disposed of with the help of approved vendors.
<p>Wastewater discharge</p>	<ul style="list-style-type: none"> • Adequate sanitary facilities, i.e., toilets and showers, shall be provided for the construction workforce. • Septic tanks and soak pits shall be provided at the labor camp for the treatment of domestic wastewater. • Storage of chemicals, oil, fuel, and lubricant in a paved storage area.

<p>Noise and vibration pollution</p>	<ul style="list-style-type: none"> • Use Diesel Generator set with an acoustic enclosure. Adopt the vehicle speed limit on the access road. • Minimal use of vehicle horns and heavy engine breaking in the area needs to be encouraged. • Temporary noise barriers shall be provided surrounding the high noise-generating construction equipment. • Mobile noise sources such as cranes, earth moving equipment shall be routed in such a way that there is minimum disturbance to receptors. • The personnel involved in high noise-generating activities shall be provided with personal protective devices to minimize their exposure to high noise levels. • The contractor should ensure that all construction equipment and vehicles are fitted with silencers, where possible. • Only well-maintained equipment should be operated on the construction site. Only limited construction activities shall be carried out during nighttime. Restrict the nighttime vehicle movement through the access road. • The contractor should undertake additional post-development noise monitoring in accordance with international noise standards. • It is also to be ensured that no village road will be utilized for the movement of equipment except the designated access road. • The number of equipment operating simultaneously should be reduced as far as practicable. • Rubber padding/noise isolators shall be used for construction equipment.
<p>Occupational health and safety</p>	<ul style="list-style-type: none"> • Adequate provision of healthy living conditions should be ensured in the labor camp. • The contractor should prepare Emergency Preparedness and Response Procedure (EPRP) and Occupational Health and Safety Management Plan.

	<ul style="list-style-type: none"> • Training on Health and Safety policy for the workers (both regular and contractual) should be provided. • Establish a grievance redressal mechanism in place, to allow the employees and workers to report any concern or grievance related to project activities. • Child labor and forced labor during project construction should be prohibited. Adequate training should be provided to staff about raising awareness about the use of PPE and EPRP. • Job responsibility and shifting chart should be prepared so that no person shall be over-exhausted, which will ultimately lead to an accident or injuries. • Safety signs should also be marked at appropriate places on the construction site and access road. • It shall also be ensured that good housekeeping at the construction site is maintained to avoid slips and falls. • Excessive waste debris and liquid spills should be cleaned up regularly. • Electrical cords and ropes should be placed along identified corridors marked for the attention of everyone at the site. • Dropping/lowering of construction materials or tools will be restricted and undertaken only under strict supervision if required. PPEs such as safety glasses with side shields, face shields, hard hats, and safety shoes shall be mandatory at a construction site. • Earplugs shall be provided if required for workers placed in high-noise areas. • Provision of first aid kits and training on their use is important. This is important for workers to meet minor accidents during construction.
Community health and safety	<ul style="list-style-type: none"> • Dust control measures should be taken by the contractor along the site approach road and dust generation site. • The speed of heavy vehicles should be limited (<20 km /hr.) near the site access road.

	<ul style="list-style-type: none"> • A traffic management plan should be followed by the contractor for the project. • Training on community health and safety issues should be provided to the drivers. • Only drivers having valid licenses should be employed in the project. • Adequate sanitation facilities at labor camps should be ensured by the contractor to maintain hygiene and minimize the spread of diseases. • Wage discrimination between male and female workers should be minimized through a proper monitoring system. • An active grievance mechanism should be developed. • GBV/SEAH should be confidential, and more options will be created to submit the grievance against GBV/SEAH. • Creating awareness about local traditions and culture among outside migrants and encouraging respect for the same. • Providing awareness training regarding sexually transmitted diseases among the workers. • Contractors will prepare and conduct induction and training on the project's Code of Conduct for all site personnel regarding do's and don'ts in relation to interaction with locals.
Traffic disruption	<ul style="list-style-type: none"> • A traffic management plan should be prepared by the Contractor before field mobilization. • The contractor should avoid heavy vehicle traffic movement during school and market hours. • The speed of heavy vehicles should be limited (<20 km /hr.) near the site access road and sensitive locations. • Only trained drivers with valid licenses shall be recruited by the contractor. • Training programs shall be conducted at regular intervals for all the drivers for raising awareness about road safety and adopting the best transport and traffic safety procedures once every month.

	<ul style="list-style-type: none"> • Regular maintenance of vehicles and the use of manufacturer-approved parts should be adopted to minimize potentially serious accidents caused by equipment malfunction or premature failure. • The villagers should be made aware of the schedule before the movement of trucks and heavy equipment in the project area. • Collaboration with local communities and responsible authorities to improve signage, visibility, and awareness of traffic and pedestrian safety. • Notify the local area responsible person before starting the construction work and put signage near the educational and religious institutes and instruct the driver to carefully drive close to the sensitive area.
<p>Involuntary resettlement and economic displacement</p>	<ul style="list-style-type: none"> • Resettlement Action Plan including Livelihood Restoration Plan should be followed during the project implementation. • The project will also provide additional livelihood restoration measures to mitigate the impacts due to the reduction in landholdings through the Livelihood Restoration Plan for the project. • Identify and provide additional social and livelihood support to especially vulnerable families. • The SEP and GM for the project will be applicable to the landowners and users impacted. • Prioritize the severely affected land users in the livelihood restoration program and monitor the livelihood condition of the affected people to ensure their quality of life is the same or better than previously. • The project management shall undertake a formal consultation with all Farmers. • from whom land shall be obtained and gain informed consent.
<p>Influx of workers</p>	<ul style="list-style-type: none"> • Recruit local labor for unskilled jobs as a priority to ensure local ownership of the project. • Organize the work of unskilled employees in a task-oriented manner. • Post the internal rules of the work site.

	<ul style="list-style-type: none"> • Include provisions in the site code of conduct to deter employees from abusing the trust of food vendors/stallholders (those provisions will explain what behavior is not acceptable- including SEA/SH and what sanctions will be applicable in case of misconduct) • Training for all staff in acceptable behaviour with respect to community interactions. • Take gender into account (give a quota to women employed) and extensively sensitize and raise awareness of all workers on issues related to SEA/SH • Sensitize the personnel of project sites on the respect of the habits and customs of the populations. • Establish a conflict prevention and management mechanism. • Respect the labor code regarding the recruitment of labor. • Ensure all workers on site sign the protocols, as well as get sensitized and their awareness raised on challenging issues such as HIV-AIDS, STIs, etc. • Ensure continuity of consultation and participation of the beneficiary communities throughout the project (with women consulted in small, separate groups facilitated by a woman). • Establish and publicize grievance procedure
<p>GBV, SEA/SH & VAC</p>	<ul style="list-style-type: none"> • Ensure that code of conducts (CoC) are developed and signed by all personnel and workers and that they attend regular training on SEA/SH, content of CoC and sanctions. • Action Plan for Implementing ESHS and OHS Standards, and Preventing Gender Based Violence (GBV) and Violence Against Children (VAC) must be rigorously applied and monitored for compliance. These Codes will also be included in the Contractors ESMP. • Ensure that SEA/SH Action Plan is developed and implemented prior to the physical start of civil works. • Develop and implement a complaint/grievance mechanism (GM) sensitive to GBV, SEA/SH, VAC, and other forms of discrimination with accessible entry points to submit complaints, referral to GBV

	<p>service providers and confidential, survivor-centered procedures for verification and managing of complaints.</p> <ul style="list-style-type: none"> • Conduct regular awareness raising campaigns about the project and the risks of GBV, SEA/SH, VAC with workers and community members (and with women in separate groups with a woman facilitator) • Include provisions in the site's internal regulations to discourage employees from abusing the trust of food vendors/stallholders, and the use of GBV, SEA/SH, VAC • Report and sanction all forms of GBV related to the project activities. • Formally prohibit child labor • Monitor changes in the status of women and the potential impacts of the project on them by conducting regular focus groups consultations with women in a sample of villages (in small groups facilitated by a woman).
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Environmental and Social Management Plan: An Environmental and Social Management Plan (ESMP) is essentially a management tool and standalone component of an ESIA that provides the assurance that the mitigation measures developed for the significant impacts of a proposed project are implemented and maintained throughout the project life cycle. The mitigation measures for the identified potential impacts are to be implemented by the contractors and the supervisions are the responsibility of the PIU, ESIA working group and other relevant institutions depending on their mandate.

The GIRAV Project needs to design a workable environmental and social management system that will ensure the predicted impacts are handled in the best possible management. Some relevant site-specific management plans that are required for the project intervention activities at the GIRAV intervention sites are provided beneath:

- Emergency Management Plan
- Workers Accommodation Plan
- Site Safety Management Plan
- Community Engagement Plan
- Influx Management Plan
- Workers Code of Conduct
- Traffic Management Plan
- Waste Management Plan

- Construction Dust Management Plan
- Water Management Plan
- Occupational Health and Safety Plan
- Community Health and Safety Plan
- Revegetation Management Plan
- Chance Finds Procedure
- Gender Action Plan
- Biodiversity Management Plan
- Invasive Species Management Plan

Grievance and Redress Mechanism: It is expected that grievances or disputes/complaints could arise in the implementation of the measures. The ESIA studies recognized three types of disputes and grievances during the implementation of feeder road activities and as such proposed the mechanism to redress any grievance or complaint that may arise.

The first type refers to the dispute between the project and/or the contractor and the local community, the second one refers to the dispute between the contractor and its workforce and the third to the dispute between the contractor and the client.

The project has already established GRM committees at Community level, Regional and Project Level. The said committees received trainings on GRM matters related to project including reporting, registering, and investigating grievance or disputes/complaints among others.

Implementation Schedule and Cost Estimates: The environmental and social management plan will be implemented in line with the finalized project schedule, as well as activities integrated into the project design. There would be a need for the contractor to update the safeguards instruments based on the final design of the road construction, rehabilitation or upgrading works. The estimated cost for implementation of the mitigation measures and monitoring plan proposed in the ESMP for the GIRAV project is approximately US\$ 275,000.

1.Introduction

1.1. Project Background

To support agricultural value chain development and to move from subsistence to a more market-oriented agriculture, the World Bank (WB) is financing the implementation of The Gambia Inclusive and Resilient Agricultural Value Chain Development Project (GIRAV) for an amount of US\$ 40 million and for five years (2022-2026).

The Project Development Objective (PDO) is to support the development of inclusive and competitive agriculture value chains¹, focusing on smallholder farmers and agri-entrepreneurs in Project targeted areas. To achieve this objective, the project will consist of three interlinked technical components, in addition to the Project Implementation and Coordination Components, organized to address the key binding constraints for the development of the agriculture and agribusiness sector:

- i) **Component 1. Improving the business environment for commercial agriculture development:** The objective of this component is to support establishing an enabling environment that can foster competitive and sustainable development of a commercial agriculture/agribusiness sector in the Gambia. This will be achieved by strengthening the capacity of the key organizations engaged in agri-food value chains and improving producers' market access by providing key market infrastructure and critical SPS services.
- ii) **Component 2. Building a productive and resilient agri-food system:** The objective of this component is to increase agricultural productivity through climate-smart intensification of selected production systems focusing on expanding irrigated areas and enhancing water management, and fostering access to improved technologies and innovations, and advisory services.
- iii) **Component 3. Mobilizing productive investment along the value chains:** This component would provide co-financing through matching grant and implementation support for competitively selected productive micro-projects in agricultural production, marketing, processing, or service provision presented by small private investors, individuals or in groups, and SMEs – in the targeted regions and selected value chains.

The project will give a special attention to private investments that improve the resilience of the domestic agri-food system to external shocks (economic, environmental) and directly or indirectly (through contract farming) create jobs and income for women and youth.

The Project will focus its intervention on the following five priority value chains: rice (to substitute for the increasing imports), horticulture (vegetables and mango for supplying urban centers and exports), cashew (for exports and domestic processing), and poultry (urban markets) and in relation with maize for feeding. These value chains have been identified as having (i) a high development potential (market opportunities and productivity gains) that can be realized in the short to medium term, (ii) a potential gain in terms of competitiveness as shown by the imports and exports price parity analysis done in agribusiness deep-dive, and (iii) a high impact on job creation, for women and youth.

A total amount of US\$10 million of the project funds has been earmarked for the implementation of the project's subcomponent 1.4, which pertains to improving rural connectivity. The objective of this

subcomponent is to enhance accessibility to markets for smallholder farmers and SMEs, leading to high post-harvest losses and transportation costs. Hence, the project intends to address the poor rural road networks by upgrading and rehabilitating selected feeder roads within the project intervention areas.

1.1. Rationale for ESIA for the project

The Environmental Social Impact Assessment (ESIA) is a systematic identification through interdisciplinary lenses of a project's development potential impacts and their significance. The Environmental Social Mitigation Plan (ESMP) in the ESIA provides a road map to the environmental measures needed to prevent and/or mitigate negative environmental effects associated with the proposed project activities.

The National Environment Management Act (NEMA1994) provides the legal basis for environment protection and preservation thereby ensuring that efforts put into planning and management are made to bear fruit. Part V of NEMA specifically provides for Environmental Impact Assessment. Suffice it to say that any project that has and/or is deemed to have an impact on the environment, such a project should undergo the EIA procedure such that potential impacts are identified, and adequate mitigation actions developed.

Construction or rehabilitation of road infrastructures are categorized as 'Class A' projects under the NEMA and EIA Procedures, which means a full ESIA study is to be conducted. Thus, it is required that the GIRAV Project look for the services of an environmental consultancy firm to develop an ESIA, the draft report of which will be sent to the World Bank for review and approval before submission to the National Environment Agency (NEA) in consideration of reviewing and granting of environmental approval for the proposed development.

1.2. Objective of the ESIA

The overall objective of conducting an ESIA is to predict, assess and evaluate the potential environmental and social impacts of the various activities of the GIRAV rural feeder roads construction and rehabilitation to develop a robust ESMP that can be adopted to reduce or eliminate the adverse effects as well as maximize the potential benefits of the project. The assessment and management plan will be a key component to developing a sustainable intervention that has minimal environmental and social impact. The result of the assessment provides an evidence base to inform policy makers and project actors.

The following are specific objective of the ESIA/ESMP study:

- To carry out Environmental and Social Screening, identify and assess potential positive and adverse negative environmental and social impacts as well as environmental settings for detail investigations, and recommend further Environmental assessment including direct, indirect, induced, and cumulative impacts in terms of magnitude, extent and duration that may be expected to occur due to Project/ Project activities.

- To carry out project site visit to collect primary data and review all available relevant secondary data to establish a comprehensive environmental baseline (including physical, biological, social, cultural, and economic environments) for the Project Area of Influence; (analyze and include the issues and recommendation identified from Environmental Screening).
- To develop proposed measures to avoid, reduce, mitigate, manage and/or compensate for such impacts, including the institutional arrangements and required capacity for the implementation of all such measures and monitor their effectiveness and suggest changes to the arrangements as well as capacity strengthening measures, if necessary.
- To identify and carry out a comparative analysis on “Project Alternative Analysis” with or without project in terms of project location (such as upstream/downstream or no change of location), project design, technology and construction methodology to avoid, minimize or reduce environmental risks associated with site locations and propose potential opportunities and design appropriate measures to minimize environmental impacts and maximize complementary environmental and enhancement measures of the Project.
- To conduct a public consultation process that ensures that Project affected people and other stakeholders are informed about the Project and its possible impacts, as well as offered the opportunity to share their opinions and feedback to input into the environmental assessment, planning and design studies and their implementation.
- To document all the above mitigation and development interventions in appropriate forms and formats to be further discussed and agreed upon with the GIRAV project, National Environment Agency and in line with World Bank standards.

1.3. Scope

The ESIA study covers the following task:

- Collect baseline data on environmental and social conditions of the project influence/ impact area.
- Identify environmental and social risks and impacts in terms of magnitude, extent and duration that may be expected to occur during construction and operation.
- Identify the critical environmental problems that require further studies and/or monitoring.
- Carry out and document alternative analyses from the environmental point of views including "No Project Alternative" (or with and without project comparison)
- Suggest mitigation measures for the adverse impacts and enhancement measures for the beneficial impacts.
- Develop Environmental and Social Management and Monitoring Plan.

- Assess the institutional arrangements and capacity for the implementation of Environmental and Social Management and Monitoring Plans and suggest changes to the arrangements as well as capacity strengthening measures, if necessary.
- Develop information dissemination and consultation strategy for the implementation of the environmental and Social mitigations and enhancement measures during project implementation.
- Publish public notice for EIA purpose as may be required.
- Consult and inform the project affected people, parties, and other stakeholders, and ensure active people's participation.
- Advise decision makers regarding the environmental implications of the project.

1.4. Project Intervention area

The project intervention areas are across the five administrative regions in The Gambia – Upper River Region (URR), Cnetral River Region (CRR), North Bank Region (NBR), Lower River Region (LRR) and West Coast Region (WCR). The total number of new feeder roads to be constructed by the GIRAV project under this ESIA study is twenty-three (23) roads, all of which are currently earth roads. Additionally, six (6) gravel roads in WCR will be upgraded to single surface dressing. Overall, this ESIA study covers twenty-nine (29) different road networks as presented in Figure 1.1. Table 1.1 shows the project intervention roads in each region and the detailed information is attached as an Annex.

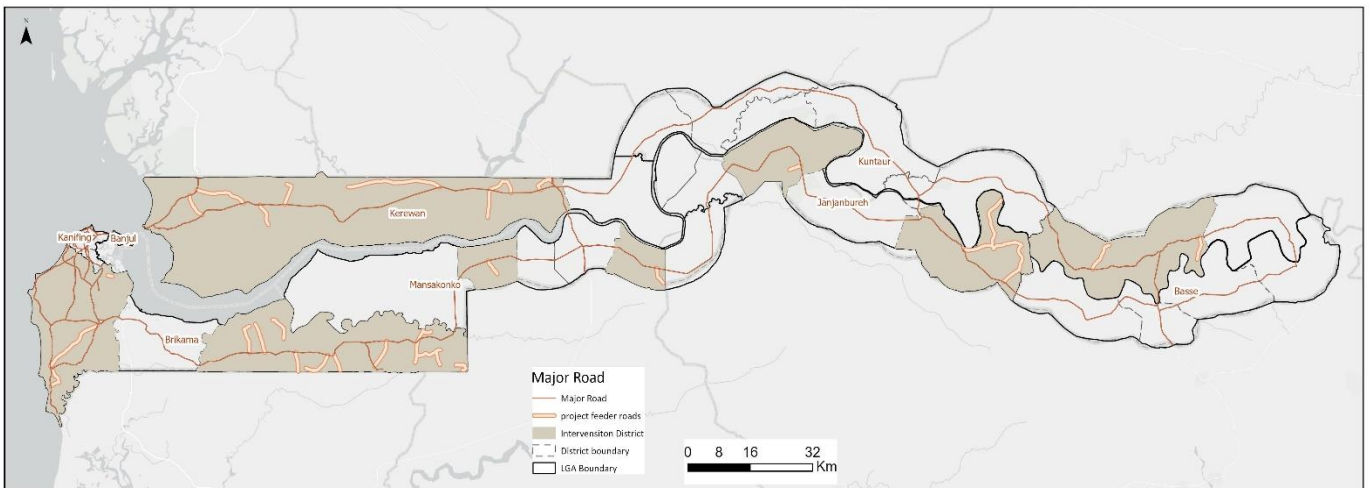


Figure 1.1: Project feeder roads in each intervention Local Government Area (LGA)

Table 1.1: Number of feeder road in each region

	Region	Number of feeder roads
1.	URR	2
2.	CRR	2
3.	NBR	8
4.	LRR	2
5.	WCR	9
	Addition Sites	
6.	WCR	6

1.5. ESIA Methodology

This methodology section of the ESIA report provides the detailed approach undertaken to carry out the ESIA for this project. The section briefly covers the methodology adopted for the assessment from desk literature review stage to the final stage of the ESIA report compilation.

The ESIA report helps inform GIRAV, NEA and all relevant stakeholders of the significant environmental and social impacts that may occur due to the Project and the measures identified to mitigate against those significant impacts. This assessment was completed in consultation with the relevant stakeholders.

The assessment was conducted using a mixed method approach to data collection using both quantitative and qualitative approaches. Therefore, both primary and secondary data collection were used to collect the data required for the assessment.

1.5.1. Literature/Desk Review – Secondary data collection

Relevant project documents were carefully reviewed to develop an in-depth knowledge and understanding of the project. Some of these vital documents include the Project Appraisal Document (PAD), Environmental and Social Management Frame (ESMF), Stakeholder Engagement Plan (SEP), Environmental and Social Commitment Plan (ESCP), Labor Management Plan (LMP), and feasibility study report.

The following legal documents were reviewed:

- National Policies and Regulations
- National Legislations
- Relevant Environmental and Social Standards (i.e. ESS1, ESS2 etc.)

- Relevant International Instruments /Conventions
- As part of the secondary information gathering to identify existing environmental conditions, proposed developments at the selected sites and predicting potential impacts, consultative meetings were organized with key actors of the project. Results from this exercise informed the primary data collection.

1.5.2. Baseline Field Visits – Primary data collection

The primary purpose of the field visit was to observe, as much as possible, the physical, biological, and socio-economic environment of the project intervention areas. It also availed the opportunity to collect primary data on the relevant environmental aspects as baseline data. The primary data collection for the baseline studies the following sub-activities:

- *Physical Environmental Baseline* – This activity entails collecting primary data on air quality, water quality, temperature, humidity, geology data from the sampled project sites.
- *Biological Environmental Baseline* – The data collection covers identification of the various flora and fauna along the proposed road corridors.
- *Socio-economic* – Social amenities, public utilities, cultural heritage, and related information of social significance were collected during the baseline field visits to project intervention sites.

1.5.3. Stakeholders Consultation

The main purpose of the consultations was to discuss the proposed project with key stakeholders both at community and institution level as well as gauging their perspective about the project. The details of the various stakeholders consulted, and the approach were provided in the introductory section of Chapter 5 on Stakeholder Consultation.

1.5.4. Assessment of Potential E& S Impacts

To identify and assess potential impacts associated with or resulting from Project activities, the ESIA team used data collected from the field consultations, professional judgment, and desktop analysis to identify potential impacts and their interactions. The significance of potential impacts that may result from the proposed Project were determined to assist in preparing recommendations for the proposed Project evaluation. Figure 1.2. presents the various components of the ESIA and ESMP.

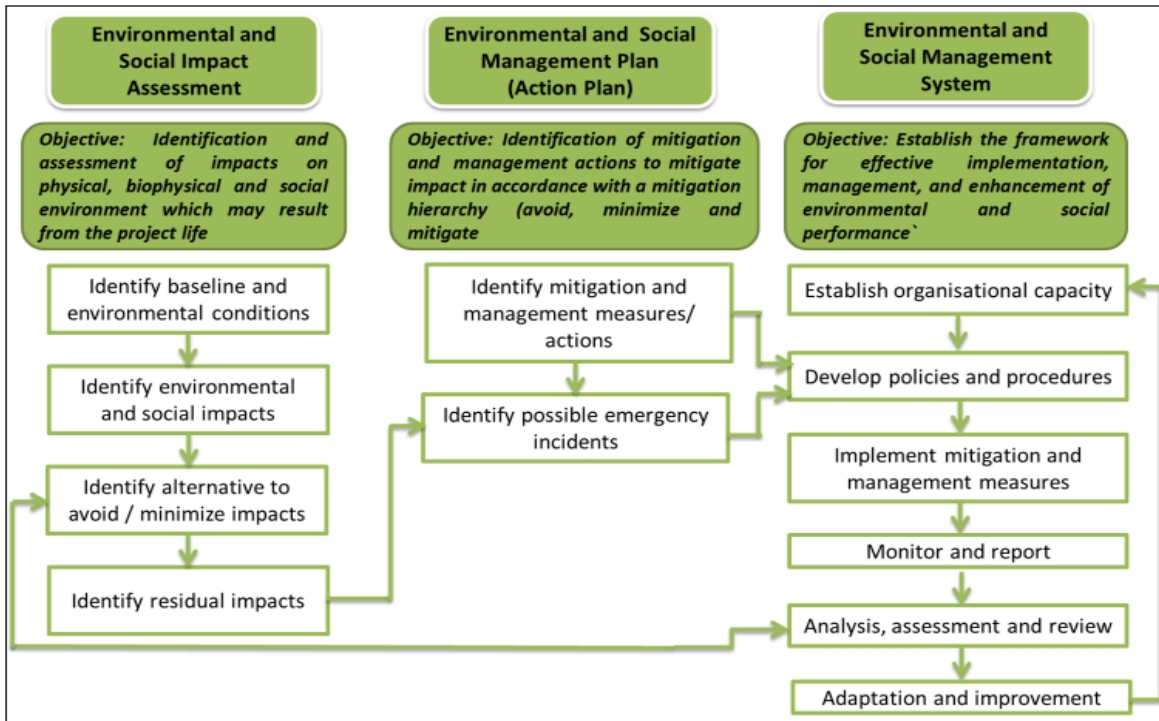


Figure 1.2. Key components of ESIA & ESMP

1.5.4.1. Impact Identification

The description of the planned project activities helps in identifying the environmental and social aspects of the proposed project. These identified environmental aspects matched with the existing baseline description of the project environment which were employed to generate a checklist of potential and related impacts of the proposed project. Project impacts were identified through the understanding of the interaction between the planned project activities and the prevailing environment at the project sites. Expert knowledge and stakeholder consultation also played a significant role in the process of impact identification.

1.5.4.2. Impact Characterization and Evaluation

The potential impacts were identified from the proposed activities of the project and further characterized to have an in-depth understanding of the nature of the identified potential project impacts. The characterization was based on the nature, characteristics and duration of the different project activities on the physiochemical and biological component of the environment as well as the socio-economic, cultural, human health and safety.

Project impact on the environment occurs when the existing environment interacts with the various project activities which may lead to changes in the environment as shown in Equation 1.

$$[\text{Environment}] + [\text{Project}] = \{\text{Changed Environment}\} \quad \text{Equation 1}$$

The evaluation of the impacts consisted of assessing as precisely as possible the consequences for the biophysical and socioeconomic environment elements considered of these different modifications.

This was done by means of a characterization tool that makes it possible to evaluate the importance of foreseeable impacts according to the criteria of intensity, extent, and duration. The integration of these criteria (Intensity, Extent, Duration and Reversibility) in an evaluation grid made it possible, for each identified impact, to qualify its importance, which can be major, moderate, or minor.

Table 1.2: Impact Significance Rubric

Criteria	Level of appreciation
Intensity	Major or High
	Moderate
	Minor or low
Scope	National
	Regional
	Local
Duration	Permanent
	Temporary
	Momentary
Importance	Major
	Moderate
	Minor or Low
Reversibility	Reversibility
	Irreversibility

The criteria used for this assessment are the nature of the interaction, the intensity or magnitude of the impact, the extent or scope of the impact, the duration of the impact, the significance of the impact, and the reversibility of the impact as explained below:

- The nature of the impact indicates whether the impact is negative or positive
- the intensity or magnitude expresses the degree of disturbance of the socioeconomic and biophysical environment; it is a function of the vulnerability of the component studied; three classes are considered (strong, medium, and weak)
- the extent gives an idea of the spatial coverage of the impact; three classes are also distinguished here (local, regional, and national)
- the duration of the impact indicates the manifestation of the impact in time; two classes were distinguished for the duration (momentary, temporary, and permanent)
- the importance of the impact corresponds to the extent of the modifications that affect the affected environmental and social components; it is a function of the duration, its spatial coverage, and its intensity; three levels of disturbance are distinguished (High, Moderate, and Low):
 - **High:** *when the impact alters the quality or permanently restricts the use of the affected feature,*
 - **Moderate:** *when the impact somewhat compromises the use, integrity, and quality of the affected element,*
 - **Low:** *When the impact does not perceptibly alter the quality or use of the affected element.*

- the reversibility of the impact provides information on whether the impact is reversible (can still be corrected or lessened) or irreversible (incorrigible, permanent damage). Two classes have been distinguished for reversibility (reversible and irreversible).

1.5.4.3. Mitigation measures

In developing mitigation measures, the first focus was on measures that prevent or minimize impacts through the design and management of the Project rather than on reinstatement and compensation measures. A ‘hierarchy’ of mitigation measures for planned activities and unplanned events is outlined below:

- 1) Avoid at Source; Reduce at Source: avoiding or reducing at source through the design of the Project (e.g. avoiding by siting or re-routing activity away from sensitive areas or reducing by restricting the working area or changing the time of the activity);
- 2) Abate on Site: add something to the design to abate the impact (e.g. pollution control equipment);
- 3) Abate at Receptor: if an impact cannot be abated on-site then control measures can be implemented off-site (e.g. traffic measures)
- 4) Repair or Remedy: some impacts involve unavoidable damage to a resource (e.g. material storage areas) and these impacts require repair, restoration, and reinstatement measures.
- 5) Compensate in Kind; Compensate through Other Means where other mitigation approaches are not possible or fully effective, then compensation for loss, damage and disturbance might be appropriate (e.g. financial compensation for degrading agricultural land and impacting crop yields). It is emphasized that compensation to individuals with residual impacts to livelihood or quality of life will generally be non-financial and will have a focus on restoring livelihoods.
- 6) Control: this aims to prevent an incident happening or reduce the risk of it happening to as low as reasonably practicable (ALARP) through reducing the likelihood of the event (e.g. preventative maintenance regimes, traffic calming and speed limits, community road safety awareness training);
- 7) Reducing the consequence (e.g. Bunds to contain hazardous substance spills); and a combination of both of these;
- 8) Recovery/Remediation: this includes contingency plans and response, e.g. Emergency Response Plans and Procedures.

A summary of the impacts was provided in a tabular form as shown in Table 1.3.

Table 1.3: Summary of impacts

Impact Assessment Summary					
Project activities					
Types of impacts					
Criteria	Intensity	Scope	Duration	Importance	Reversibility
Without mitigation					

Mitigation Measures/ Improvement	<ul style="list-style-type: none"> Mitigation Measure 1 Mitigation Measure 2 				
With mitigation					

1.5.4.4. Risk Assessment

The health, safety and environmental risks associated with the proposed project were assessed and ranked as “Low”, “medium” or “high”, using the Risk Assessment Matrix (RAM) as shown in Table 1.4.

Table 1.4: Risk Assessment Matrix

			Likelihood				
			A	B	C	D	E
			Remote	Unlikely	Possible	Likely	Certain
Negative Consequences	5	Severe	M	H	H	H	H
	4	Major	M	M	H	H	H
	3	Moderate	L	M	M	M	H
	2	Minor	L	L	M	M	M
	1	Negligible	L	L	L	L	L
Positive impact (P)			P	P	P	P	P

The level of impact was largely determined by a qualitative appraisal of the likely change in the receiving environment, human health/safety and socio-economic situation, based on the matrix in Table 1.4 and the weighting used was as follows:

- **Low Risk** : Where the level of risk is broadly acceptable and generic mitigation measures are already assumed in a design process but require continuous improvement.
- **Medium Risk** : Where the level of risk is tolerable, but mitigation measures are required to minimise the risk to reduce the risk as much as practicable (i.e. tolerable if ALARP).
- **High Risk** : Where the level of risk is not acceptable and mitigation measures are required to move the risk figure to the lower risk categories.
 - Positive impacts (to be enhanced if at all practicable).

1.5.5. Environnemental and Social Management Plan

After the assessment and evaluation of all the significant environmental and social impacts, a management plan was formulated to effectively implement the recommended enhancement and mitigation measures. Various management plans and programmes were proposed to tackle each of the significant impacts that may emanate from project activities. Furthermore, the monitoring plan for the implementation of the ESMP were also developed by preparing indicator parameters for the proposed measures and highlighting the monitoring method and frequency as well as authorities responsible for the execution of the monitoring plan. A budget was developed for the implementation of the ESMP and monitoring plan.

In summary, the ESMP was prepared to set out: (i) actions to implement mitigation measures; (ii) a monitoring and reporting program, based on agreed performance indicators; (iii) emergency response procedures; (iv) institutional and organizational arrangements; (v) capacity development and training; (vi) implementation schedule; and (vii) cost estimates.

Table 1.5: The ESMP matrix

Activities	Impacts	Indicators	Means of verification	Timelines (preparation, construction, exploitation, Closing phases)	Responsible for			Cost of implementation (US\$)
					Execution	Monitoring	Aftercare	

1.5.6. Preparation and Submission of ESIA/ESMP report

Each section of the report was compiled and edited by the specialists for that section from the team members. However, the overall reporting and compilation of the independent chapters was done by the lead consultant for onwards submission to the GIRAV team

2. Project Description

2.1. Introduction (Justification, objective, Components)

The World Bank has supported the Government of The Gambia in strengthening her agricultural sector in the past through various interventions, including but limited to the followings: The Gambia Emergency Agricultural Production Support Project implemented from 2012 to 2015, the Gambia Commercial Agriculture and Value Chain Management Project (GCAV) implemented from 2014 to 2019).

To further support agricultural value chain development and to move from subsistence to more market-oriented agriculture in the Gambia, the World Bank (WB) is financing the implementation of The Gambia Inclusive and Resilient Agricultural Value Chain Development Project (GIRAV) for an amount of US\$ 40 million for five years. Following a restructuring approval from the World Bank to respond to the Gambia Government's request to procure and subsidize the fertilizer for the upcoming cropping season of 2023 to ensure adequate food production, the Additional Financing (AF) from the national IDA grant of US\$68 million to the Gambia Inclusive and Resilient Agricultural Value Chain Development Project (GIRAV - P173070, IDA Grant No. D9190) for The Gambia was initiated.

The Project Development Objective (PDO) supports the development of inclusive and competitive agriculture value chains, focusing on smallholder farmers and agri-entrepreneurs, fertilizer distribution, increased water access for household and agricultural use and land administration in Project targeted areas. The focus areas of this project will be to (i) increase in the value of marketed output at the beneficiary level (disaggregated by gender, smallholders, and Small and Medium Enterprises -SMEs); (ii) increase in productivity of targeted agricultural commodities (yield in metric ton/hectare); (iii) the share of agricultural produce that is processed into higher-value products (percentage); and (iv) farmers reached with agricultural assets or services (core indicator- gender-disaggregated), (v) improve access to fertilizer for farmers (vi) increase access to potable water in rural and peri-urban areas; and (vii) to improve securing access to land especially for women horticultural producers.

2.1.1. Project Development Objective

The development objective for GIRAV is to promote the development of inclusive and competitive agriculture value chains, focusing on smallholder farmers and agribusinesses in Project targeted areas. To achieve this objective, the project will consist of three interlinked technical components, in addition to the Project Implementation and Coordination Component and emergency response, organized to address the key binding constraints for the development of the agriculture and agribusiness sector:

- i) Increase in the value of marketed output at the beneficiary level (disaggregated by gender, smallholders, and Small and Medium Enterprises -SMEs);
- ii) Increase in productivity of targeted agricultural commodities (yield in metric ton/hectare);
- iii) share of agricultural produce that is processed into higher-value products (percentage); and
- iv) Farmers reached with agricultural assets or services (core indicator-gender-disaggregated).
- v) Improve access to fertilizer to farmers.
- vi) Increase access to potable water supply in rural and peri-urban areas and
- vii) Improve securing access to land, especially for women horticultural producers.

2.1.2. Project Components Descriptions

Component 1: Improving the business environment for commercial agriculture development.

This component aims to support establishing an enabling environment that can foster private investment and build a competitive and sustainable development of a commercial agriculture/agribusiness sector in the Gambia. This will be achieved by (i) strengthening the capacity of the key organizations engaged in agri-food value chains; improving value chain coordination and partnership between actors, (ii) improving producers' market access by providing (a) key marketing infrastructure, (b) critical SPS services and (c) **feeder roads to improve rural mobility and connectivity.**

Component 2: Building a productive and climate-resilient agri-food system.

This component aims to increase agricultural productivity through climate-smart intensification of selected production systems, focusing on enhancing water management and fostering access to improved technologies and innovations. More specifically, the project will support the main interventions organized in two sub-components: promoting modern irrigation in women and youth-led agribusiness firms and increasing access to technology, innovation, and advisory services.

Component 3: Mobilizing productive private investments along the value chains.

This Component will support private investments in productive activities and related services by addressing the major market failures that constrain the financing of investments in agricultural value chains. It will (i) develop the capacity of financial institutions (PFIs) to scale up their financing of agro-food value chain actors by building their knowledge of the sector and their capacity to evaluate agricultural investment proposals; (ii) establish a matching grant (MG) instrument to co-finance competitively selected productive private investments; and (iii) provide technical assistance and capacity building to strengthen technical, entrepreneurial, and management skills of smallholders and SMEs. The sub-components include building the operating capacities of partner financial institutions, facilitating co-funding productive investments to leverage private capital mobilization, and providing technical assistance to smallholders and SME promoters of productive investment subprojects.

Component 4: Project coordination, monitoring, and knowledge management

This component ensures that the project is efficiently managed and monitored, and the CPCU and the implementing agencies carefully track that performance and outcomes. It will facilitate (i) administrative, technical, and financial management of the project; (ii) coordination among all institutional partners to ensure efficient flow of information and support to all value chain actors; (iii) effective contractual arrangements with key implementing partners and other private sector operators; (iv) monitoring and evaluation of the performance and the financial, environmental, and social impact of the project; and (v) development of communication activities to publicize and disseminate the project results, best practices and success stories. Under this component, the project will finance: (i) expenses incurred in implementing the project through the CPCU, the participating implementing agencies, and various service providers; (ii) technical assistance provided through consultancies, audits, and training to enhance the implementation capacity of the CPCU; (iii) communication, knowledge production and sharing, and outreach activities; (iv) monitoring and evaluation of project financial performance, outcomes, and impacts; (v) citizen engagement; (vi) oversight of social and environmental safeguard policies; and (vii) institutional

strengthening to ensure the sustainability of the project's results. The CPCU will implement this component.

Component 5: Contingency Emergency Response

Given The Gambia's vulnerability to shocks, a Contingency Emergency Response subcomponent (CERC), with a zero-dollar provision, is included to create a financing mechanism within the project for emergency demands arising from natural disasters, diseases, and other shocks. This CERC is particularly critical in the context of emergency such as the desert locust evasion threatening the West African region. If such a crisis develops, the government may request the World Bank to reallocate project funds to cover some costs of emergency response and recovery. The operations manual for the CERC component is being prepared and will be validated before any disbursement under this component. Expenditures will be appraised and reviewed to determine if they are acceptable to the World Bank before any disbursement is made. Disbursements will be made against an approved list of goods, works, and services required supporting crisis mitigation, response, recovery, and reconstruction.

Component 6: Improving Access to Water

This component aimed at further increasing water supply for agricultural sector to promote irrigation, boost agribusiness, and improve access to potable water in rural and peri-urban areas. It includes 3 sub-components as follows:

Sub-component 6.1: Expansion of Water Supply to Rural Areas

This sub-component objective is to improve access to water supply in rural and peri-urban areas. The Bank funded GERMP AF provided support to NAWEC and focused on GBA. The rural areas covered by NAWEC have urgent water needs since access to water is very limited. Interventions to be funded would involve: (i) drilling new boreholes, construction of pump headworks and solar energy connections, (ii) extension of water distribution networks including construction of tanks and centralized treatment centers where necessary and (iii) new household connections.

Sub-component 6.2: Meter Replacement, Energy Efficiency Improvements, and Non-Revenue Water (NRW) Improvement

This subcomponent addresses four main areas:

- I. Meter Replacement Program
- II. Improvement of Non-Revenue Water (NRW)
- III. Energy efficiency improvements of the water business
- IV. Technical Studies for Water Supply Masterplan and Groundwater Monitoring

Sub-component 6.3: Provision of Water for Irrigation

The objective of this sub-component is to support the development of irrigation services further. It will finance: (i) consultant services for the mapping of groundwater resources in terms of availability and quality; (ii) the technical assistance for an updated assessment of the actual irrigated land areas and the potential of irrigable land; (iii) infrastructure and equipment to connect boreholes with horticultural perimeters for irrigation; and (iv) associated training to increase water use efficiency and sustainability of infrastructure and equipment.

2.2. Description of Project intervention areas and road conditions

The Gambia Inclusive and Resilient Agricultural Value Chain Development Project (GIRAV) Feeder Roads project is planned for the construction rehabilitation, upgrading, and maintenance of the selected feeder roads across the six (6) Agricultural Regions in the country namely in (WCR, LRR, NBR, CRR-S, CRR-N and URR). Figure 2.1 shows the project intervention districts and the proposed feeder road networks.

Among other importance, the feeder roads are mainly targeting connecting the Agribusiness firms in each of the intervention areas to main truck roads to address the challenges of the transportation of the agricultural goods to markets and to minimize the incidence to post harvest losses.

The proposed feeders' roads designs will consist of a single carriage road of width 6 to 7m with a transverse slope on either side to be constructed with pavement of either laterite or stabilized base and double surface dressing. The total distance of the feeder roads covered in this study is 200Km with varying the length and condition of the roads.

Larger populations around and within the project area of influence are envisaged to benefit from the feeder roads. All the people met during the initiation discussion and sensitization raised concerns of the current conditions of the roads and the challenges they posed during transportation of the agricultural goods and services and other socioeconomic activities in their communities .

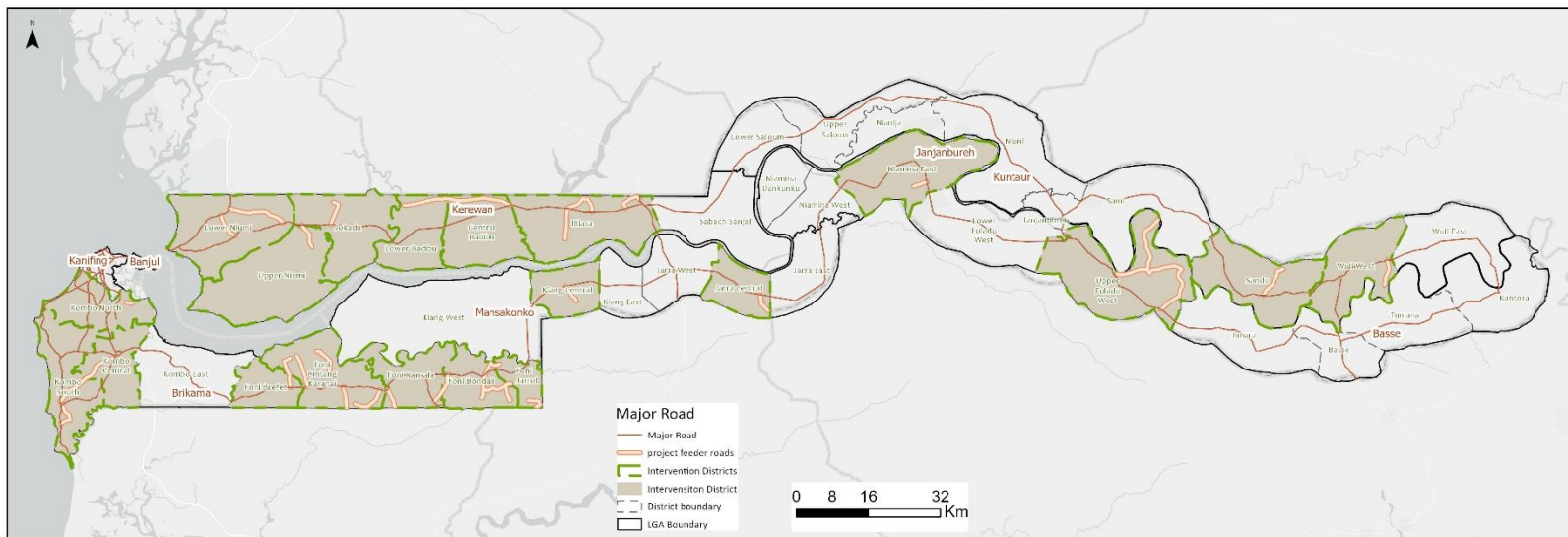


Figure 2.1: Project intervention districts and the proposed feeder road network

2.2.1. Roads Status in the project area

Most of the feeder roads are to be constructed, rehabilitated, and upgraded are either in poor and fair states due to rare maintenance or rehabilitation. The feeder roads possess a varying road network in each of the project areas of influence connecting not only the agribusiness firms but also the settlements within and around the road corridors.

All these roads need to be rehabilitated, upgraded, and maintained for sustainability purposes. Considering the importance of these feeder roads in the entire agricultural system, transport facilities such as the proposed feeder roads should be sustained for insuring a comfortable transport of goods and human beings.

The transport of goods is considered as a key element for the region's development if the agriculture of both industrial and food crops remains the main economic activity. Currently, access to market due to poor road networks in the agricultural regions of rural Gambia remained as one of major contributors to post harvest losses for most farmers thereby making them food insured and low income.

The feasibility study of the (200Km) feeder roads development identified varying conditions of the feeder roads from poor to very poor and good, in need of construction, rehabilitation and upgrading in each of project area of influence. The study noted that some of the roads are in deplorable condition with gullies and water courses and some of them are bumpy making the roadability a major challenge.

In some communities, the feeder roads are earth roads and in poor condition, characterized by erosions and depressions, indicating the presence of pools of water on the road during the rainy season making the roads impassable to vehicles and people during the rainy season.

The study found out that the alignment of some of these roads did not pass through a sensitive ecosystem such as wetland and forest, however, serious erosion was clearly documented and confirmed during the consultations and field observation. However, along the road corridor, there are sensitive ecological relevance that were captured by the feasibility study notably the community forest, forest park, cemetery, orchards, wetland, and swampy areas among others.

Similarly, some of the selected roads were recently constructed with very low quality making their roadability a major concern, especially during the rainy season. The laterite pavement of the loose laterite has been washed away. Some roads pass through settlements which need construction.

2.2.2. GIRAV Selected Feeder Road

2.2.2.1. Upper River Region

The Upper River Region (URR) is one of the six agricultural regions of the Republic of Gambia with its capital Basse. It is in the eastern part of the country with a total land area of 2,069 square kilometers which has a length of 79.6 km to the West, whereas the width is 26 km from North to South. According to the 2013 population and housing census, the region has a population of 237,220 with a population density of 119/Km². The project area of influence has a population of six thousand five hundred and two inhabitants (6,502).

Table 2.1: Proposed roads to be constructed and rehabilitated in URR

Ref	Road	Existing Road		Region	District	Length	Villages Linked
		Surface type	Condition				
1	New feeder road construction	Earth Road	Poor	URR	Sandu	4.0	Main road to Sare Jammo Mballow
2	Feeder road Rehabilitation	Gravel Road	Fair	URR	Wuli West	4.2	Chamoi Bunda to Limbambulu Bambo

Main Road to Sare Jumma Mballow & Baja Kunda

This road will start from the main truck road to Sare Jumma Mballow and Baja Kunda measuring 8.2Km. The community of Baja Kunda has a major public facility like health center, primary, junior secondary and senior secondary schools which means constructing the road will enhance movement of people to these facilities. The road is currently in a deplorable state with depressions, gullies and water courses on the way making the movement of people and good a great challenge. Evidence of erosion was noticed on the road indicating the need for proper drainage along the road corridors.

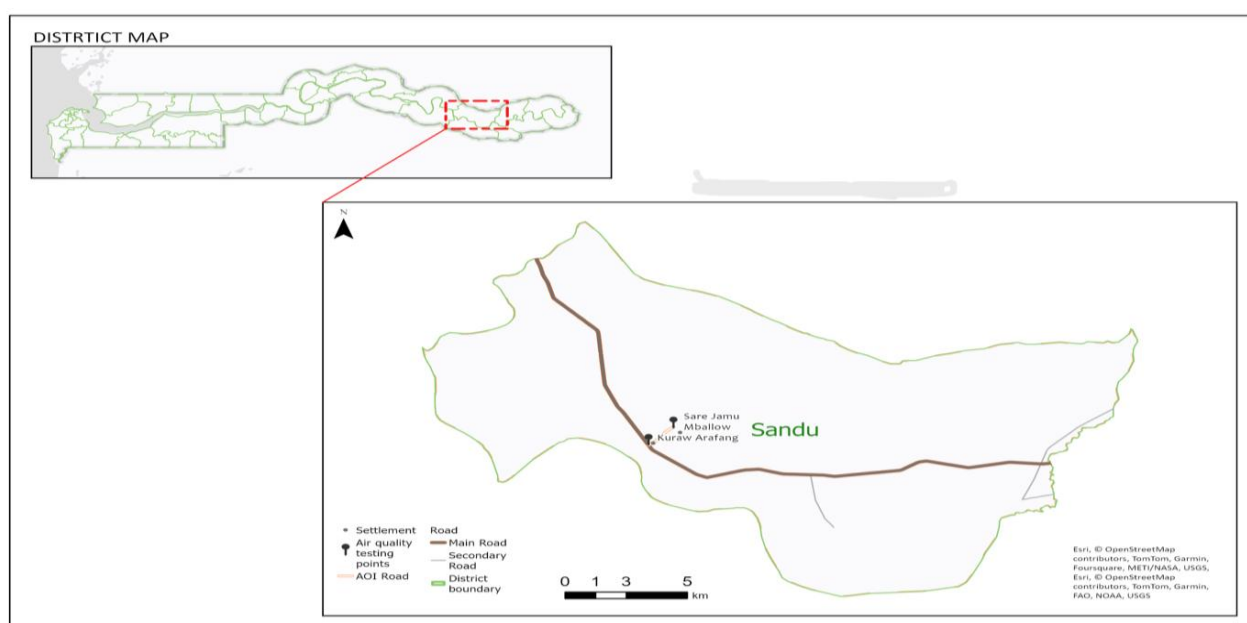


Figure 2.2: Map of proposed road to be constructed in Sandu district, URR

Chamio Bunda to Limbambulu Bambo Road

This road will connect Chamio Bunda to Limbambulu Bambo measuring 5.4Km. The total length of the roads in URR add up to 13.6 Km and there are important public facilities that could access using the road thus its importance. The community of Limbambulu is close to the River Gambia, nearly 200m away. The said road was previously constructed with very low standard and the laterite pavement of the loose laterite has mostly wash away thus its bumpy nature. There is a major watercourse going across the road, which will require a design culvert of either 2 or 3 cells. Evidence of erosion was noticed on the road indicating the need for proper drainage along the road corridors.

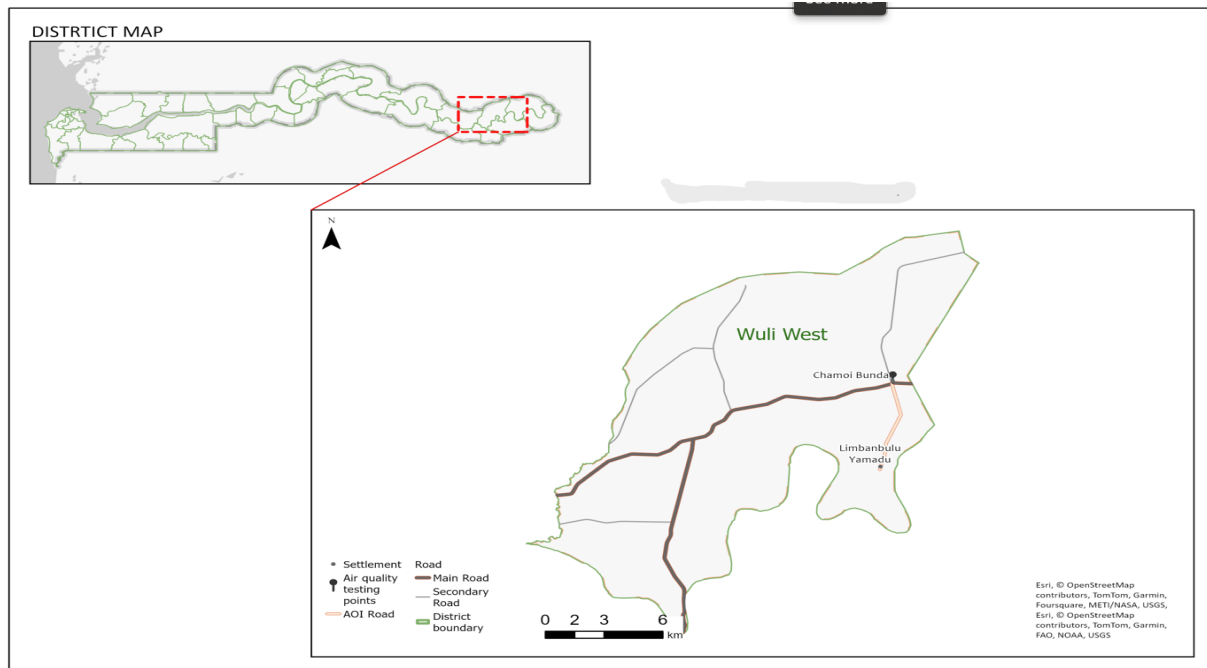


Figure 2.3: Map of proposed road to be rehabilitated in Wuli West district, URR

2.2.2.2. Central River Region Roads

The CRR has its capital in Janjanbureh. According to the 2013 population and housing census, the region had a population of 221,907 with a total area of region was 2894.3 km². The roads in this region will connect villages (8) along the corridor and agribusiness firms to the main truck roads and measure 35.5 Km. The population of the project area of influence added up to 15,609 people as per feasibility study report. There are no protected forests along the selected roads but there are some fallow areas that are not currently under cultivation characterized by shrubs. The farms and orchards are mainly used for ground nut and millet cultivation among types of crops and fruit trees like cashews.

Table 2.2: Proposed roads to be constructed in CRR

Ref	Road	Existing Road		Region	District	Length	Villages Linked
		Surface type	Condition				
3	New feeder road construction	Earth Road	Poor	CRR/N	Niamina East	3.5	Darussalam/Sinchu Alhagie to Pateh Sam
4	New feeder road construction	Earth Road	Poor	CRR/S	Upper Fullado West	32.0	Cha Kunda, Sare Soffie, Chargel, Madina Duta Wally, Nyamen Kunda, Dobong Kunda to Bansang

Darussalam/Sinchu Alhagie to Pateh Sam Road

This road will connect Darussalam/Sinchu Alhagie to Pateh Sam. It is located on the South Bank of Pateh Sam and main highway and measuring 3.5 Km west. There are no settlements between the two villages thus no reallocation of the people. The road is an earth road with poor conditions, characterized by erosion and depressions which is an indication of the presence of pools of water during the wet season. Passage of vehicles during and people during the rainy season becomes a major challenge. Evidence of gully erosion was noticed on the road indicating the need for proper drainage along the road corridors.

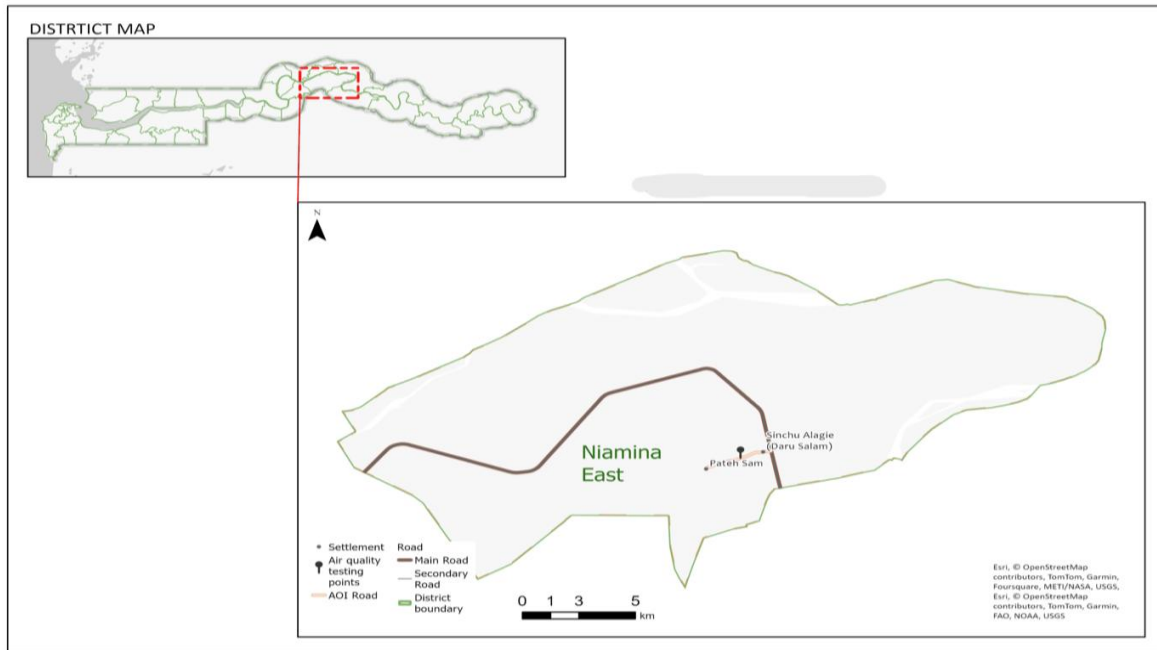


Figure 2.4: Map of proposed road to be constructed in Niamina East district, CRR-N

Cha Kunda, Sare Soffie, Chargel, Madina Duta Wally, Nyamen Kunda, Dobong Kunda to Bansang

This road measures a total distance of 32 Km. It runs from Cha Kunda and connects the following villages to Bansang , Sare Soffie, Chargel, Madina Duta Wally, Nyamen Kunda, and Dobong Kunda.

One of the communities along this corridor (Bansang) serves as a growth and commercial center in the Region. It has important public facilities like Hospital which serves as one of the major referral hospitals in the Region. Constructing this road will enhance the movement of people as well as the goods and services in the area.

The road is a laterite feeder road in a very low standard making the movement of goods and services as well as people a major challenge, especially during the rainy season. Along the road corridor are fallowed lands and the road passes through settlements and farmlands. Towards Dobong Kunda to Bansang the road passes through rice fields with irrigation canals. Evidence of gully erosion was noticed on the road indicating the need for proper drainage along the road corridors.

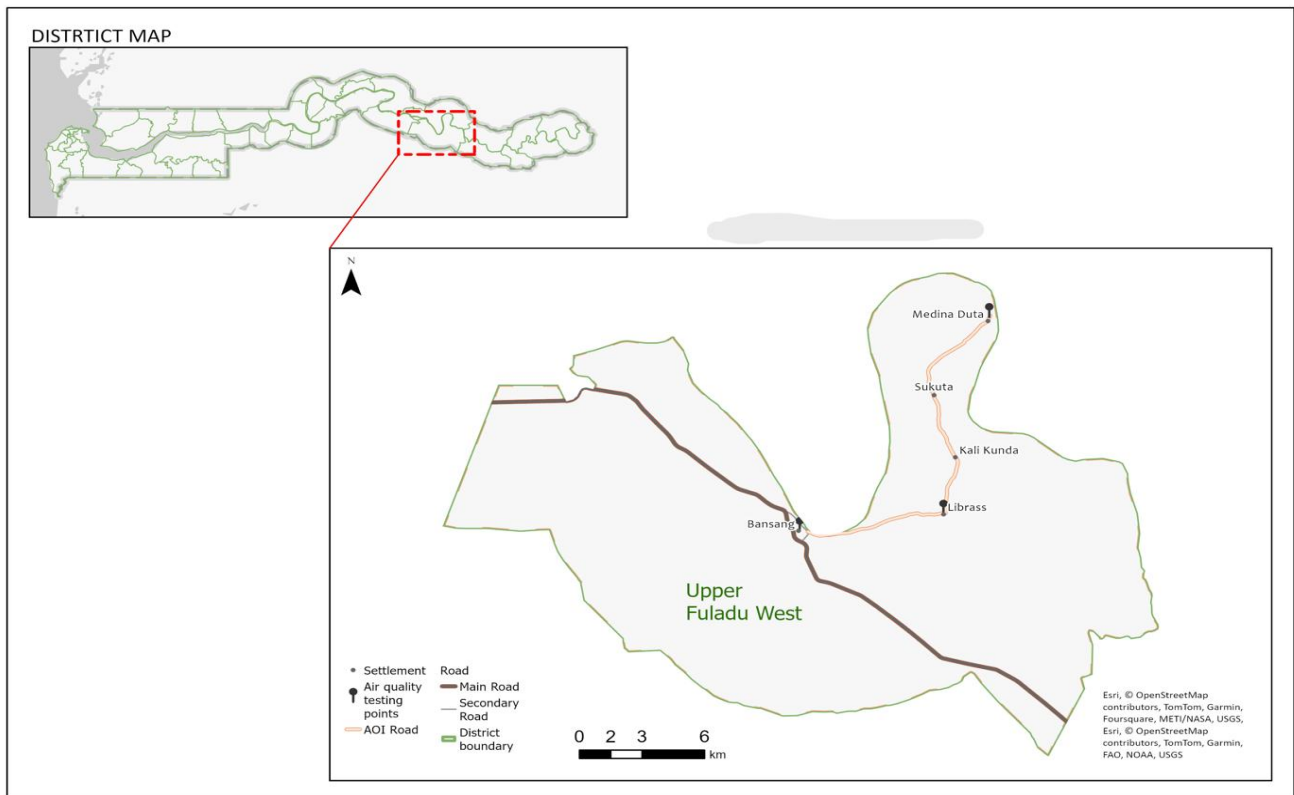


Figure 2.5: Map of proposed road to be constructed in Upper Fuladu West district, CRR-S

2.2.2.3. North Bank Region Roads

The North Bank Region occupies the western third north bank of Gambia. The region occupies an area of approximately 1556 sq.km with the capital as Kerewan. The region's population was estimated at 220,080 inhabitants as of 2013 population and housing census. The population of the project area of influence added up to 62,179 people. The road network has a total length of 75.2Km and will connect villages and agribusiness firms to the main truck road for ease of transportation of agricultural goods and services. Along the road corridors there are farms and orchards mainly used for ground nut and millet cultivation among types of crops and fruit trees like cashews. Some of the roads in this region pass through settlements and thus environmental and social issues are envisaged during works.

Table 2.3: Proposed roads to be constructed and rehabilitated in NBR

Ref	Road	Existing Road		Region	District	Length	Villages Linked
		Surface type	Condition				
1	New feeder road construction	Earth Road	Poor	NBR	Jokadu	6.0	Kuntaya, Jissa ker Amadou to Kerr Omar Saine
2	New feeder road construction	Earth Road	Poor	NBR	Jokado	5.8	Kerselen, Kerr Sidik, Kabakoto/Kerr Ousmanbuso to Kerr Malick Nana to Hakalang road
3	New feeder road construction	Earth Road	Poor	NBR	Lower Nuimi	6.7	Keer Jatta, Ndofan, Ker Wali to another main road
4	New feeder road construction	Earth Road	Poor	NBR	Lower Nuimi	9.0	Fass, Manneh, Ngare/Sadir Jobe, Ndongu Charr to Ndongu Kebbeh
5	New feeder road construction	Earth Road	Poor	NBR	Badibou	5.6	Main road, Land Sarr, Macca Farafenni to main road
6	Feeder road Rehabilitation	Gravel Road	Fair	NBR	Badibou	7.5	Illiasa, Jiman Sar Baa to Katchang
7	New feeder road construction	Earth Road	Poor	NBR	Badibou	25.0	Minteh Kunda, Kerr Ardo, to Njawara
8	New feeder road construction	Earth Road	Poor	NBR	Badibou	9.6	Yallal Tankonjala, Bantang Killing, Yuna Angaleh, Taaly Ya, Jajari, India to Illiasa

Kuntaya, Jissa, Kerr Amadou to Kerr Omar Saine Road

This road measures 7 km and starts from North Bank main truck road at Kuntaya through Jissa , Kerr Amadou to Kerr Omar Saine. It is the main road connecting the villages to Kuntaya, a small town and district center in the area. The community of Kuntaya has fairly active commercial activity and a market and it has a district health center and a primary, junior secondary and Senior secondary schools.

This road provides access to these facilities and other public institutions to communities of the villages highlighted as well as other settlements in the area.

The road does not pass through sensitive ecosystems like wetland and forest, however, evidence of serious was seen and the road passes the settlement of Kerr Amadou to Kerr Omar Saine which means that there is a possibility of reallocation should the alignment be maintained, and road width be increased.

Kerselen, Kerr Sidik, Kabakoto/Kerr Ousmanbuso to Kerr Malick Nana to Hakalang Road

The road is 5.8Km distance and is an earth road located from Kerelen on the North Bank Road and runs through south eastwards to Kerr Sidik and then southwards through the village of Kerr Ousmanbuso to Kerr Malick Nana on Hakalang Road. The road provides access to markets and transportation of goods and services for many villages within and around the corridor. The current condition is deplorable with depressions on the section of the road as well as erosions and water courses making the passage a major challenge, especially in the rainy season. Although there is no sensitive ecosystem within and around the road corridor, the road passes through settlements and farms which is an indication of possible environmental and social ramifications.

Kerr Jatta, Ndofan, Kerr Wali to Main Truck Road

The road measures 6.25Km and runs between the main highway from Barra to Senegal border at Karang and the North Bank Road from Barra to Farafenni. It runs southwards from Kerr Jatta on the Barra/Amadalai/Kaolack Highway to Ndofan and South eastwards through Kerr Walli to a junction on the North Bank Road approximately 1 Km Southwest of Mbeuguma. The road could create an essential link between two important highways at a relatively short distance.

The road is an earth road which connects villages to the main highways leading to health and educational facilities as well as to the weekly markets. The condition of the road is deplorable state with depressions, gullies, and water courses and quite bumpy even in the dry season and be impassable during the wet season. There is no evidence of the road passing through a sensitive ecosystem, however, evidence of erosion was noticed which means the road will require proper drainage for ease of natural flows more especially during the rainy season.

Fass, Manneh, Ngare/Sadir Jobe, Ndungu Charr to Ndungu Kebbeh Road

The road measures a total distance of 9Km located between Fass on the Barra/Amadalai/Kaolack Road and Ndungu Kebbeh on the North bank road. The area has small bustling towns with markets and a lot of commercial activities. The road is currently earth road and runs on a southeastern direction through Manneh, Ngare, Ndungu Charen and Ndungu Kebba. The road provides access to markets and transportation of goods and services for many villages within and around the corridor. The current condition is deplorable with depressions on the section of the road as well as erosions and water courses making the passage a major challenge, especially in the rainy season. Although there is no sensitive ecosystem within and around the road corridor, the road passes through settlements and farms which is an indication of possible environmental and social ramifications.

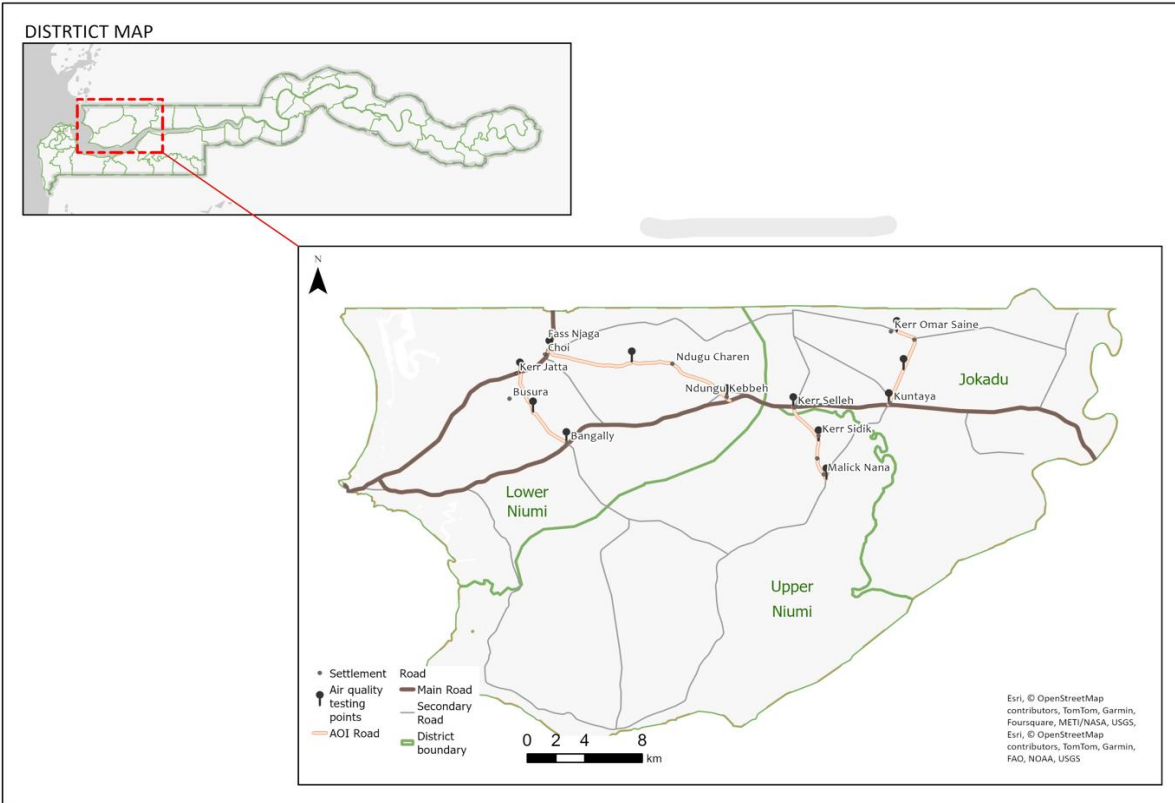


Figure 2.6: Map of proposed road to be constructed in Jokadu, Lower and Upper Niumi district, NBR

Main Road to Lang Sarr, Mecca Farafenni to Main Road

The road is a 5.6Km earth road runs north-eastwards from Mecca Farafenni through the village of Lang Sarr to the Trans Gambia Highway at Farafenni. This road will serve major public facilities located in farafenni as one of the growth and commercial center in the Region and a strategic location for many businesses in the area. The current condition of this road is earth road and in deplorable condition with many depressions, gullies, and water courses on the road. Like most of the roads, proposer drainage is required due to areas prone to runoff during heavy downpours in the rainy season causing erosion.

Illiassa, Jiman Sarr Baa to Katchang Road

This road measures a total distance of 7 Km starting from Katchang and runs northwards to Jiman Sarr Ba and northwards again to Illiassa on the North Bank Road. The road is an existing feeder road that connects the villages on the main North Bank Road. Illiassa is an old historical town and district center in the area with an active commercial activity and a market. The community of Illiassa has a district health center and many other public facilities like primary. Junior and senior secondary schools. The road is currently serving as the main access to many villages along the corridor. The current condition of the road is better; however, it will still require rehabilitation or reconstruction to enhance movement of people, good and services in the area. Like most of the roads, proposer drainage is required due to areas prone to runoff during heavy downpours in the rainy season causing erosion.

Minteh Kunda, Kerr Ardo to Njawara Road

This road is one of the longest roads to be constructed in the region measuring 24.5Km. the road is a gravel road which was previously designed and constructed and runs westward south of the Gambia/Senegal border. The road passes through a minimum of 14 villages in addition to other settlements located within and around the proximity of road. The current condition of the road is such that it will re rehabilitation /reconstruction to make it more motorable, especially during the rainy season. Along the road corridor are farmlands mainly used by the communities within the catchment for agricultural crop production. Evidence of gully erosion was noticed on the road indicating the need for proper drainage along the road corridors.

Yallal Tankonjala, Bantang Killing, Yuna Angaleh , Taaly Ya, Jajari, India to Illiasa Road

This will start from the main North Bank Road at Yallal and runs northwards through Tankonjala to Bantang Killing, then westwards through Yuna Angaleh then south westwards to Jajari and India to the North Bank Road to Illiasa. It has a total distance of 9.3 km and is an earth road. It provides the main access to the weekly markets and other socioeconomic services. The current condition is deplorable with depressions on the section of the road as well as erosions and water courses making the passage a major challenge, especially in the rainy season. Although there is no sensitive ecosystem within and around the road corridor, the road passes through settlements and farms which is an indication of possible environmental and social ramifications during construction works.

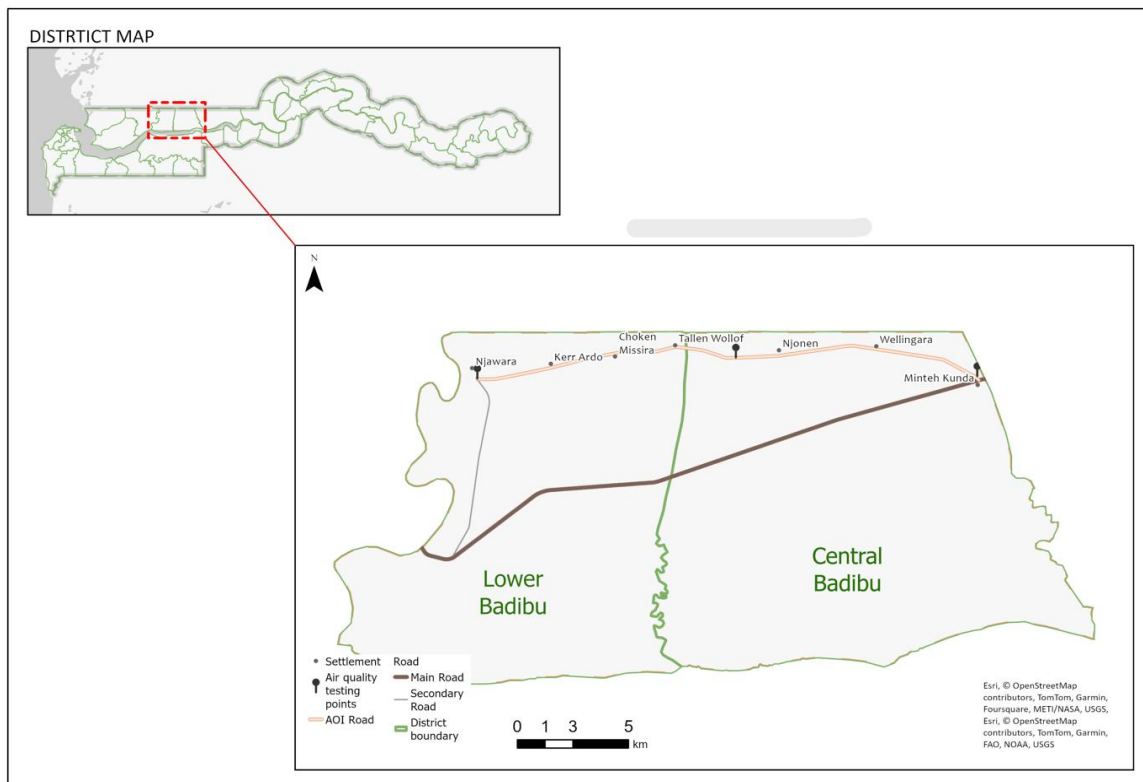


Figure 2.7: Map of proposed road to be constructed in Lower and Central Badibu district, NBR

2.2.2.4. Lower River Region Roads

The region has its capital in Mansakonko. As per the data recorded from GBOS in 2013 population and housing census, the region had a population of 81,042 inhabitants with a population density of 051. The total area of the region is 1618 km². The infant mortality rate was 96 for every thousand births and the under-five mortality was 137 per every thousand births. The population data recorded by the feasibility study report was 2,122 inhabitants.

Table 2.4: Proposed roads to be constructed in LRR

Ref	Road	Existing Road		Region	District	Length	Villages Linked
		Surface type	Condition				
13	New feeder road construction	Earth Road	Poor	LRR	Jarra West	4.5	Main Road to Minna
14	New feeder road construction	Earth Road	Poor	LRR	Kiang Central	4.5	Nema to Sibito

Main Road to Minna

This road will start from the main truck road to Minna connecting Suluko measuring 4.5Km . The road is currently an earth road and there is no settlement between the main road and Minna. The Minna Road is in a poor state of condition and was previously constructed to a very low stand. Some sections of the road have huge depressions indicating a presence of pools of water during the rainy seasons. Evidence of gully erosion was noticed on the road indicating the need for proper drainage along the road corridors.

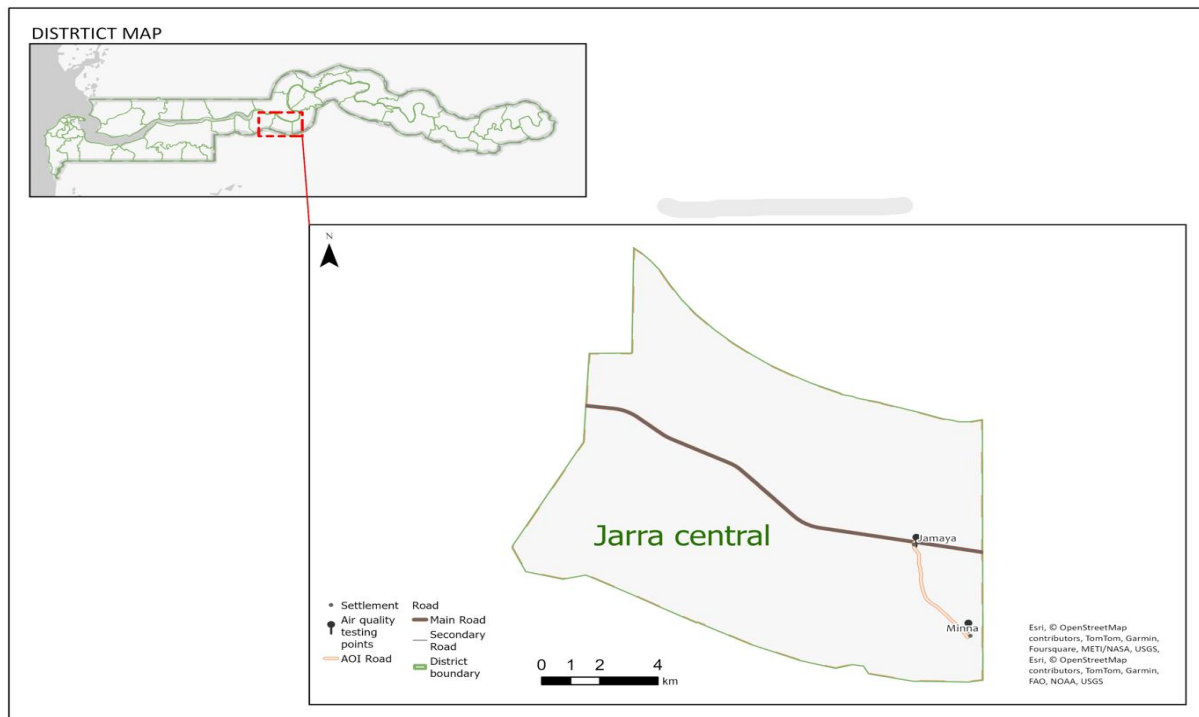


Figure 2.8: Map of proposed road to be constructed in Central Jarra district, LRR

Nema to Sibito Road

This road will connect Nema to Sibito and the agribusiness firms. It is also an earth road measuring 4.5 km southeast of Sibito and in a poor condition. Along the road corridor from Nema to Sibito is the gallery forest, part of which may be largely altered during construction. There is no sensitive ecosystem like wetland and swampy areas along the road corridor. Evidence of gully erosion was noticed on the road indicating the need for proper drainage along the road corridors.

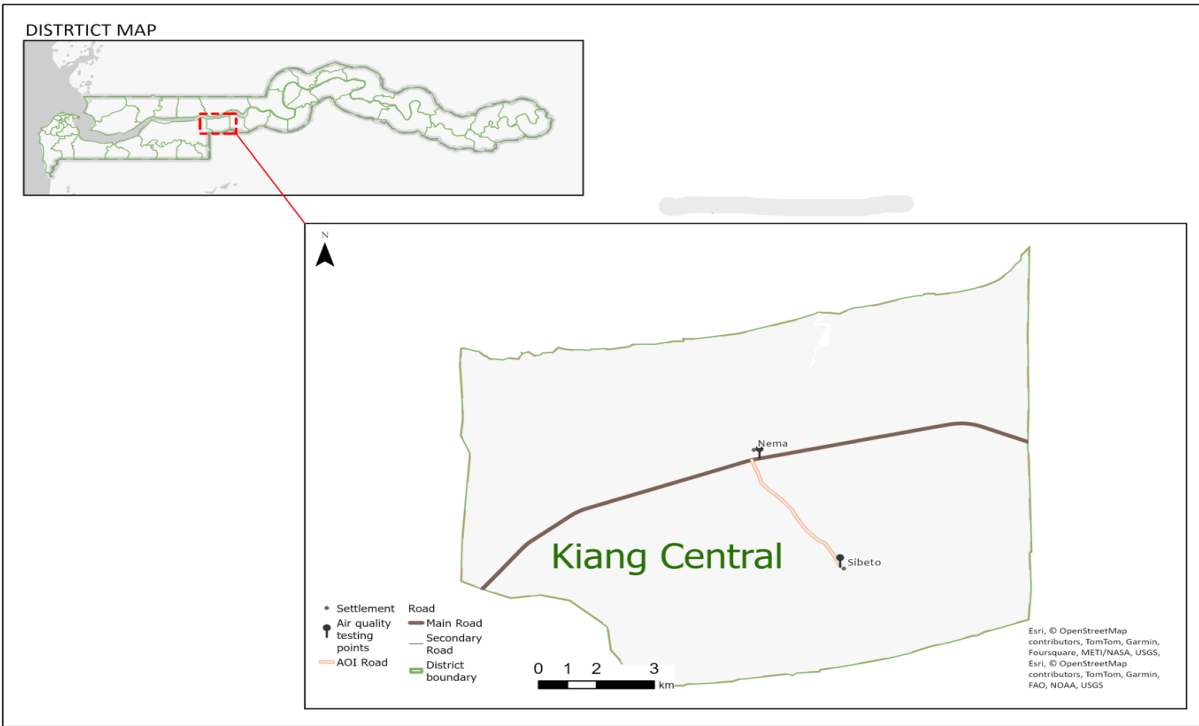


Figure 2.9: Map of proposed road to be constructed in Kiang Central district, LRR

2.2.2.5. West Coast Region Roads

The region has the largest roads to be constructed, rehabilitated, and upgraded with a population of 688,744 inhabitants as per the 2013 population and housing census. The population data recorded from feasibility study of the project area of influence added to the 39,219 people. The road conditions in this region mainly range from fair, poor and good, which means most of the roads will require construction, rehabilitation and upgrading for enhance transportation of good and services and other socio-economic services . some of the road alignments have sensitive ecosystems like community forest and forest parks that will require attention during earth and civil works. Culturally sensitive sites like cemeteries are sported in along the road corridor and while other roads pass through settlements/communities. Wetland/swampy areas were also noticed in some of the road alignments in addition to community forest , farmlands, and orchards.

Table 2.5: Proposed roads to be constructed in WCR

Ref	Road	Existing Road		Region	District	Length	Villages Linked
		Surface type	Condition				
15	New feeder road construction	Earth Road	Poor	WCR	Foni Kansala	4.6	Kapanti, Kapa to Ballen
16	New feeder road construction	Earth Road	Poor	WCR	Foni Bondali	7.5	Badali, Burambang, Bulengant, Tibat, Knkurang to Bambara
17	New feeder road construction	Earth Road	Poor	WCR	Foni Bondali	1.7	Bondali Bundakunda to Jorem Bundakunda
18	New feeder road construction	Earth Road	Poor	WCR	Foni Bondali	7.3	Nyantempo, Fass Chamen, Nfee, Jending Jilahr to Bulunto
20	New feeder road construction	Earth Road	Poor	WCR	Foni Jarrol	4.3	Gjonkil, Kewel, Kang mamudu, Kansambu to Kampasa
22	New feeder road construction	Earth Road	Poor	WCR	Foni Jarrol	7	Wassadou, Adullay, Fass Chabai kangiramba, Busary to Bulengant
23	New gravel feeder roads require surfacing	gravel road	Poor	WCR	Kombo North	1.5	Lamin Daranka (John Pickering School to the Gardens and Rice field)
19	New feeder road construction	Earth Road	Poor	WCR	Kombo West	5.0	Gunjor to Berending
21	FeederNew feeder road construction	Earth Road	Poor	WCR	Kombo West	14.0	Brikama, Kassakunda, Nyofele, to Ginjor

Ref	Road	Surface type	Condition	Region	District	Length km	Villages Linked
1	New gravel feeder roads require surfacing	Gravel Road	Good	WCR	Foni Bintang	5.8	Bulajorr to Katarcor
2	New gravel feeder roads require surfacing	Gravel Road	Good	WCR	Foni Bintang	9	Tampoto to Jakoi Sibirik
3	New gravel feeder roads require surfacing	Gravel Road	Good	WCR	Foni Bintang	6	Kusamai to Bajagar
4	New gravel feeder roads require surfacing	Gravel Road	Good	WCR	Foni Bintang	7.6	Somita to Batendin to Jakoi paima
5	New gravel feeder roads require surfacing	Gravel Road	Good	WCR	Foni Bintang	7.8	Sibanor to Gifanga)
6	New gravel feeder roads require surfacing	Gravel Road	Good	WCR	Foni Bondaly	4.2	Bondally Jolla, Bondally Tenda to Jorren Bondakunda

Kampanti, Kapa to Ballen Road

This road links the villages of Kapa and Ballen to the main Soma Mandinaba truck road. It measures 4.3Km distance and is currently an earth road. The starts at Kampanti going southwards through Kappa to Ballen. There are swampy areas as well as prime farmlands along the road corridor. The road will serve as the main access to GCAV Farm at Kapa as well as a school at Kampanti. In addition to vehicles, donkey carts and motorbikes are frequently using the road for many socioeconomic activities. Part of the road has depressions, gullies, and evidence of erosion on the sections of the road caused by the runoff during the rainy season rendering the road unusable. Proper drainage is required to be addressed to ensure the natural drainage of the runoff water is not affected by the road.

Bondali, Burambang, Belengart, Tibat, Kangkurang to Bambara Road

This road has a total distance of 8.2Km stretch with a 2.5m average width liking Bondali located on the Mandinaba to Soma Road to Bambara going through Burambang, Belengart Tibat and Kangkurang. There are settlements in all the villages along the stretch of the road with light traffic of both commercial and private vehicles using the road. The road will provide access to public facilities like health facilities and schools within the area. Although this road passes through settlement, there will be no need for reallocation/displacement.

Bondali Bundakunda to Jorem Bundakunda Road

This road will be at Bondali Bundakunda and measures 4.1Km southwards towards Jorem Bundakunda and was recently constructed by the Nema project. the road will provide access to the inhabitants of Jorem Bundakunda and to public facilities including but not limited to following like school, health center , Gamtel and police post at Bondali. The condition of the road is good and has adequate drainage installed. The road passes through a lowland which is an indication of road having a proper drainage to ensure natural flow of water is not affected but the road. Along the road corridor there is forest discovered during the field visits.

Nyantempo, Fass Chamen, Nfee, Jending Jalaharr to Bulunto Road

This road measures 7.2Km and is in a deplorable state making the movement of people, good and services a major challenge. The road will start at Nyantempo going south-westerly through Fass Chamen, Nfee, Jilaha and ending at Bulunto. Along the road corridor there are settlements more especially in Fass, Chamen, Jending Jilaha and Bulunto and this would provide transportation links to the market and health facilities at Bwiam. The road corridor is also filled with farms/orchards and constructing the road will enhance the movement of people as well as goods and services. The condition of the road is such that only drawn carts and some vehicles. The road did not pass through sensitive environments, however, evidence of erosion by runoff was noticed during the site inspection.

Gjonkil, Kewel, Kang Mamud, Kansambu to Kampasa Road

The road measures 2.1Km with lots of settlements along the road corridor. The road is an earth road in a deplorable condition. The construction of the roads starts at Gjonkil, and goes eastwards through Kewel, Kang Mamuda, and Kansambu to Kampasa. The road if constructed will provide access to important public facilities and other socioeconomic activities.

Wassadou, Adully, Fass chabai, Kangiramba, Busary to Belengart Road

This road will start from Wassadou and goes through Adully, Fass Chabai, Kangiramba, Busary and ends at Bulengant. The road measures about 7 Km and is an earth road in poor condition. The communities settling along the road corridor are fully inhabited and connected by the road. The road if rehabilitated/reconstructed will ease the movement of communities as well as the agribusiness firms and will allows framing communities to easily access the market and as well improved links to schools and health facilities within the community and its surrounding. One thing that is visible along the road corridor are settlements and gallery forest. Although the road does not pass through sensitive ecosystems like wetlands or forest cover, there is evidence of erosion which is an indication of the need for proper drainage to avoid the natural runoff flow from disturbing the shoulders of the road.

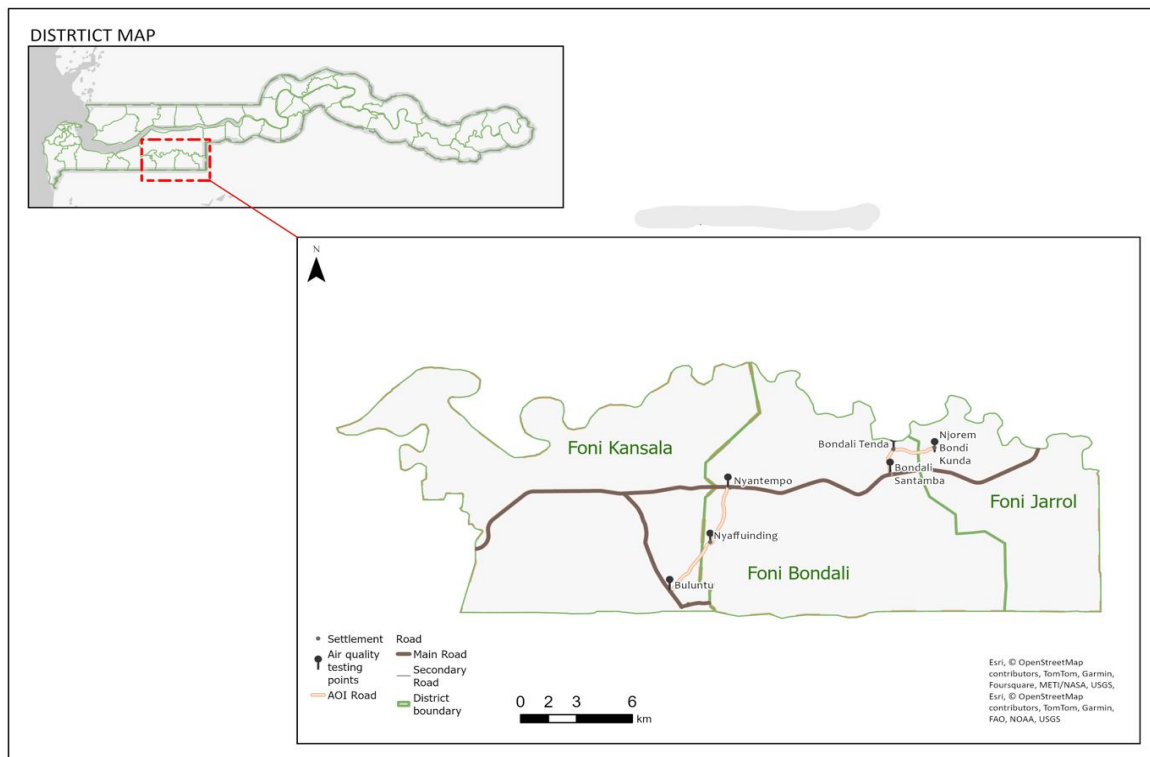


Figure 2.10: Map of proposed road to be constructed in Foni Kansala, Bondali and Jarrol district, WCR

Lamin Daranka (John Pickering School to Garden and Rice Garden) Road

This road is an earth road and in a deplorable condition measuring 1.5Km . Within and around the road corridor are settlements. The road will start from Lamin Daranka (John Pickering School to Garden and Rice Garden). It is an important road that connects rice fields, vegetable gardens and schools used by vehicles and donkey carts. This road passes through built up areas mainly residences and this is an indication that relocation properties are a possibility to widen the road and construction of this road could lead to many potential negative impacts to the surrounding communities.

Brikama, Kassakunda, Nyofele to Gunjur Road

This road is a 14km long laterite road going westward starting at Brikama, passing through Kassakunda and Nyofele and ending at Gunjur. Along the road corridor there are forest parks, wetlands/swampy and horticultural gardens. The road will link the community of Gunjur to their livelihood activity sites like gardens and fishing centers. It will also ease the transportation of goods and services to major markets in the area. There are many trees, orchards of fruit trees and residences along the road corridor. Evidence of drainage was noticed indicating the need for proper drainage.

Gunjur Berending to Berending Road

This road measures 6.1Km, part of which is earth while the other part is gravel. The road is in very poor state with lots of settlements along the road corridor. The road will start from Berending going northwards towards Gunjur Berending. This area is dominated by settlements and will provide links to the community of Gunjur Berending to the main Mandinaba Soma road as well as schools and health post at Berending. Along the road corridor there are wetlands, forest parks and farmlands/orchards.

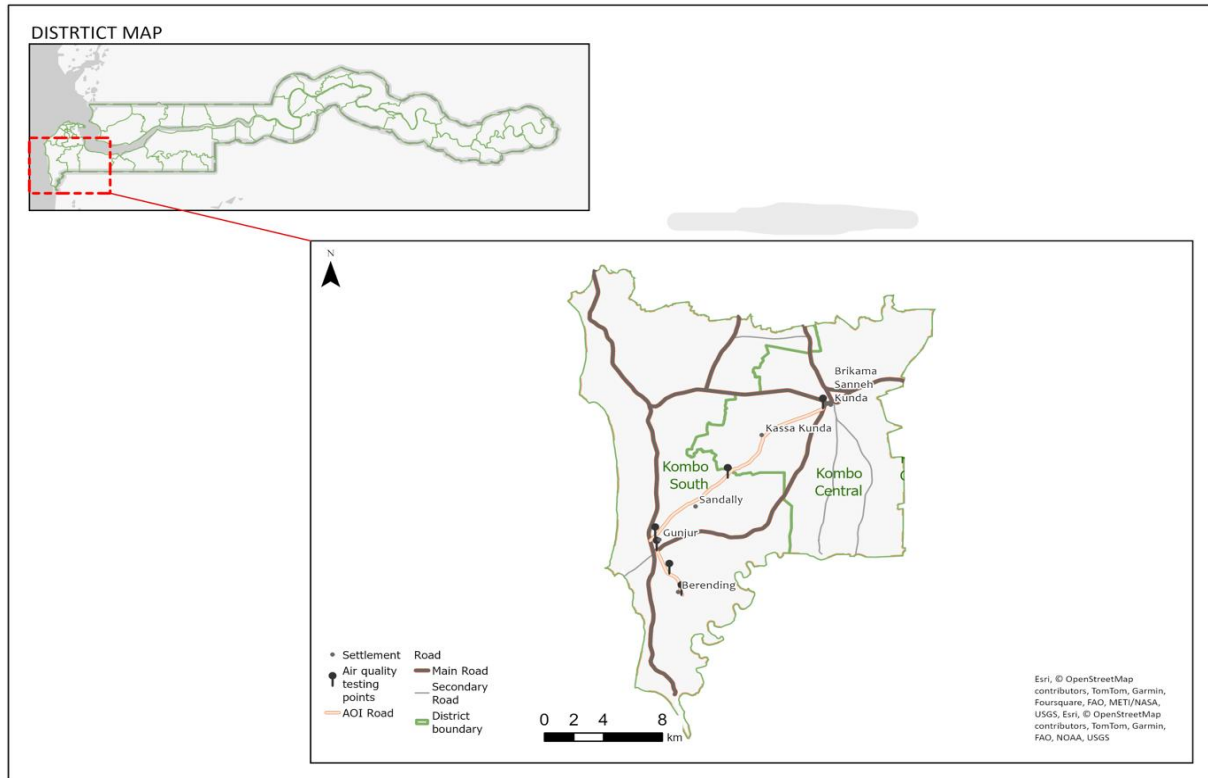


Figure 2.11: Map of proposed road to be constructed in Kombo Central and South district, WCR

Bulajorr to Katakorr Road

The road measures 6.3 Km and is in good condition. The start from Bulajorr and ends at Katakorr. There are settlements along the road corridor and does not pass through a sensitive environment such as wetland and forest parks. The road, however, passes through a lowland and there is evidence of

gully erosion which is an indication of the need for proper drainage. Even though the drainage system is provided, part of the road section is seriously eroded further indicating the need for culvert.

Tampoto to Jakoi Sibirik Road

This road will start from Tampoto to Jakoi Sibirik. It measures 9Km and is in a good condition. It is the main roads connecting rice fields and use by vehicles and donkey carts. Evidence of gully erosion was noticed on the road indicating the need for proper drainage along the road corridors to avoid damage of road shoulders.

Kusamai to Bajagar Road

This road will start from Kusamai to Bajagar with 6Km long . It is the main road connecting rice fields and use by vehicles and donkey carts. Evidence of gully erosion was noticed on the road indicating the need for proper drainage along the road corridors to avoid damage of road shoulders.

Somita to Batending to Jakoi Paima

The road is 7.6Km long with gravel and in good condition. The road will start from Somita to Batending to Jakoi Paima . The area is fully inhabited by many villages and there are public facilities like schools and productive agricultural . It is the main road connecting rice fields and use by vehicles and donkey carts. Evidence of gully erosion was noticed on the road indicating the need for proper drainage along the road corridors to avoid damage of road shoulders.

Sibanor to Gifanga Road

The road is 7.8 Km long and in good condition serving as the main road for many villages and settlement along the corridor. The road will start from Sibanor to Gifanga and does not pass through sensitive ecosystems like wetlands and forest. Evident was that erosion on the section of the road indicating the need for adequate drainage to avoid the damage of runoff water on the road shoulders.

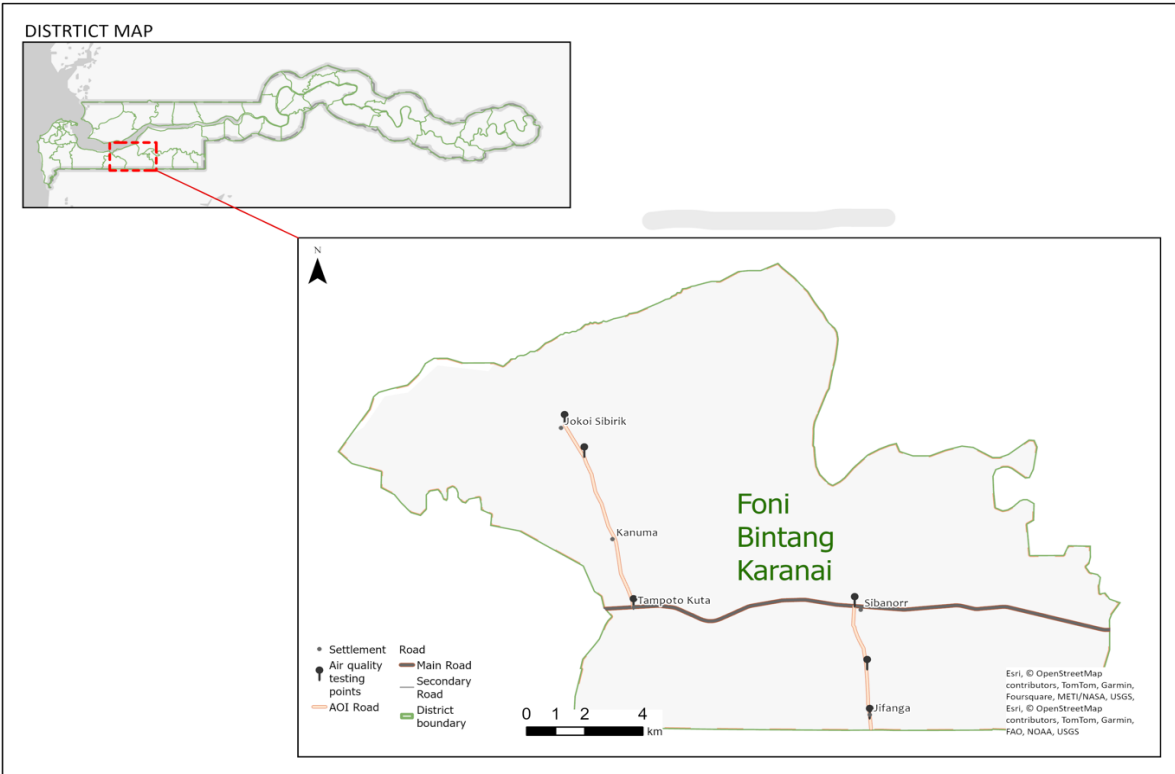


Figure 2.12: Map of proposed road to be constructed in Foni Bintang district, WCR

2.3. Project Activities

This section of the chapter presents a comprehensive breakdown of the construction of a fully flexible pavement, which is an engineered structure with a bitumen bound surface and pavement layers design to carry vehicular loads safely and at a level of comfort to the end users (drivers, cyclists and pedestrians). The construction of roads to high standards facilitates the movement of both people and goods promoting socioeconomic development of countries. In this regard, the Government of The Gambia’s efforts in road infrastructure development through the Gambia Inclusive and Resilient Agriculture Value Chain Development Project (GIRAV) is laudable.

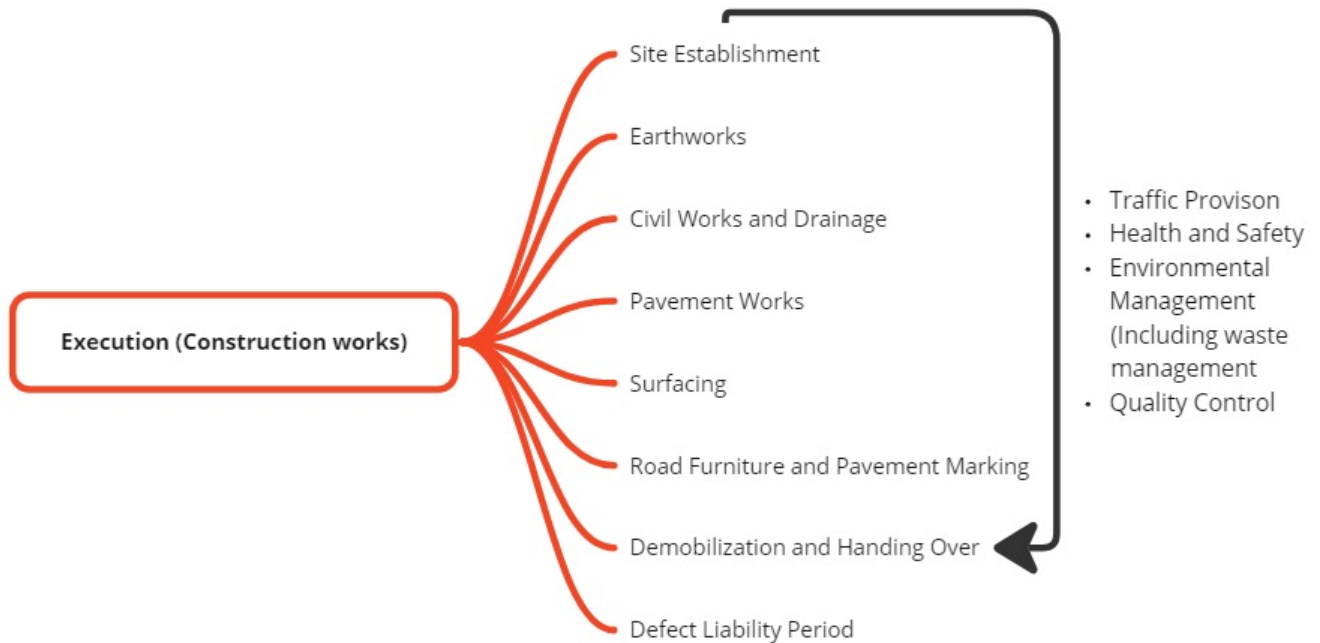


Figure 2.13: Mapping of a road construction project

In undertaking the construction of a new roadway or upgrading of an existing one, adherence to strict specifications and diligent planning forms the cornerstone of the project. The process begins with an exhaustive preparation phase where all work performed must align closely with the established lines, grades, cross-sections, dimensions, and tolerances as detailed in the drawings or indicated in the specifications. All materials utilized in the construction must meet the stringent quality requirements set forth in the contract. Should discrepancies or errors arise within the drawings, it is incumbent upon the contractor to promptly highlight these issues to the Consultant or their representative through formal queries before commencing work on the relevant sections. Moreover, the contractor bears the responsibility for sourcing and producing materials in strict adherence to the specifications, including the exploration and development of local material sources at their own expense.

Prior to a project's commencement, the contractor is required to submit a detailed work program in the form of a Critical Path Method (CPM) network diagram, for the Consultant's approval. This program must account for various factors such as breaks, and the rainy season, ensuring a comprehensive plan that encompasses the entirety of the project's scope. The level of detail required in the program is extensive, covering total quantities of work, monthly production rates, sequence of major activities, and the critical path of the project. Additionally, a procurement schedule for materials, especially those with long manufacturing and delivery durations, must be coordinated with the activity dates in the program. This detailed planning phase is critical for setting a foundation for the project, ensuring that every aspect of the construction process is carefully orchestrated to meet the stipulated completion date and within budget, without compromising on quality or safety standards.

Subsequent updates and revisions to the program are essential for maintaining alignment with the project's progress and adjusting for any deviations from the original plan. In instances where actual

progress does not conform to the program, leading to potential delays, the contractor is required to submit a revised program of works, highlighting modifications made to ensure the project's completion within the agreed timeline. This iterative process of planning, monitoring, and adjusting is vital for the successful execution of a road construction project, ensuring that every phase from material procurement to the final construction methods and equipment usage adheres to the established specifications and quality standards. Through this approach, the project aims to achieve its objectives efficiently, maintaining transparency and open communication between the contractor, consultant, client, and all stakeholders involved.

Following comprehensive planning and preparatory phases outlined, and with the mobilization of a consultant completed—defining their scope of works to oversee the project execution and ensure adherence to the outlined specifications—project activities would be set to commence as detailed below. It's imperative to note that quality assurance and quality control measures would have been rigorously established, underscoring their significance in achieving the project's quality objectives:

2.3.1. Topographic survey

A topographic survey through the utilization of Global Navigation Satellite Systems' (GNSS) equipment, will be conducted to record accurate ground conditions through field measurements to capture the following:

- Trigonometric control points at appropriate intervals along the length of the projects referenced to from The Gambian Datum.
- Road centre-line survey and longitudinal profile
- Cross-section survey at appropriate intervals and at changes in topography
- Location and dimensioning of all existing road infrastructure
- Location of water features crossing the project sites
- Identification of obstructions along the project corridors
- Identification of utilities and other existing features along the project corridors.

2.3.2. Soil and materials survey

The purpose of the survey is to locate lateritic and sand borrows within acceptable hauling distance from the project site with sampling for laboratory tests and sampling of existing ground conditions. The samples will undergo, tests for gradation – to check materials constituents' ability to interlock and cohesive properties; natural water content; Atterberg limits – plastic limit and liquid limits of material; and California Bearing Ratio (CBR) - to measure materials' load-bearing capacity at a known density (and moisture content), to ensure suitability for use as pavement materials. The pavement structure will be as specification and will be based on the design of flexible pavement design based off CBR values to determine layer thickness. A systematic sampling of the natural ground will be conducted to determine its suitability to constitute part of the road foundation. Sampling of the lateritic pavement structure will be carried out for the duration of the project to ensure material compliance with project specification.

2.3.3. Hydrology and hydraulic studies

With the Gambia river traversing the entire length of the country a hydrology and hydraulic study is essential to avoid damage to the road structure due to poor drainage and design. Therefore, a hydrologic and hydraulic study will be conducted to:

- Identify watersheds with the potential of influencing the proposed road projects and their characteristics.
- Estimation of flow rates at influence points along the road corridor
- Design of hydraulic structures to be constructed along road corridor

2.3.4. Traffic Study

A traffic study will be conducted to obtain the volume of traffic expressed as a rate of flow, as Vehicles Per Hour (VPH), and Vehicles Per Day which will be converted into Average Daily Traffic (ADT) or Annual Average Daily Traffic (AADT) if necessary. If the proposed sites are new roads without traffic an estimate of traffic volume will be made based of areas with similar population and social amenities. The traffic data will be used in design of the pavement structures.

2.3.5. Economic study

An economic and social status study of the populations within the project zones will be conducted to collect data such as average income and standard of living, availability of the different modes of transport including their cost to measure project impact following its completion.

2.3.6. Engineering Design

Incorporating the guideline and methodologies outline by the American Association of State Highway and Transportation Officials (AASHTO), the engineering design for a fully flexible pavement structure will be developed, leveraging the extensive data acquired from the studies and surveys. Design using AASHTO guidelines and references to other design manuals such as the Design Manual for Roads and Bridges (DMRB) will be made to determine the appropriate pavement and hydraulic structures based on anticipated traffic loads, ground conditions and availability of materials.

2.3.7. Right-of-way and Land Acquisition

Right-of-way and land acquisition for the road construction projects, following the completion of comprehensive studies, will rely on the efforts of the clients' representative through a collaborative approach between the Department of Physical Planning, the Ministry of Lands, Regional Government, and Religious Affairs, and relevant parties. All required land parcels identified using the detailed topographic data collected will be communicated at the earliest possible time to ensure the availability of the right-of-way for construction works. Subsequently, the Ministry of Lands will undertake valuation assessments to determine fair compensation rates for affected landowners. This

integrated procedure ensures that land acquisition is conducted ethically, transparently, and in compliance with The Gambia's legal and regulatory frameworks, thereby fostering community support and minimizing potential disputes, ensuring the smooth progression of the project. The entire process of land acquisition should be in compliance with World Bank Environmental and Social Standards (ESS) 5.

2.3.8. Execution (Construction Works)

2.3.8.1. *Site Establishment*

The Contractor is mandated to establish and maintain a comprehensive site establishment for the efficient execution of the project, including a main office, camps, stores, tanks, and workshops. These facilities must cater to the needs of the staff and provide clean, safe conditions, with workshops equipped for major repairs and stores offering ventilated and secured storage. All sites are to be appropriately fenced, with considerations for future dismantling and transportation in line with Client's instructions. The Contractor is responsible for submitting detailed plans for the site establishment, including layouts and specifications for offices, stores, workshops, and camps, alongside necessary insurance documentation for buildings and contents. This submission process is crucial for ensuring the Consultant's approval and compliance with the contract specifications.

Upon the project's completion, the Contractor is responsible for the dismantling and removal of the site establishment, ensuring that everything is maintained in good condition throughout the construction period for a possible handover to the Client. Special provisions are made for the accommodation and office spaces of the Consultant and his staff, including specifications for housing and the necessary utilities. This comprehensive approach ensures that all parties have the necessary facilities and services for the project's duration, emphasizing the Contractor's responsibility for establishing a conducive work environment, maintaining it, and adhering to the contract's environmental and operational standards.

2.3.8.2. *Traffic Provision*

The provision and maintenance of traffic accommodation during construction and maintenance periods are essential for ensuring the safe and easy passage of public traffic, which includes the construction of detours, bypasses, barricades, signs, deployment of flagmen as necessary and liaison with the traffic police. These measures are vital for minimizing disruptions to the flow of traffic and maintaining public safety throughout the construction process. The contractor is required to submit a detailed strategy for each type of traffic accommodation operation, including layout plans showing the areas covered by the proposed operations, construction details, temporary drainage, marking, and other relevant details for approval by the Consultant. This ensures that all traffic accommodation measures are planned and implemented in accordance with the specifications and to the satisfaction of the Consultant.

The contractor is responsible for providing and constructing necessary detours to divert traffic from construction zones, with all details subject to approval by the Consultant. These detours must be

designed to accommodate public traffic safely and conveniently, including maintaining access to properties within or adjacent to the work area. Failure to comply with the provisions for traffic accommodation can lead to the suspension of work under the contract until compliance is achieved. Additionally, the contractor must ensure the safety of public services that may be encountered along the constructed detours. The accommodation of traffic also involves maintaining pedestrian traffic, ensuring that detours have sufficient width and vertical clearance, and implementing temporary drainage works to manage surface run-off effectively.

2.3.8.3. Environmental Management

Environmental considerations are integral throughout the duration of construction projects, ensuring that works are conducted in a manner that is both environmentally and socially responsible. Contractors are required to be well-versed with environmental legislations and policies, with all environmental-related activities coordinated with the governing body – National Environment Agency (NEA). The emphasis is on minimizing potential impacts through careful planning and execution, including maintaining detailed records and drawings of work areas, such as quarries, spoil dumps, and access roads, to facilitate adequate rehabilitation post-construction. Environmental standards for offices, accommodations, and waste disposal are monitored rigorously, with any recommendations from inspection teams implemented promptly to comply with environmental regulations.

The construction process necessitates respect for local communities and natural resources, ensuring minimal disturbance to water sources, lands, and ecosystems. This includes obtaining necessary permissions, avoiding damage to fields and large trees, and ensuring that any conflicts or agreements with local communities are meticulously documented. Additionally, the establishment and removal of camps, the operation of quarries, and the management of water supplies are conducted with environmental sensitivity, incorporating measures to prevent erosion, pollution, and disease transmission. Strategies for waste disposal, hazardous substance management, and dust control, are outlined to mitigate adverse environmental impacts, underscoring the contractor's ongoing commitment to environmental stewardship throughout the project lifecycle.

2.3.8.4. Earthworks

The earthworks involve a comprehensive preparation and manipulation of the site to facilitate the application of pavement layers. This initial phase of construction includes a wide range of activities such as clearing and grubbing, removal of trees and obstructions, and the relocation of services, all aimed at preparing the ground for the construction of roadways, embankments, and necessary infrastructure. The use of heavy machinery is pivotal in achieving the desired excavation levels and in managing materials on-site. The process begins with the site being cleared of all vegetation and debris to reach a 'Cleared Level,' followed by excavation down to the 'Finished Excavation Level,' ensuring alignment with project specifications. Throughout this phase, careful management of materials is emphasized, with topsoil reserved for specific uses and excavated materials evaluated for their suitability in construction, maintaining a clear separation to prevent contamination.

An essential aspect of earthworks is the protection of the construction site from water, requiring the implementation of effective drainage solutions to prevent issues such as water accumulation, erosion, and waterlogging. This involves constructing drainage structures like dams and ditches and utilizing

pumping equipment to maintain dry site conditions. Moreover, the proper grading of cuttings and embankments is crucial to facilitate water runoff and ensure that dry conditions are preserved throughout the construction period. These measures are vital for mitigating potential delays and damage caused by water, thereby safeguarding the integrity of the construction process and the eventual road structure.

The process of clearing and grubbing marks a significant preparatory step, involving the removal of surface obstructions to establish a clean and stable foundation for construction. This operation is carried out to specified depths under the supervision of the Consultant, focusing on the road prism and selected borrow areas while preserving valuable vegetation when possible. Following this, the management and disposal of cleared materials are conducted in an environmentally responsible manner, ensuring site cleanliness and compliance with regulatory standards. The final preparation stage involves assessing and preparing the ground for embankment construction, removing topsoil and unsuitable materials to provide a stable base for the road structure, thus setting a solid foundation for the subsequent construction phases.

2.3.8.5. Pavement Works

The construction of pavement layers is a critical phase in road works, requiring planning, execution, and quality control to ensure the durability and functionality of the road. Before commencing any pavement layer operations, it is essential that all drainage works are completed for the section in question, unless an exception is made by the Consultant. The materials for the construction of Sub-base, Base, and other pavement layers must be sourced from approved quarries, with the Contractor responsible for ensuring the aggregates meet the specified requirements. Prior to the use of these materials, the Contractor must conduct and bear the cost of all necessary sampling and testing to obtain the Consultant's approval. Furthermore, the storage of materials must be managed to preserve their quality, necessitating proper drainage and protection from contamination at the storage site.

The construction process involves several key steps: spreading the materials evenly across the prepared surface, adjusting moisture content for optimal compaction, and achieving the specified density through systematic compaction efforts. Compaction trials are conducted to establish effective methods and parameters, ensuring the pavement layers meet the required standards. For the Sub-base layer, materials like natural laterite gravel are used, adhering to specific grading and performance criteria such as Liquid Limit, Plasticity Index, and California Bearing Ratio (CBR). Similarly, the Base layer comprises selected natural gravel, meeting requirements for grading, and CBR. The compaction of these layers to the prescribed density is crucial for forming a stable and durable road structure. Upon completion, the surfaces of Subgrade, Sub-base and Base layers are finished to meet elevation tolerances and surface evenness, as dictated by the project specifications, ensuring the pavement structure's integrity and readiness for subsequent construction activities.

2.3.8.6. Surfacing

Road surfacing works are a critical component in the construction and maintenance of durable and safe roadways. The process begins with the transportation and storage of bitumen, ensuring it is free from contamination and stored under conditions that prevent extreme temperature fluctuations. The bitumen is heated carefully to avoid overheating, maintaining a balance that preserves its quality while ensuring it is workable. Before surfacing operations, trial lengths are constructed to fine-tune the

application rates of bitumen and aggregate, ensuring the surfacing material's embedment and performance under traffic conditions are optimized. This preparatory phase is crucial for achieving the desired surface quality and longevity.

The surfacing process emphasizes the quality of materials, from the aggregate's grading to the bitumen's viscosity and flash point, ensuring all components meet standards for a durable, high-performance road surface. The application of prime coat protects the completed base layer and prepares the surface, enhancing the adhesion between the existing road layer and the new surface material. The bituminous material is applied only under favorable weather conditions and at specific temperatures to ensure effective bonding and compaction. The construction process is highly controlled, with specified application rates for prime coats, and careful attention to temperature and weather limitations. The finishing touches involve protecting adjacent structures from splatter, maintaining traffic flow during operations, and ensuring the surface is prepared to specified compaction and tolerance requirements. This approach ensures the road surface is not only functional and safe but also extends its lifespan, reflecting the intricate balance between material quality, application technique, and environmental considerations in road surfacing works.

2.3.8.7. Civil Works and Drainage

In the construction of bridges, culverts, Irish crossings, and other concrete structures, the selection and handling of materials, along with curing and waterproofing processes, play pivotal roles in ensuring the durability and integrity of the infrastructure. Concrete, a vital material in civil works, requires careful selection of its components—cement, aggregates, and water—which must meet stringent standards for quality and performance as outlined in the specifications. The specifications mandate rigorous testing and sampling of these materials to ensure they conform to established standards, such as those set by ACI, and ASTM. These controls extend to the concrete mix design, where trial mixes are conducted to establish concrete proportions that will achieve the required strength and durability. The concrete's strength is further ensured by adhering to specified mix proportions and by conducting comprehensive testing of the materials.

The process of curing and waterproofing concrete is critical to its long-term performance, especially in varying environmental conditions. Proper curing methods, such as the use of wet burlap and impermeable membranes, are essential to prevent premature drying and to ensure the concrete reaches its intended strength and durability. For waterproofing, the selection of materials and techniques must prevent water ingress, which could compromise the structural integrity of the concrete. This comprehensive approach, as detailed in the specifications, underscores the importance of meticulous material selection, curing, and waterproofing in the construction of durable and reliable concrete structures, ensuring they meet the specified requirements for strength, durability, and resistance to environmental conditions.

Drainage works, integral to the construction of roads and infrastructure projects, require attention to slopes and levels to ensure effective water management and prevent waterlogging or erosion. The excavation and backfill processes form the foundation of constructing concrete drains, masonry repairs, and culvert installations, adhering strictly to the specifications and design drawings or as directed by the Consultant. The work encompasses all necessary procedures to achieve the desired outcome, including drainage, and pumping activities, ensuring the backfill reaches the original ground or finished surface level. Moreover, the construction requirements emphasize the importance of

maintaining close conformity with the specified lines, grades, and cross-sections, with special attention to over depth and over width excavations. Unauthorized deviations are not compensated, and the additional concrete required for adjustments is at the contractor's expense, highlighting the critical nature of adhering to established slopes and levels to prevent structural and functional issues in drainage systems.

Furthermore, the scheduling of excavation works is strategically planned to prevent exposed conditions for extended periods, optimizing the coordination between roadway excavation, embankment work, and drainage construction to always maintain positive drainage. This comprehensive approach ensures that all drainage structures, including reinforced concrete drains and culverts, are constructed with precision in alignment, grade, and dimensions as per the specifications. The meticulous control of slopes and levels extends to the backfilling process, utilizing only approved granular materials to achieve a compact and stable fill, thereby safeguarding the integrity and functionality of the drainage system. Careful planning and execution underscore the significance of slope and level considerations in drainage works, ensuring long-term durability and effectiveness in water management for infrastructure projects.

2.3.8.8. Road Furniture and Pavement Marking

The installation and maintenance of road furniture, particularly traffic signs, emphasize the significance of quality and visibility for the safety and guidance of vehicular and pedestrian traffic. Traffic signs are to be installed in compliance with standards, ensuring they are reflective, well-positioned, and constructed from durable materials like galvanized steel and aluminum alloy sheets. Reflective sheeting, integral to the signs, ensures visibility at night or under poor light conditions, employing synthetic sheet resin and glass spheres under a transparent film for a smooth, flat surface. The detailed requirements for sign materials, including bolts, nuts, washers, and the specific standards for steel and aluminum, underscore the commitment to quality and longevity. The construction process involves precise placement, orientation, and adherence to specified dimensions and designs, ensuring that each sign serves its purpose effectively, both during the day and at night.

Road markings play a crucial role in traffic management, requiring reflectorized paint or thermoplastic reflectorized paint for enhanced visibility. The application involves sophisticated equipment and processes that ensure uniformity, adherence to specified thicknesses, and immediate effectiveness post-application. Reflective spheres are added to the paint before drying, maximizing visibility under headlights. Guardrails, another critical aspect of road safety, are to be installed with attention to detail, using materials like steel beams and accessories that meet standards. The installation process includes consideration for the environment and traffic, with specific requirements for painting, fastening, and reflective plates to ensure they are both visible and durable. Together, these specifications for road furniture demonstrate a comprehensive approach to road safety, combining quality materials, advanced application techniques, and maintenance practices to protect road users.

2.3.8.9. Demobilization and handing over

Demobilization process marks the transition from active construction to the final handover of the project. This involves the systematic withdrawal of construction machinery, equipment, and personnel from the site, ensuring that the area is left in a safe and environmentally friendly state. The consultant,

having been fully mobilized with a defined scope of work that encompasses overseeing project milestones, ensuring adherence to quality assurance and quality control measures, now shifts focus towards the final evaluation of the project's execution against the set standards and specifications.

The handover process is planned and executed, involving thorough inspections, completion of any outstanding work, and confirmation that the road meets all safety, functional, and aesthetic requirements as per the contract. Documentation, including as-built drawings, warranties, and maintenance instructions, is compiled, and transferred to the responsible authority, marking the official completion of the construction phase.

Entering the defect liability period, a critical timeframe is established to identify and rectify any defects that may emerge post-handover. This period underscores the project's commitment to quality and durability, ensuring that any issues are addressed promptly, and the infrastructure remains in optimal condition for its intended lifespan. The road construction project's conclusion is not merely about achieving physical completion but ensuring a legacy of quality, safety, and sustainability for future users.

2.4. Alternative Analysis

The design of rural feeder roads under the GIRAV program required careful consideration of multiple alignments, pavement, drainage, and ancillary facility alternatives. Each option was assessed not only for technical feasibility and cost, but also for its environmental and social implications. This section summarizes the analysis and rationale behind the recommended strategies.

2.4.1. Alignment Alternatives

Several alignment strategies were reviewed during site visits. Upgrading existing gravel tracks is the most cost-effective option, minimizing land acquisition and environmental disturbance. However, this approach may perpetuate poor drainage and erosion risks. Offset alignments, used near fence lines and villages, avoid demolitions but require new clearing, potentially affecting farmland. Raised carriageways provide resilience in flood-prone areas, though they involve higher costs through more material. Village bypasses improve safety and traffic flow but require strong community acceptance.

Environmental and social trade-offs:

- Existing track upgrades minimize clearing but may affect drainage.
- Bypasses and offsets reduce demolition risks but can disrupt farmland.
- Raised causeways alter hydrology but ensure year-round access.

2.4.2. Pavement Alternatives

Pavement options ranged from earth roads to concrete strip roads. Laterite gravel is affordable and widely available but requires frequent maintenance. Stabilized gravel and slurry seal provide more durable surfaces, particularly in wet or high-traffic areas. Surface dressing offers long lifespan and low maintenance, though it requires imported bitumen. Concrete strip roads are highly resilient in flood zones but carry significant environmental costs due to cement production.

Environmental and social trade-offs:

- Laterite use involves quarrying impacts but is affordable for rural communities.
- Surface dressing reduces dust and improves safety in villages and markets.
- Concrete strips ensure reliable access but have high carbon and financial costs.

2.4.3. Drainage Alternatives

Given that many feeder roads traverse waterways, drainage solutions are critical. Irish crossings are inexpensive but unreliable during peak rains. Pipe culverts and box culverts provide more durable solutions, preventing isolation of villages during floods. Raised embankments are necessary in flood plains but alter natural water flow.

Environmental and social trade-offs:

- Irish crossings minimize intervention but risk seasonal isolation.
- Culverts and small bridges ensure connectivity but require larger footprints.
- Embankments protect roads but may affect floodplain ecosystems.

2.4.4. Ancillary Facilities

During the feasibility studies and technical design phase, special attention was given to ensure that road alignments avoid interference with NAWEC's utilities, including underground pipes and electric poles. Therefore, except for a few communities in the West Coast Region (peri-urban areas), particularly the road connecting Tampoto and Kanuma, Lamin Daranka, and Gunjur-Berending, where the electric poles are situated close to the road corridors but not within the Right of Way. Public water taps, especially near the road corridor in Kusamai, were noted. Additionally, since most of the identified roads are located in rural areas where such facilities are typically lacking, it is unlikely that relocation will be necessary, and no disruption to public services is expected.

Work site camps were considered in central villages, near quarries, and along highways. Central village camps like in the case of Bwiam and Doobo ease logistics but may generate social conflict. Quarry-based camps reduce transport emissions but increase worker commuting. Distributed mini-camps accelerate work but raise management costs.

Environmental and social trade-offs:

- Village camps risk community tensions but improve efficiency.
- Quarry camps reduce emissions but separate workers from communities.

2.4.5. Comparative Assessment

The alternatives were weighed across technical feasibility, cost, environmental impact, and social acceptance. The analysis concluded that upgrading existing gravel roads, combined with selective bypasses and raised embankments in waterways, offers the most balanced solution. Pavement strategies will employ single surface dressing for lower-traffic lots and double surface dressing for higher-traffic corridors. Drainage will rely on culverts and Irish crossings, with embankments in flood-prone areas and earth drains. Camps will be located in villages, with mitigation measures captured in the Environmental and Social Impact Assessment (ESIA) and contractor Environmental and Social Management Plans (ESMPs).

Table 2.6. Overall alternative analysis

Alternative	Technical Feasibility	Cost	Environmental Impact	Social Impact	Overall Suitability
Upgrade Existing Gravel	High	Low	Moderate (drainage issues)	Low (minimal land acquisition)	Suitable for most corridors
Offset Alignment	Medium	Medium	Moderate (new clearing)	Positive (avoids demolitions)	Case-by-case use near villages
Raised Causeway	Medium	High	High (hydrology changes)	Positive (year-round access)	Best for waterways/flood zones
Village Bypass	Medium	Medium	Moderate (new land clearing)	Mixed (safety gains vs. acceptance issues)	Selective use in dense settlements
Laterite Gravel Pavement	High	Low	Moderate (quarrying impacts)	Moderate (affordable, but maintenance burden)	Default option for rural feeders
Surface Dressing (Single/Double)	High	Medium–High	Moderate (bitumen import)	Positive (dust reduction, safety)	Recommended for higher traffic lots
Concrete Strip Road	Medium	Very High	High (cement footprint)	Positive (long lifespan, reliable access)	Only for flood-prone sections
Irish Crossing	Medium	Low	Low (minimal intervention)	Negative (seasonal isolation risk)	Limited use in small streams
Box Culverts/Small Bridges	High	High	Moderate (larger footprint)	Positive (ensures connectivity)	Best for major waterways

Village Camps	High	Low	Moderate (waste/fuel risks)	Mixed (logistics easy, but social conflict possible)	Preferred with ESMP mitigation
Quarry Camps	High	Medium	Positive (reduced transport emissions)	Neutral (worker commuting)	Secondary option

The GIRAV rural feeder roads project considered a range of technical, financial, environmental, and socio-economic alternatives to ensure cost-effective, resilient, and socially acceptable outcomes. The analysis compared scenarios with and without the project, alongside specific upgrading and construction options.

- Without Project: Roads remain in poor condition, with gully erosion worsening and communities facing reduced access to markets, health care, and education. While no new environmental disturbance occurs, existing risks of flooding and erosion intensify, undermining rural livelihoods.
- With Project: Roads are widened, upgraded, or newly constructed depending on corridor conditions. This improves connectivity, reduces travel time, and enhances agricultural productivity. Environmental impacts include vegetation clearing, quarrying, and hydrological changes, but these are mitigated through drainage structures, embankments, and contractor Environmental and Social Management Plans (ESMPs).

Table 2.7. Analysis of alternatives based on with and without project scenarios.

Alternative	Description	Technical (With Project)	Financial (With Project)	Environmental (With Project)	Socio-economic (With Project)	Without Project
Type 1: Upgrade with Double Seal (Good Base Layer)	Reinforce slopes, compact sub-base, apply double seal basalt aggregate.	High durability, low maintenance	GMD 17,750,000/km.	Quarrying and bitumen use; moderate footprint.	Reliable access, reduced dust, improved safety and market connectivity	Roads remain weak; erosion worsens; communities face declining access.
Type 2: Upgrade without Double Seal (Good	Similar to Type 1 but without double seal.	Moderate durability, higher maintenance	GMD 13,850,000/km.	Lower footprint, less material use.	Improved access, but road deteriorates faster; higher	Same as Type 1 “Without Project”: erosion worsens,

Base Layer)					upkeep costs.	access declines.
Type 3: Upgrade with Double Seal (Poor Base Layer)	New sub-base and base, double seal basalt aggregate.	Very durable, resilient in weak soils.	GMD 19,765,000/km.	Higher material use, quarrying impacts.	Strong benefits, reliable in poor soils, reduced isolation.	Poor base layer continues to fail; erosion worsens; communities underserved.
Type 4: Upgrade without Double Seal (Poor Base Layer)	New sub-base and base, no double seal.	Moderate durability, higher maintenance.	GMD 16,500,000/km.	Lower footprint, but still requires clearing and quarrying.	Access improved, but maintenance burden remains.	Roads remain weak; erosion worsens; access declines.
Type 5: New Road with Double Seal	Full new construction, double seal basalt aggregate.	Very high durability, long lifespan.	GMD 22,115,000/km.	High clearing, hydrology impacts; mitigated with drainage.	Strong benefits, new access to underserved areas, reliable connectivity.	No new access created; erosion continues; communities remain isolated.
Type 6: New Road without Double Seal	Full new construction, no double seal.	Moderate durability, higher maintenance.	GMD 18,250,000/km.	High clearing, lower footprint than double seal.	Access improved, but benefits less sustainable; higher upkeep costs.	No new access created; erosion continues; communities remain underserved.

3. Legal and Institutional Framework

3.1. Policy Framework

There are certainly a substantial number of policies and legislations that deal with the environment and natural resources management in the Gambia. The objective here is not only to discuss all these policies and legislation but to stress those that are essential in the development of the ESIA and sustainable implementation of the GIRAV Project. Important national policies that guided the development and implementation of this ESIA essentially consist of the following:

3.1.1. The Recovery Focused National Development Plan (NDP) 2023

Pillar VII of the RF-NDP covers three clusters including transport infrastructure and connectivity. Land, River, Sea and Air Transport expanded and strengthened for affordability, accessibility and competitiveness are outcome 7.2 and one of the programme priority is the construction of urban roads (250km) and construction of rural roads (514km).

The road transport network is the major artery and conduit of the national transport system – interconnecting and facilitating intermodal transfers. Without a fully functioning road transport network – economic and social activities will be negatively impacted with great costs to the economy (GDP) and society at large.

The regional and ward level consultations during the development of the RF-NDP have revealed challenges faced by local communities in terms of access to basic services including access roads. Therefore, construction of new and rehabilitation of existing rural roads by GIRAV Project will address the above-mentioned challenges and directly contributes to the achievement of Pillar VII of the RF-NDP. Furthermore, the construction of rural access roads are one of the enabling factors for the agricultural sector highlighted in the RF-NDP.

4.1.2. The Gambia Environmental Action Plan (GEAP III 2021-2030)

The Gambia Environmental Action Plan (GEAP) has been the first integrated environment and natural resources management policy document of the country. It provides the framework for

environmental policy planning and natural resources management on a continuous basis. It is now in its third phase of implementation (GEAP III 2021 - 2030). An important achievement of the GEAP implementation process has been the institutionalization of an environment and natural resources management framework, and specifically the establishment of the Environmental Impact Assessment (EIA) process in the country under the purview of a multi-sector Environmental Impact Assessment Working Group housed at the NEA headquarters.

However, a major GEAP challenge has been the dormancy of the National Environment Management Council (NEMC), in that it does not meet as regularly as required, and the members have not always been kept abreast with the GEAP coordination and implementation process. This has resulted in considerable loss of political mileage and support for NEA, and consequently a reduction in financial and material support over the years which further impacts negatively on GEAP implementation.

***Relevance to the project.** The GIRAV Project will trigger GEAP by using it as guide for its over-all environmental planning and natural resource management, in its quest to contribute to the attainment of sustainable food and nutritional security through best food production practices through ensuring appropriate social and environmental considerations.*

4.1.1. National Transport Policy (2018 – 2027)

This National Transport Policy (NTP) was developed within the context of the country's Program for Accelerated Growth and Employment (PAGE II or the National Development Plan - 2017- 2021), and within the broader framework of the national Vision 2020 blueprint. It was envisaged that, building on the achievements and lessons from the National Transport Plan (developed in 1998), the NTP will play a significant role in defining the priorities and objectives in the Transport sector, aimed to serve the country's development goals.

The NTP is the guiding document for the development of the country's transport sector and is to be implemented in tandem with the National Transport Plan, which focuses on the development and maintenance of transport infrastructure in The Gambia. The key role of the NTP is to:

- Provide guidance on Government priorities and strategic directions for transport to key stakeholders and institutions involved in planning, financing, developing, providing, maintaining and regulating transport infrastructure and services.

- Ensure that the strategic directions are aligned with both the 2063 AUC agenda and the UN SDGs.
- Provide a platform for dialogue, and to provide guidance on the roles and responsibilities of key stakeholders.
- Provide guidance on priorities for investment and reform that enable and facilitate achievement of the strategic objectives for transport within the policy framework.
- Provide a long-term decision-making platform for the effective management and development of transport infrastructure and services in the country.
- Describe the need for transport infrastructure and services in the context of Gambia’s national development objectives, as well as within the regional context (the African Union and NEPAD), and within the principles of the sub regional organization of ECOWAS.

Relevance to the project: *This policy is relevant since the construction of feeder roads by the project will improve the transport sector of the country.*

4.1.2. Road Safety Strategy (2021 – 2030)

This road safety strategy has been prepared as a major step to tackle road safety problems. The strategy sets a goal of eliminating fatal and serious injuries on the road, like other major public health goals for control of malaria or HIV-AIDS.

Relevance to the project: *This Strategy will be applicable to the project operational phase when vehicles will be commuting on the constructed roads and there may be potential road safety issues.*

4.1.3. The National Health Policy (2012-2020)

The National Health Policy of the Ministry of Health and Social Welfare aims at contributing to the socioeconomic development and wealth creation of the country by promoting and protecting the health of the population through equitable provision of quality health care within the context of Primary Health Care. This mission essentially puts the concept of health beyond the confines of curative care to other socio-economic determinants of health. The Policy further aims to reduce the frequency of environmental health and safety related diseases or conditions by 30 per cent by 2020 through policy measures such as:

- Ø Enforcement of environmental health related laws
- Ø Instituting proper management of solid, gaseous, and liquid wastes

Successful implementation of the policy measures will result in reducing morbidity and mortality of major diseases, reducing health risks and exposures associated with negative environmental consequences.

Relevance to the project: *This policy is relevant to the GIRAV Project because potential impacts that might pose adverse consequences to the health and wellbeing of the workers and farmers at all stages of the project cycle needs to be avoided (where possible) or mitigated to promote and protect the health and safety of all parties.*

4.1.4. Agriculture and Natural Resources (ANR) Policy (2017-2026)

The Agriculture and Natural Resources (ANR) Policy (2015 – 2025) provides the agricultural and natural resource sector with a policy framework to chart the nature and scope of its interventions in poverty reduction, and achievement of the Sustainable Development Goals (SDGs) of the country.

This wide-ranging policy guidance notes that ‘Gambia has exceptional natural conditions which support a diverse agriculture resource base. Nourished by huge influxes of nutrients from the river, marine waters of the Gambia are rich in species (over 500 marine species) , abundance and diversity. The agriculture sector therefore has the potential to contribute immensely to the social, economic, and cultural advancement of the Gambia.

Applicability to the project: *It is among the priorities of the project to ensure attainment of its deliverables in a sustainable manner which is aligned with this policy. This will be heightening poverty reduction and food security without deforming the environment.*

4.1.5. The Wildlife Sector Policy and Strategy (2013)

The Wildlife Policy provides a vision for the sector for the next 20 years in accordance with the principle of maintaining environmental sustainability and socio-economic transformation as enshrined in Vision 2020. The Policy aims at increasing the proportion of protected areas to 10 percent of national land territory in recognition that biodiversity resources are crucial as live-support systems for many Gambians, and the resources contribute significantly to the betterment of living standards of many communities.

In this regard a network of three national parks and four nature reserves, 23 protected Areas, have so far been established bringing the total area under protection to over 41,000 ha. This area is likely to increase as the Gambia strives to further protect a wider spectrum of ecologically significant habitats, including the coastal zone as required in the Convention on Biological Diversity and the Ramsar Convention. Apart from rehabilitating wildlife habitats and sanctuaries, the establishment of a network of protected areas will significantly contribute to general environmental protection.

Additionally, the expansion of Protected Areas (PAs) including wetlands as a source of livelihoods for people and habitat for water birds and other aquatic animals is in line with the provisions of the Ramsar, Biodiversity and Bonn Conventions.

Applicability to the project: *This policy serves as a guide for the GIRAV Project to consider during site selection for project intervention activities.*

4.1.6. Strategic Environment Assessment (SEA) Policy 2016 – 2021

The basis for the SEA Policy is PAGE II 2016-2020 which also falls within the ambit of the national Vision 2020 framework. Its main purpose is to introduce Strategic Environment Assessment (SEA) as a planning tool for promoting sustainable development in the country; it aims to ensure that environmental, and possibly other sustainability aspects are considered in the process of developing national and regional policies, plans or programs.

The need for the application of SEA in the national planning process is becoming more and more important because the pressure on the environment and natural resource base is increasing every day. Besides, it is considered that SEA is a direct means for achieving the Sustainable Development Goal (SDG) 7 on Environmental Sustainability, SDG1 on eradicating extreme poverty and hunger, as well as Sustainable Development Goals (SDGs) 13, 14 and 15.

Applicability to the project: *This policy is relevant since it was designed to be a planning tool for promoting sustainable development in the country.*

4.1.7. The National Biodiversity Strategy and Action plan (2015 – 2020)

Wildlife resources constitute important biotic assets of the country from both ecological and economic viewpoints. Over the last decade, the Gambia has invested great efforts to preserve its natural heritage. Biological diversity has since 1977, when the Banjul Declaration was pronounced to solemnly declare governments' untiring efforts to conserve for now and posterity, a wide spectrum as possible of our remaining flora and fauna, appeared as one of the most important conceptual developments.

The National Biodiversity Strategy and Action Plan is an important instrument to guarantee the conservation of biodiversity in the Gambia, as well as equitable sharing of benefits of its use. This document is also a contribution to the implementation of the three objectives of the convention on Biological Diversity.

Applicability to the project: *This strategy and action plan are significant to the project due to potential loss of fauna and flora that might be triggered by project activities. Hence, there is the need to use this document as a guide for conservation of biodiversity in the project intervention areas.*

4.1.8. National Forest Policy (2023 – 2032)

This Forest Policy replaces the second policy which ended in 2019. The purpose of the policy is to achieve the sustainable management of sufficient forest cover that could meet the social, economic, and environmental and livelihood needs of the current and future generations. This Forest Policy 2021- 2030 is developed in the context of the implementation of the Gambia National Development Plan (NDP) 2018-2021 and the National Forestry Strategy and Action Plan (2019 – 2028). It also integrates policy provisions of the 'Validated Supplementary Agriculture and Natural Resources (ANR) Policy' 2017 - 2026, as well as other national development initiatives. The new policy envisions contributing to the implementation of The Gambia's obligations in the frameworks of international and sub-regional conventions and agreement that the country is party to.

The goal of this policy is to conserve and sustainably manage and develop at least 30% forest cover in the country that can contribute to national socio-economic and environmental

development and protection and to meeting The Gambia's commitments under relevant international and regional conventions and agreements.

Applicability to the project: *The project might require site preparation and road construction in which vegetations are removed and trees are fallen. Therefore, this policy is relevant to guide the project on the manner to protect and manage the vegetation/forest cover for sustainable development.*

4.1.9. The Gambia National Water Policy (2006)

Within the Gambian National Water Policy, national food security is a primary consideration, and the Policy contains provisions for balancing the available water with agricultural demand. The document is rigorous in relation to water resource management and clearly highlights the likelihood of future climate change-driven flood risks across the Gambia; noting that some 20 percent of the country's surface area comprises water, wetlands, and tidal creeks.

The policy includes strong reference to both climate change and flooding, and clearly raises the issue that these will come more to the fore in the future in the face of climate change and sea level rise.

Applicability to the project: *This policy is relevant to the project activities on the usage and management of water resources during the project intervention activities. Huge quantity of water might be needed for damping the gravel road to suppress dust during the construction phase of this project.*

4.1.10. National Adaptation Plan of Action (NAPA) on Climate Change, (2007)

The NAPA is the Gambia's action plan for climate change adaptation. The plan provides a detailed description of the country from a biophysical perspective and includes fisheries, the sensitive nature of the mangrove ecosystems to climate change, as well as to arrange for water related adaptation challenges.

From all indications, the coastal zone is clearly recognized as being most vulnerable to climate change due to its high population density combined with sea level rise (SLR) predictions.

Emphasis is placed on the complexity of separating natural variability from human influences in the coastal environment.

Applicability to the project: *The NAPA is expected to be a significant tool during the project implementation, since the project is aimed at improving food security and resilience of smallholder farmers to climate change in The Gambia.*

4.1.11. Decentralization and Local Development policy (2015-2019)

The primary aim of this policy is for the government to respond to its constitutional obligation to create an enabling policy environment for promoting democratic governance that is participatory. In this respect, the policy took note of the fact that over the years since the attainment of political independence in 1965, successive Governments of our Republic have designed and endeavored to implement measures aimed at the attainment of full democratic governance and economic independence with prosperity for all citizens. As a result of this policy decisions can be taken both for political and natural resources governance at local levels.

Applicability to the project: *The project works closely with the Regional Agricultural Extension Officer and project interventions will be across all the regions, which is in line with the objectives of this policy.*

4.1.12. National Climate Change Policy, 2016- 2025

This policy sets out comprehensive and cross cutting policy directions to implement national development strategies in a climate resilient manner, drawing on all sectors of the population in a spirit of partnership and collaboration. The Policy sets in place enhanced institutional arrangements for coordination and mainstreaming, outlines a new integrated approach to resource mobilization, and develops a clear policy direction for human resource development. It focuses attention on policy priorities in four key thematic clusters and emphasizes the links between climate change adaptation and disaster risk reduction. Lastly, it outlines the approach to be followed to develop the implementation framework for the Policy, through the subsequent National Climate Change Response Strategy and Action Plan.

Applicability to the project: *It is likely that project activities will be impacted by climate change and there is a need to put in place appropriate and affordable adaptation and mitigation actions to curb vulnerability to climate change effects and to achieve sustainable low-carbon prevalence through reduction in emissions of greenhouse gas into the*

atmosphere. The project contractors will be required to adopt technologies and techniques that reduces GHG emissions in compliance with this policy.

4.1.13. Gambia National Gender and Women Empowerment Policy (2010 – 2020)

The Gender Policy is developed as an integral part of the national development objectives to enhance the overall government strategy of growth through poverty eradication. Gender being a cross cutting issue, the policy is developed along six thematic areas embracing the government's priority development concerns. It specifically covers the priority gender issues that must be mainstreamed in development policies and programmes. This is to address the existing gender imbalances and ensure sustained and sustainable socio-economic development.

Applicability of the project: *This policy is relevant to the GIRAV Project since most of the beneficiaries of the project are women and youth.*

4.1.14. National Youth Policy (2009 – 2018)

The rationale for developing a third-generation youth policy is based on the Gambia Government's commitment to creating an enabling environment for youth as an integral part of the national development. It is quite evident that, given the youthful population of the Gambia, this new policy formulated will give strategic direction to Youth issues and suggest intervention strategies to achieve sustainable development for Youth in the Gambia. The purpose of this policy is to define the main approach that the Ministry of Youth and Sports will adopt to address youth issues within the larger development goals of The Gambia.

Applicability to the project: *This policy is relevant to the GIRAV Project since most of the beneficiaries of the project are youth.*

4.2. Relevant Laws and Acts

4.2.1. The National Environmental Management Act 1994

The National Environmental Management Act (NEMA, 1994) is the legal framework for the control and management of the environment and for matters connected therewith; it is under the purview of the National Environment Agency (NEA). Part V of the NEMA offers for certain projects listed under Schedule A to be considered for environmental impact assessment. These include tourism projects, large scale agricultural investment projects, large scale conservation projects, large scale aquaculture projects, roads, waste management, and urban development. The proposed project suits the large-scale agricultural project development described in the Act.

Applicability to the project: *This Act is relevant to the development of the ESIA study for this project. The provision for all developmental projects to conduct EIA is instructed in this Act. The Act also spells out the process and procedure of developing an EIA study.*

4.2.2. The Biodiversity and Wildlife Act (2003)

The Wildlife and Biodiversity Act of 2003 provides for the Department of Parks and Wildlife Management to declare and manage national parks, reserves and local sanctuaries, as well as Ramsar sites for the purpose of preserving the country's biodiversity. It also allows for the participation of 'local people' in biodiversity management for the purpose of ensuring their sustainable use.

Applicability to the project: *Several projects' activities have potential effects on biodiversity; for example, The construction of feeder roads may fairly require significant vegetation clearance, especially where road passes through farmlands or forest covers. The constructed roads may also has potential to impede comfortable movement of different species.*

4.2.3. The Children's Act (2005)

The Children's Act of 2005 (the "Children's Act") is the principal law concerning children's rights in Gambia. By its terms, the Children's Act "superseded[s] the provisions of all other laws, other than the Constitution, on any matters pertaining to children for which provision has been made

under this Act”. However, the UN Committee on the Rights of the Child has voiced concern that the Act “fails to cover all areas under the Convention, including issues related to child marriage, female genital mutilation and child labour, and that it has not been effectively enforced and has not been sufficiently disseminated”.

Applicability to the project: *This act is very relevant to this project since children must be protected against child labor at construction sites, child exploitative work in both earth work sites as well as abuse and violence against children.*

4.2.4. Physical Planning and Development Act (Chapter 57:08; Volume 8)

The Physical Planning and Development Act provides under the Ministry of Lands and Regional Administration for the systematic preparation and approval of physical development plans and control of developments in Greater Banjul and other growth areas in The Gambia. Guidelines regarding the location of urban and rural settlements, traffic and transportation routes, resource utilization and economic activities, and the preservation of national and environmental reserves are spelt out in this Act.

Applicability to the project: *This act is relevant since the GIRAV feeder road construction falls under infrastructural development in the prospective project sites. This Act is triggered.*

4.2.5. Land Acquisition and Compensation Act (1991)

The Land Acquisition Act permits the acquisition of land by the government for "public purposes" though this is conditioned upon payment of compensation. Land acquired under the act is to be designated as State Lands and then administered under the provisions of the State Lands Act. This would abrogate customary tenure arrangements and permit the establishment of leases.

Applicability to the project: *This Act will be significant where the feeder roads or the diversions will displace farmlands or physical properties such as residential homes, undeveloped land plots.*

4.2.6. The Local Government Act, (2002)

This Act and its re-enacted version of 2002 establishes, and empowers, local government Councils to, among others, ensure, in their areas authority: (i) prevention of soil erosion; (ii) the management of forests and forest products, especially as it will impede soil erosion and (ii) The regulation of the disposal of refuse, the prevention and generally for the oversight of health and sanitation; (iii) The establishment and management of recreation grounds open spaces and parks. This Act was enacted in 2002 to make provisions for (i) the functions, powers, and duties of local authorities, (ii) development in the decentralized governments, (iii) local government civil service, traditional authorities, and the co-ordination of local government authorities.

Applicability to the project: *The design and implementation of the GIRAV Project is in consultation with the local authorities. This reflects the relevance of the Local Government Act.*

4.2.7. Labour Act (Chapter 56:01; Volume 8)

The Labour Act protects the rights of the employee. It also ensures his right of association as well as prevents child labour. Therefore, any contractual documentation for works under the GIRAV PROJECT – Gambia should consider the Labour Act. The Department of Labour enforces this Act.

Applicability to the project: *Since the project will hire workers, this Act is relevant to protect the rights of the employees and also manage employer-employee relationship.*

4.2.8. The Forestry Act (2018)

The relevance of the Forestry Act is largely the same as described under the biodiversity act. Several project activities have bearing on forest resources and wildlife necessitating the consideration of this Act in the execution of the project.

Applicability to the project: *This Act will be helpful during project intervention site selections to avoid any disturbance to forest parks.*

4.2.9. Public Health Act (Chapter 40:02; Volume 6)

The Public Health Act makes provision with respect to matters affecting Public Health in The Gambia including prevention, suppression and control of infectious diseases, communicable diseases, sanitation, protection of food, supply of water, protection from mosquitoes and pollution in general, occupational health and safety and international health.

Applicability to the project: *The Public Health Act is relevant in that GIRAV Project will have social and environmental issues that will trigger the public health Act going by the foregoing functional operational areas. This Act is enforced by the Ministry of Health and Social Welfare.*

4.2.12. Women's Act (2010)

This Act requires that both Public and Private Institutions must take appropriate measures to promote and protect women's rights, their legal status, and rights from any form of abuse or violence by any person, enterprise, organization or institution. The Act also provides for the full and adequate participation of women in decision making processes and having equal voting rights as men. The Women's Act is enforced by the Ministry of Gender, Children and Social Welfare. Their above policies and laws aim to safeguard the environment and health of The Gambians.

Applicability to the project: *This act is relevant to the GIRAV Project as it protects Women who form a critical proportion of the project intervention communities and are vulnerable to all forms of discrimination and violence. Therefore, this Act is triggered by the GIRAV Project.*

4.2.13. Hazardous Chemicals and Pesticides Control and Management Act 1994

This Act establishes the Chemical and Pesticides Control Management Board which is responsible for the registration, control and management of all hazardous chemicals as well as monitor and control the import, manufacturing, distribution. Storage, and disposal of chemicals and pesticides in The Gambia.

Applicability to the project: *This Act is relevant due to the potential use of hazardous chemicals during the construction phase of the feeder roads.*

These documents were reviewed during the development of this ESIA to ensure compliance with the local procedures, and Laws.

4.3. Relevant International Conventions and Agreements

The most important of these International Conventions and Agreements to which Gambia is a Party that are relevant in this project are listed in Table 4.1 below.

Table 4.1: International Agreements and Conventions Ratified by Gambia relating to the project

Convention/Protocols	Objective	Relevance to the GIRAV Project
United Nations Convention on Biological Diversity (CBD)	Convention has three main goals, including the conservation of biological diversity; the sustainable use of its components; and the fair and equitable sharing of benefits arising from genetic resources	Land clearing and to construct feeder roads will impact existing biodiversity in Project affected areas. Includes the possible loss of trees/vegetation and dependent biodiversity
United Nations Convention to Combat Desertification (UNCCD)	To combat desertification and mitigate the effects of drought	The construction of feeder roads could create environments prone to trigger desertification
UN Framework Convention on Climate Change (UNFCCC)	Aims to stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system	The loss of trees and vegetation will mean loss of “green cover” and loss of carbon capture footprint. The use of heavy machineries during the construction phase may contribute to GHG emission.
Convention on Wetlands of International Importance (RAMSAR Convention)	Aims for national action and international cooperation for the conservation and wise use of wetlands and their resources	Some of the proposed feeders roads passes through wetlands which requires special consideration.
United Nations Convention on the Elimination of all Forms of Discrimination	Convention highlights the right of women to own, manage, enjoy and dispose of the property as central to their financial independence and may be critical to their ability to	Women are the main targets of the GIRAV Project and will ensure that they have access to the benefits of this Project in the same way as men

Against Women (CEDAW) and the Optional Protocol to the Convention on the Elimination	earn a livelihood and to provide adequate housing and nutrition for themselves and their children	
AGREEMENT	FOCAL POINT	FOCUS AREA
UN Convention on Biological Diversity (UNCBD)	DPWM	Biodiversity Conservation
UN Convention to Combat Desertification (UNCCD)	Dept. Forestry	Desertification
UN Framework Convention on Climate Change (UNFCCC)	Climate Change Secretariat, MECCNAR	Climate change`
Convention on Wetlands of International Importance (RAMSAR Convention)	DPWM	Wetlands
Common CILSS Regulation	NEA	Pesticides Management
Convention on the Conservation of migratory Species of wild Animals (CMS Convention)	DPWM	Migratory species

4.4. Regulatory Framework

4.4.1. Environmental Impact Assessment, 2014

The regulations apply to all policies, plans, programmes, projects, and activities specified in the regulation and its Schedules.

The regulation state as follows:

No proponent shall implement a project

- (a) Likely to have a negative environmental impact; or
- (b) For which an environmental impact assessment is required under the NEMA Act or these Regulations; unless an environmental impact assessment has been concluded and approved in accordance with these Regulations.

(2) No licensing authority under any law in force in Gambia shall issue a license for any project for which an environmental impact assessment is required under the Act unless the applicant produces to the Permitting authority a license of environmental impact assessment issued by the Authority under these Regulations.

(3) No licensing authority under any law in force in Gambia shall issue a trading, commercial or development permit or license for any micro project activity likely to have cumulative significant negative environmental impact before it ensures that a strategic environmental plan encompassing mitigation measures and approved by the Authorities is in place.

4.4.2. Anti-Littering Regulation, 2007

These Regulations concern control of pollution by litter in a public place or in any place that is visible to any extent from a public place. Specific provision is made for littering by transport vehicles and littering of public parks. A local authority shall ensure that each public road or area within its jurisdiction is, so far as practicable, kept free of litter.

4.4.4. Noise and Excessive Vibration Pollution Control Regulations, 1999

This regulation stipulates that where defined work of construction, demolition, mining, or quarrying is to be carried out in an area, the Authority may impose requirements on how the work is to be carried out including but not limited to requirements regarding –

- (a) Machinery that may be used, and
- (b) The permitted levels of noise as stipulated in the Second and Third Schedules to these Regulations.
 - (1) The relevant lead agency shall ensure that mines and quarries where explosives and machinery are used are in designated areas and not less than two kilometers away from human settlements.
 - (2) Any person carrying out construction, demolition, mining, or quarrying work shall ensure that the vibration levels do not exceed 0.5 centimeters per second beyond any source property boundary or 30 meters from any moving source. On Permissible noise levels, Sections indicate that No person shall make, continue or cause to be made or continued any noise more than the noise levels set in the First Schedule to these Regulations, unless such noise is reasonably necessary to the preservation of life, health, safety, or property.

4.5. Relevant World Bank E&S Safeguards (ESS)

The World Bank has ten (10) Environmental and Social Standards which are highlighted on Table 4.2, together with their relevance to the project.

Table 4.2: World Bank’s ESS

World Bank ESS and their relevance to current project	Relevance to the project	Key requirements	Principles to be followed by the Project
ESS 1. Assessment and Management of Environmental	Relevant	ESS1 sets out the Client’s responsibilities for assessing, managing, and monitoring	Due to the potential impacts that may result from project activities, an

and Social Risks and Impacts		environmental and social risks and impacts associated with each stage of a project supported by the Bank through Investment Project Financing, to achieve environmental and social outcomes consistent with the Environmental and Social Standards (ESSs)	ESIA is currently being conducted. The ESIA study will eventually provide an ESMP and the Contractor will also be required to develop a C-ESMP.
ESS 2: Labor and Working Conditions	Relevant	ESS 2 sets out the Client must promote sound worker management relationships and enhance the development benefits of the project by treating workers in the project fairly and providing safe and healthy working conditions.	The project should adopt and follow the labour management procedure, which documents labour requirements and identify the risks associated with project activities that together with aspects of welfare in line with legal requirements and good international and industry practices
ESS 3: Resource Efficiency and Pollution Prevention and Management	Relevant	ESS3 sets out client's and sub-contractors' obligation to apply technically and financially feasible measures to improve efficient consumption of energy, water, and raw material, as well as other resources. Such measures shall integrate cleaner production principles into the product design and production processes to conserve raw	From assessment, the GIRAV project activities produce non-hazardous and hazardous waste materials, use chemicals and could contaminate precious natural resources such as freshwater and damage natural landscapes, vegetative land cover, topsoil and pollute groundwater and surface water. Thus, period inspection during the project implementation cycle will provide specific pollution

		material, energy, water and other resources.	prevention and control measures and waste management strategies
ESS 4: Community Health and Safety	Relevant	ESS4 sets out the client's obligation to address the health, safety, and security risks and impacts on project-affected communities to avoid adverse impacts on the health and safety of community members. The influx of labor could also expose local communities to public health risks and communicable diseases, such as sexually transmitted infections.	During consultations, there is evidence of unavoidable impacts on project-affected communities in terms of health, safety, and security risks. Accordingly, mitigation measures will be proposed broadly announced and disclosed among local stakeholders, particularly local communities, to raise their awareness.
ESS5: Land acquisition, Restriction of land use and Involuntary Resettlement	Relevant	ESS5 aims to avoid involuntary resettlement and forced eviction and mitigate unavoidable adverse social and economic impacts from land acquisition or restrictions on land use.	The project activities are expected to require land acquisition especially farmlands where the proposed roads pass through, restrictions on land use or involuntary resettlement.
EES 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	Relevant	ESS6 sets out the client responsibilities to protect and conserve biodiversity and habitats promotes sustainable management of living natural resources and supports livelihoods of local communities.	The project will follow the National Biodiversity Strategy and Action Plan (NBSAP), 2015 which provides the framework for the conservation and sustainable use of biodiversity
ESS7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local	Not relevant		The Republic of The Gambia does not have such groups of people and thus it is not

Communities			relevant to this project.
ESS 8: Cultural Heritage	Relevant	ESS8 sets the client's obligation to protect cultural heritage from the adverse impacts of project activities and support preservation and promote equitable sharing of benefits from the use of cultural heritage.	From consultation with project stakeholders, the risks are considered not very likely.
ESS 9 (Financial Intermediaries):	Not Relevant	FIs are to maintain an Environmental and Social Management System (ESMS), to identify, assess, manage, and monitor the E&S risks and impacts of FI subprojects on an ongoing basis...commensurate with the nature and magnitude of E&S risks and impacts of FI subprojects, the types of financing, and the overall risk aggregat	This standard is not quite relevant to the proposed road construction sub-project.
ESS10: Stakeholder Engagement and Information Disclosure	Relevant	ESS10 sets out the client's obligation to engage in open and transparent consultation with project stakeholders to ensure the project's inclusive process and sustainability.	The client will engage with and provide sufficient information to, stakeholders throughout the projects life cycle in a manner appropriate to the nature of their interests and the potential environmental and social risks and impacts of the project.

Table

Scope/Objective	Description of Bank Policy	Description of the National Regulation	Gaps and Bridging Actions
ESS 1: Assessment and Management of Environmental and Social Risks and Impacts			
<p>Identify, evaluate, and manage the project's environmental and social risks and impacts in a manner consistent with the ESSs.</p> <p>To adopt a mitigation hierarchy approach to:</p> <p>Anticipate and avoid risks and impacts</p> <p>Where avoidance is not possible, minimize or reduce risks and impacts to acceptable levels;</p> <p>Once risks and impacts have been minimized or reduced, mitigate; and</p> <p>Where significant residual impacts remain, compensate for or offset them, where technically and financially feasible.</p>	<p>The standard guides on assessing the Project's potential environmental and social risks and impacts and addressing potential impacts through planning and mitigation hierarchy approach.</p>	<p>National Environmental Management Act, 1994 and the Environmental Assessment Regulations (EIA) of 2014 mandates that no person shall commence an undertaking which in the opinion of the Agency has or is likely to have adverse effects on the environment or public health unless, before the commencement, the undertaking has been registered by the NEA and an environmental permit has been issued by the Agency in respect of the undertaking.</p>	<ul style="list-style-type: none"> - Although legislation seeks to anticipate and mitigate/avoid risks and impacts, it does not fully address potential impacts and mitigation hierarchy approach e.g., content-wise it does not address impacts on the vulnerable - Assistance/compensations to be provided for the affected parties by the government as in with Land Acquisition & Compensation Act if required - The stakeholders at all levels, both regional and national, are consulted in the preparatory project stage through consultations for them to become abreast with project components roles they will play during implementation. <p>The capacities of the stakeholders particularly CPCU staff and partners on world bank ESF will also be built at the early stage of project implementation to enable them to collaborate effectively in addressing this gap</p>
ESS2: Labor and Working Conditions			

<p>To promote safety and health at work, fair treatment, non-discrimination, and equal opportunity of project workers, including vulnerable workers such as women, persons with disabilities, children.</p> <p>To prevent the use of all forms of forced labor and child labor.</p> <p>To support the principles of freedom of association and collective bargaining of project workers in a manner consistent with national law.</p> <p>To provide project workers with accessible means to raise workplace concerns.</p>	<p>Working age and migrant workers, contracted workers, and primary supply workers, as appropriate. It provides certain requirements that the project must meet in terms of working conditions, protection of the workforce (especially the prevention of all forms of forced and child labor), and provision of a grievance mechanism that addresses concerns on the project promptly and uses a transparent process that provides timely feedback to those concerned.</p> <p>Under ESS 2, workplace processes will be put in place for project workers to report work situations that they believe are not safe or healthy and remove themselves from a work situation that they have reasonable justification to believe presents an imminent and serious danger their life or health. Project workers who remove themselves from such situations will not be required to return to work until necessary remedial action to correct the situation has been taken. Project workers will</p>	<p>The Labour Act 2007 provides for the rights and duties of employers and workers, guarantees trade unions the freedom of associations, and establishes Labour Commission to mediate and act in respect of all labor issues. The Labour Act seeks to address the necessary compensations needed to be awarded to workers for personal injuries arising out of and in the course of their employment.</p> <p>Labour Act 2007 details the duties of persons employed. it is not part of the duties of persons employed to remove themselves from such unsafe working places and also silent on they not being retaliated against</p>	<p>Although the Labor Commission makes provision for anticipated labor-related complaints and redress, beneficiaries' access to the commission is challenge at the regional level because its office is in the urban area with no regional representation.</p> <p>The law does not explicitly mandate workers to remove themselves from such unsafe working places and is also silent on reprisal</p>
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	not be retaliated against or otherwise subject to reprisal or negative action for such reporting or removal.		
ESS3: Resource Efficiency and Pollution Prevention and Management			
To achieve the sustainable use of resources, including implementing measures that avoid or reduce pollution resulting from project activities and minimizing and managing the risks and impacts of pesticide use.	The ESS3 provides requirements for projects to achieve the sustainable use of resources, including energy, water, and raw materials, as well as implement measures that avoid or reduce pollution resulting from project activities. The standard places specific consideration on hazardous wastes or materials and air emissions (climate pollutants) given that the current and projected atmospheric concentration of greenhouse gases (GHG) threatens the welfare of present and future lives.	The NEMA mandates the NEA to enforce compliance with established EIA regulations and procedures among companies and businesses in the planning and executing development projects, including existing projects. The act also mandates the Agency to register and manage all pesticides to ensure that the approved ones are used. The Hazardous Chemicals and Pesticide Management Act, 1999 provides for the registration and use of pesticides and related matters.	The Legislation ensures that measures are put in place by polluters through routine monitoring by regulatory agencies and institutions i.e., NEA, etc. However, it does not address the risks associated with the management of demolition and construction waste.
ESS4: Community Health and Safety			
To anticipate and avoid adverse impacts on the health and safety	This standard recognizes that project activities, project equipment and infrastructure increase the exposure of project	The Public Health Act, in place of the prevention of disease, promotes, safeguards, and	The Act does not consider the assessment workplace safety. Additionally, not

<p>of project-affected communities during the project lifecycle from both routine and non-routine circumstances.</p> <p>To promote quality, safety, and considerations relating to climate change in the design and construction of infrastructure, including dams.</p> <p>To ensure that safeguarding personnel and property is carried out to avoid or minimize risks to the project-affected communities.</p>	<p>stakeholder communities to various health, safety and security risks and impacts and thus recommends that projects implement measures that avoid or limit the occurrence of such risks. It provides further requirements or guidelines on managing safety, including the need for projects to undertake safety assessment for each phase of the project, monitor incidents and accidents and preparing regular reports on such monitoring. ESS4 also guides emergency preparedness and response.</p>	<p>maintains and protects humans and animals' health and provides for related matters. The Act enjoins the provision of sanitary stations and facilities, destruction of vectors including mosquitoes, protection of water receptacles, and promoting environmental health and sanitation.</p>	<p>adequate measures are in place to deal with occurrences and emergencies.</p> <p>The law provides the platform to engage with stakeholders. A stakeholder engagement plan has been prepared and will be in place for project implementation. Community needs concerning project activities will be assessed and necessary measures will be taken.</p>
<p>ESS 5: Land Acquisition, Restriction On Land Use And Involuntary Resettlement</p>			
<p>This aims to avoid involuntary resettlement, forced eviction, and aims to mitigate unavoidable adverse social and economic impacts from the land acquisition or restrictions on land use</p>	<ul style="list-style-type: none"> -PAPs with the formal legal rights to land or assets must be compensated for any losses. -PAPs who do not have formal legal rights to land or assets but have a claim to land or assets that is recognised under national law, including claims derived from customary or traditional tenure arrangements are eligible for compensation. - PAPs with no recognisable legal right or claim to land or assets are compensated for lost non-land assets, and 	<p>None in the Land Acquisition & Compensation Act</p> <ul style="list-style-type: none"> -Use of Project GRM as the first stage - use of the legal system as the final resort <ul style="list-style-type: none"> -PAPs with a formal title are compensated for lost land/other assets. -PAPs with legalizable or no legal title: Legalizable are not distinguished and considered non-legal PAPs have no right to 	<ul style="list-style-type: none"> -Same in principle/application. -WB policies will apply as indicated in the RPF. -Project level GRM - Use legal system

	provided with resettlement assistance.	be compensated for land and non-land assets.	
ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources			
<p>To protect and conserve biodiversity and habitats.</p> <p>To apply the mitigation hierarchy and the precautionary approach in the design and implementation of projects that could impact biodiversity.</p> <p>To promote the sustainable management of living natural resources.</p> <p>To support livelihoods of local communities, including Indigenous Peoples, and inclusive economic development, by adopting practices that integrate conservation needs and development priorities.</p>	<p>ESS6 promotes the conservation of biodiversity or natural habitats. and supports the protection and maintenance of the core ecological functions of natural habitats and the biodiversity they support. It also encourages projects to incorporate into their development, environmental and social strategies that address any major natural habitat issues, including identification of important natural habitat sites, the ecological functions they perform, the degree of threat to the sites, and priorities for conservation.</p>	<p>The Forest Act and Wildlife Act & Policy aim at the conservation and sustainable development of forest and wildlife resources for the maintenance of environmental stability and continuous flow of optimum benefits from the socio-cultural and economic goods and services that the forest environment provides to the present and future generations, whilst fulfilling Gambia's commitments under international agreements and conventions.</p>	<p>Not adequate provisions are made under national laws and policies.</p> <p>The project will take measures to protect and conserve biodiversity and habitats and all requirements specified in the ESS6</p>
ESS7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities			
Not applicable to the GIRAV project			
ESS8: Cultural Heritage			
<ul style="list-style-type: none"> To protect cultural heritage from the adverse impacts of project activities and support its preservation. To address cultural heritage as an integral aspect of sustainable development. To promote meaningful consultation with stakeholders regarding 	<p>This standard requires that the ESA considers direct, indirect, and cumulative risks and impacts on tangible or intangible cultural heritage.</p> <p>Impacts on cultural heritage are to be avoided and the mitigation hierarchy applied. A chance finds procedure will be designed to ensure that any encountered, previously unknown cultural</p>	<p>The Gambian Constitution (1997) recognizes culture as a necessary tool for national integration and development.</p> <p>The State shall take steps to encourage the integration of appropriate customary values into the fabric of national life through formal and informal education and the conscious introduction of cultural dimensions to relevant aspects of</p>	<p>The regulations and policies do not address cultural heritage as an integral part of sustainable development and promotion of equitable sharing of benefits.</p> <p>The National Centre for Arts and Culture provides a platform for collaboration with opinion leaders, community representatives, and other institutions to protect cultural assets. The project will go the extra mile to complement the stakeholder engagement plan (SEP) to educate communities to appreciate the</p>

<p>cultural heritage. To promote the equitable sharing of benefits from the use of cultural heritage.</p>	<p>heritage, is appropriately managed.</p>	<p>national planning. (2) The State shall ensure that appropriate customary and cultural values are adapted and developed as an integral part of the growing needs of the society as a whole; and that traditional practices which are injurious to the health and well-being of the person are abolished. (3) The State shall foster the development of Gambian culture.</p>	<p>role of cultural values and assets in sustainable development.</p>
<p>ESS9: Financial Intermediaries</p>			
<p>Not applicable to the GIRAV feeder road construction subproject</p>			
<p>ESS10: Stakeholder Engagement and Information Disclosure</p>			
<p>To establish a systematic approach to stakeholder engagement that will help Borrowers identify stakeholders and build and maintain a constructive relationship with them, particularly project-affected parties. To assess the level of stakeholder interest and support for the project and to enable stakeholders' views to be considered in project design and environmental and social performance</p> <p>To promote and provide means for effective and inclusive engagement with project-affected parties on issues that could potentially affect them throughout the project life cycle.</p> <ul style="list-style-type: none"> To ensure that appropriate project Information on environmental and social risks and impacts is 	<p>The standard establishes a systematic approach to stakeholder engagement that potentially helps the Borrower to identify stakeholders and build and maintain a constructive relationship with them; as well as disclose information on the environmental and social risks and impacts to stakeholders in a timely, understandable, accessible, and appropriate manner and format. It recommends that stakeholder engagements are commenced as early as possible in the project development process and continued throughout the lifecycle of the Project.</p> <p>This allows for stakeholders' views to be considered in the project design and environmental and</p>	<ul style="list-style-type: none"> The key laws most relevant to stakeholder engagement are: the 1997 Constitution recognizes the right to information for all citizens as a fundamental human right. To fully operationalize the right to information, people need to be effectively engaged and provided with information on issues that affect their lives. The Access to Information Act, 2020 which was also passed into law in 2021 by the Gambian parliament Stakeholder engagement is an integral part of the Environmental Impact Assessment process. Gambia Environmental Assessment Regulations (2014) and National Environmental Management Act (NEMA), requires effective public consultation and participation as an integral component of Environmental and Social Impact Assessment (ESIA) procedures 	<p>The NEMA's EIA regulations have not been developed to fully operationalize mechanisms for disclosure or dissemination of information and grievance redress.</p> <ul style="list-style-type: none"> The project has developed a stakeholder Engagement Plan. The SEP also includes a GRM based on an existing grievance redress mechanism for resolving grievances for the GIRAV. The GRM is a transparent system that is expected to ensure quick resolution of complaints and disputes, it also has the structure for disclosing vital information to requisite stakeholders. <p>It also provides a means for effective and inclusive engagement. This instrument which satisfies almost all the requirements of ESS 10, will be applied during project implementation to bridge the gaps in national regulations and policies</p>

<p>disclosed to stakeholders in timely, understandable, accessible and appropriate manner and format.</p> <ul style="list-style-type: none"> • To provide project-affected parties with accessible and inclusive means to raise issues and grievances, and allow Borrowers to respond and manage such. 	<p>social performance. The Borrower is also expected to implement a grievance mechanism to receive and facilitate the resolution of concerns and grievances.</p>		
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4.6. Institutional Framework

4.6.1. Relevant Institutions

The Government established the following institutions to implement the NEMA 1994.

4.6.1.1. National Environment Management Council

The National Environment Management Council (NEMC) is responsible for policy formulation and directions for the purposes of the Act. The NEMC also sets national goals and objectives and determines policies and priorities for the protection of the environment.

4.6.1.2. National Environment Agency

The responsibility of the National Environment Agency (NEA) is to exercise general supervision and coordination over all matters relating to the environment and to be the principal instrument of government in the implementation of all policies relating to the environment. In addition to NEA, the Act provides for the establishment and enforcement of environmental quality standards to be set by a technical committee of NEA known as the Environment Quality and Environment Impact Assessment Working groups.

4.6.1.3. Department of Agriculture

The Department of Agriculture provides leadership on food, agriculture, and at some point, help in natural resources management, and related issues. It is also responsible for developing and implementing policies and programs that contribute to strengthening Gambia's primary industries for primary producers at the farm levels and protecting animals and plants.

4.1.6.4. Department of Water Resources

The Department of Water Resources' (DWR) Mission is to “regulate and manage the sustainable utilization of water resources, coordinate related policies and provide timely and accurate weather and climate data and information to safeguard population and promote food security through

effective participation, monitoring and awareness creation for overall socio-economic development of The Gambia.

4.6.1.5. Parks and Wildlife Department

Responsible for conservation and management and planning of conservation and biodiversity activities. Park management decentralization enhanced local communities to be responsible for the management of the forest parks and conserved areas within the local communities. This policy shift has helped a great deal in the sustainable management of parks and wildlife.

4.6.1.6. Department of Forestry

The Department of Forestry oversees any actions necessary to ensure the sustainable use and protection of all forests in The Gambia excluding private forests. In addition, it shall be responsible for co-operating and liaising with national and international organizations and bodies all over the world on forestry matters, in particular a national forest inventory which is supposed to take place at regular intervals. The department along with relevant stakeholders facilitate the conservation and development on rational basis, i.e. a sustainable utilization, of an adequate forest cover of land area for the environment and socio-economic development of present and future generations.

4.6.1.7. National Roads Authority

NRA responsible for the planning, construction, and maintenance of the national road network. NRA, with a Board of Directors comprising representatives of relevant Government Ministries and private stakeholders, delegates responsibilities to the private sector in maintenance and construction

4.6.1.8. Department of Geology

The role of the department is to gather, collate, assess, and disseminate all information related to the rocks, minerals, and ground resources of the country. The department also provides advice on an adhoc basis to the public and private sector on all issues relating to the earth sciences. It also administers the sections of the Mines and Minerals Act 2015 that relate to mineral and resources exploitation.

4.6.1.9. Office of the Governor

The Office of the Governor is the entry point for development projects within the region. Governor's serves as the government's representative at the regional level to ensure that projects are implemented as designed and for the benefit of the local communities.

4.6.1.10. Area Councils

The area councils in each region are the local government administrative authority that oversees the development and administration of the region.

4.7. Institutional and Implementation arrangements

The Ministry of Agriculture is responsible for overall project implementation. It collaborates closely with the Ministry of Transport, Works and Infrastructure and its respective agency, NRA on the execution of the GIRAV feeder roads subproject.

An inter-ministerial Project Steering Committee (PSC) provides strategic oversight of the project. The PSC is chaired by the Minister of Agriculture or designated representative and meets at least twice a year. The secretariat of the PSC is headed by the CPCU in the Ministry of Agriculture. Membership of the PSC includes the project coordinator, with representatives from GCCCI (vice-chair of the PSC); the Ministry of Finance and Economic Affairs; MOTIE; the Ministry of Youth and Women; the Ministry of Environment, Climate Change and Natural Resources; the Ministry of Transport Works and Infrastructure; GIEPA; Gambia Public Procurement Authority

(GPPA); SMEs engaged in agribusiness; National Coordinating Organization for Farmers Association in The Gambia (NACOFAG); Gambia Women' Federation; youth organizations; and civil society organizations. The main functions and responsibilities of the PSC are:

- i. provide strategic and policy guidance to the CPCU for implementation and coordination of activities;
- ii. ensure overall conformity with government policies and strategies;
- iii. review and assess project progress and performance;
- iv. approve the annual work plan and budget (AWPB);
- v. resolve implementation problems or conflicts; and
- vi. assist the CPCU in obtaining, whenever needed, government assistance and contributions to the project.

The CPCU within the Ministry of Agriculture is responsible for project coordination and implementation. In 2014, the Ministry of Agriculture established the CPCU for centralized coordination and implementation of all projects funded by development partners in the agricultural sector, to avoid a multiplicity of project implementation units, create synergies between projects, strengthen capacity, and build continuity in project management. CPCU staffing was strengthened to meet the specific needs of GIRAV, with the addition of a director of operations; a rural/civil engineer in charge of irrigation equipment, feeder roads, and marketing infrastructure; a grant management specialist to manage and implement the matching grant mechanism; an agribusiness specialist; a social development specialist in charge of social safeguards, GBV, SEAH, gender, and youth; an environmental specialist in charge of managing the environmental risks ; a communication and knowledge management specialist; a digital technology specialist in charge of designing, updating, and implementing digital platforms; and support staff. The reinforced CPCU coordinates overall project implementation on a day-to-day basis, prepare and consolidate AWPBs and oversee technical agencies involved in project implementation. It is responsible for all fiduciary aspects of the project (procurement, disbursement, accounting, and financial reporting) and M&E. It prepares bi-annual progress reports and ensures the annual auditing of all project accounts by independent auditors acceptable to IDA.

4. Baseline Data

4.1. Physical Environment

4.1.1. Surface Water Sources

The Gambia is situated within the semi-arid Sudano-Sahelian zone of West Africa, and located on the river Gambia basin, which stretches from between 11° and 15° North latitude, and 17° and 17° west longitude. It has an area of 10,356 km² and occupies the down-most part of the river Gambia basin.

Although the country is divided into five (5) regions, this study target regions with project intervention sites such as; Central River Region, North Bank Region, Lower River Region and West Coast Region. The project is intervening in all regions.

4.1.1.1. River network in the Central River Region

The Central River Region is situated on the upper estuary of the river Gambia and stretches for approximately 200 km. This area is characterized by numerous meanders and home to a multitude of islands. This section of the river has a width measuring from several hundred to a few kilometers, and mean depths are between 8 to 16m. The mangroves flank the riverbanks in this area, behind which are the flooded zones spanning variably at different locations.

The tidal influence and/or range is higher in this area than the Upper River Region, and salinity intrudes as far as Kuntaur, which is the upper limit of the saline front, by mid-July. The seasonal flow variations have a significant impact on the longitudinal fresh/saltwater edge in this region.

Generally, during the high flow period (i.e., mid-July to mid-September), the fresh/saltwater interface is gradually pushed further downstream, making the region salt free by mid-August. In view of its lower banks, this area is mostly suitable for tidal irrigation, as the high tide water is significantly high to overflow the banks and inundate the fields. Likewise, the low tide water levels create room for water in the field to drain out back into the river.

The region is located between *Sandougou Bolong* in the north and *Sofaniama Bolong* on the southern bank of the river. It also has two major tributaries i.e., *Kaimasala* and *Nianija Bolongs* which flow from northern Senegal (see Figure 4.1).

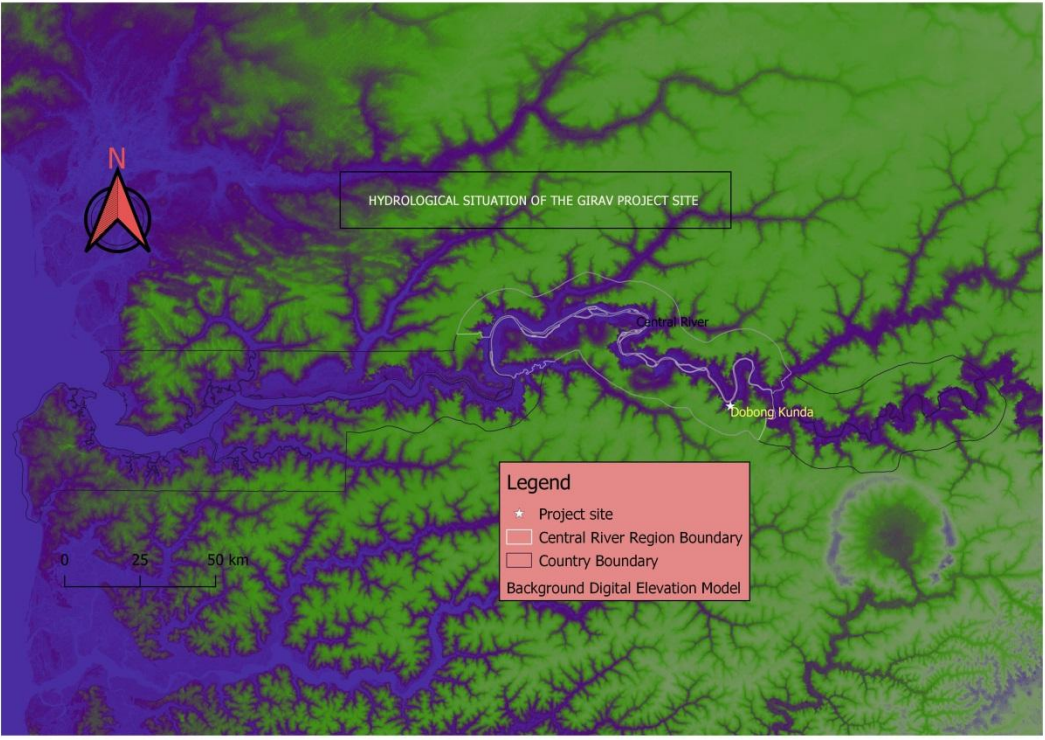


Figure 4.1: River network in the Central River Region

4.1.1.2. River network in North Bank Region

The North Bank Region is found on the lower estuary of the river, bordering with the Atlantic Ocean on the west (see Figure 4.2). More than two thirds of the stretch of the area is located within the perennially saline, thus, resulting to saline intrusion into the tidal flats within the area. The *Miniminyang Bolong* connects with the main river through this region as well as *Bao Bolong* wetland reserve.

In view of the above, areas along the river and adjacent to the *Bolong* and wetland, are often affected by saline intrusion into the groundwater, negatively impacting water quality for domestic and agricultural purposes.

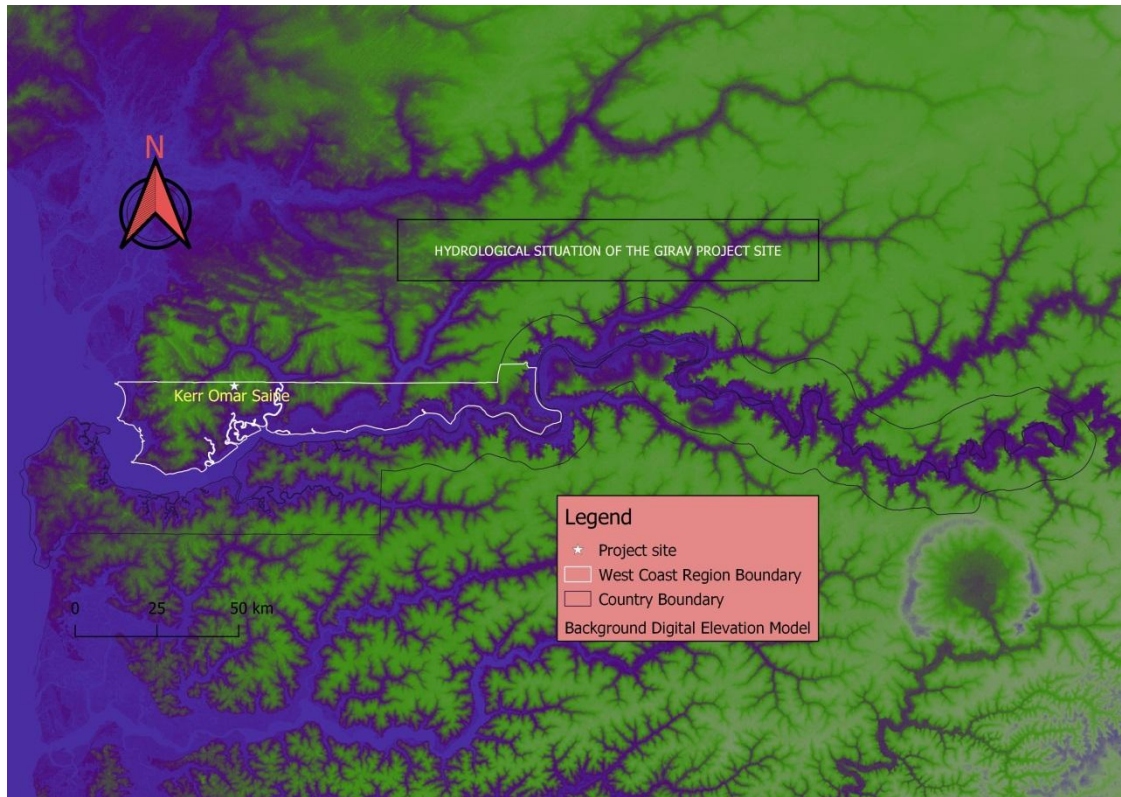


Figure 4.2: The river network in the North Bank Region

4.1.1.3. Lower River Region

The Lower River Region is found on the southern edge of the mid-lower estuary of the river Gambia. It is located between the *Sofaniama bolong* to the east and *Bintang bolong* to the west (see Figure 4.3). More than two thirds of the stretch of the area along the river is located within the seasonally saline zone, thus, resulting to saline intrusion into the tidal flats within the area. The *Sofaniama Bolong* serves as the upper boundary while *Bintang bolong* serves as the lower boundary, all of which connects to the main river. Meanwhile, there are several waterways flowing laterally towards the rivers, which often carry eroded materials.

In view of the above, areas along the river and adjacent to the two *Bolongs*, are often affected by saline intrusion into the groundwater, negatively impacting water quality for domestic and agricultural purposes.

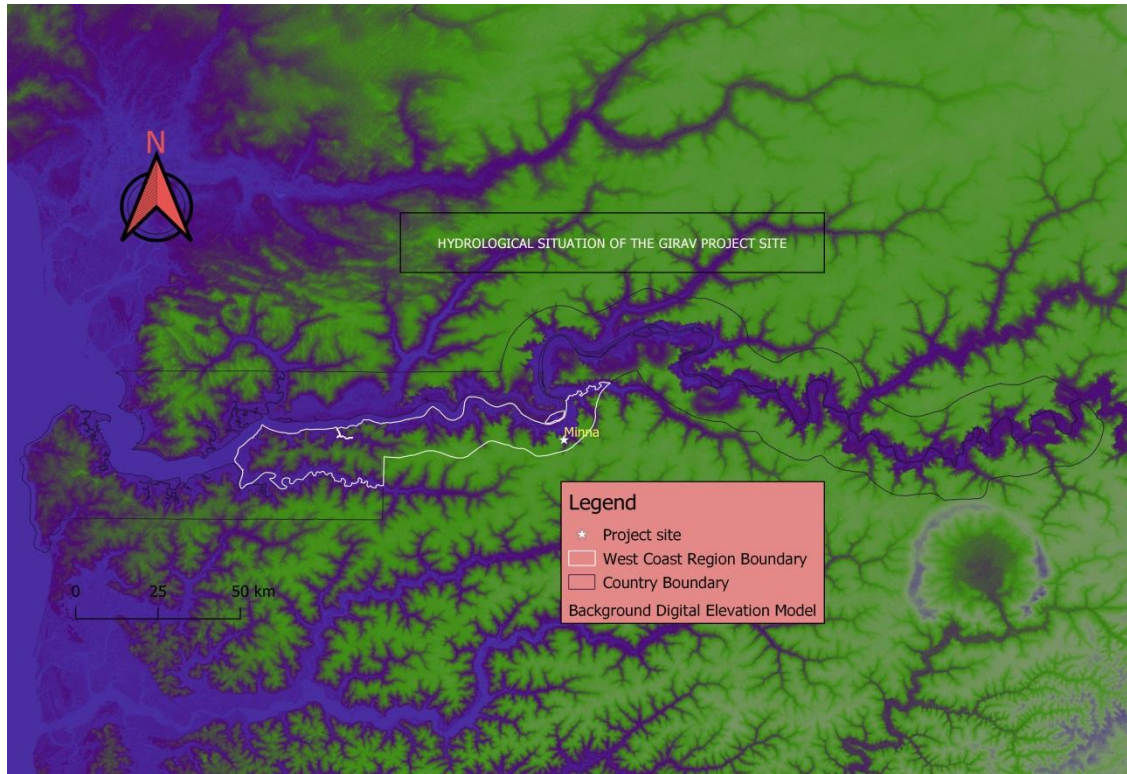


Figure 4.3: The river network in the Lower River Region

4.1.1.4. West Coast Region

The West Coast Region is found on the southern edge of the extreme lower estuary of the river Gambia. It is located between the *Bintang bolong* to the east and the Atlantic coast to the west (see Figure 4.4). The entire stretch of the area along the river is located within the perennially saline zone, thus, resulting in saline intrusion into the tidal flats, waterways, and tributaries within the area. Meanwhile, there are several waterways flowing laterally towards the river, which often carry eroded materials.

In view of the above, areas along the river and adjacent to the *Bolong* and Atlantic coast, are often affected by saline intrusion into the groundwater, negatively impacting water quality for domestic and agricultural purposes.

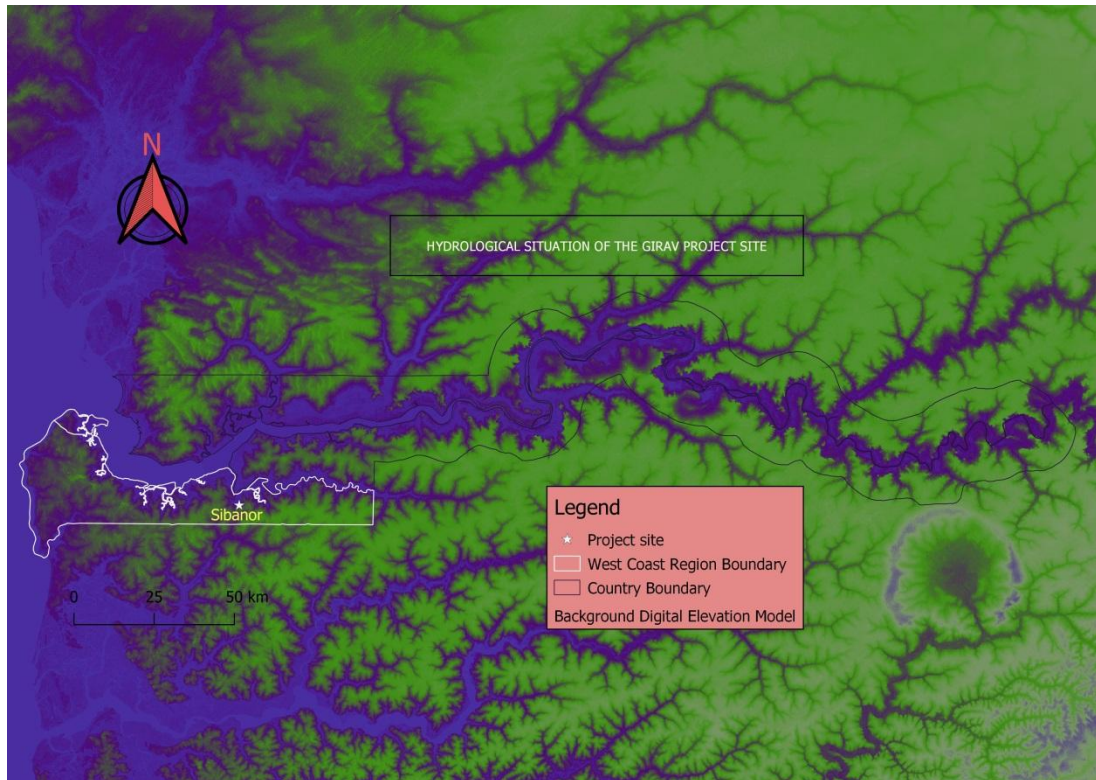


Figure 4.4: The river network in the West Coast Region

4.1.2. The hydrogeological characteristics and groundwater resources in the regions

The groundwater system in The Gambia is categorized into the superficial and deep aquifer system. The shallow sand aquifer (SSA) is of Moi-Pliocene geological age, mainly made of unconsolidated, medium to coarse sand grain and found at 15 to 120 meters depth below the ground level. It is further partitioned into the Upper Phreatic Aquifer and a Lower Semi-Confined Aquifer, separated by a licky clay-silt aquitard of 15-30 m thickness. It is primarily recharged through local rainfall infiltration and a small portion of lateral inflow from across the border with Senegal.

Currently, the Gambia abstracts water from this aquifer, through traditional hand dug wells tapping from the upper phreatic aquifer while boreholes are drilled deeper into the lower semi-confined aquifer (NIRAS 2013).

Meanwhile, the deep sand aquifer (DSA) system in The Gambia, mainly includes poorly consolidated sand and sandstone buried at 250 to 450 meters deep. This aquifer is largely undeveloped with only three exploratory boreholes, one of which is in Garawol, in the Upper River Region and the other two are in the Lower and West Coast Region. Thus, generally all the regions utilize the groundwater of the superficial aquifer system to satisfy its domestic and agricultural water needs.

Water Quality and Supply situation at the project sites

Water quality analysis for the selected sites were conducted by the Water Quality Monitoring and Control Laboratory under the Department of Water Resources. The physio-chemical and microbiological analysis was carried out around 22nd March, 2024. The following physico-chemical parameters were analyzed; Temperature (T), Electrical Conductivity (EC), pH, Total Dissolved Solid (TDS), Salinity and Turbidity (NTU). Chemical analysis was also done using the DR3900 Spectrophotometer. Key findings from the analysis of the collected water samples from the project sites are presented beneath:

- The results of the samples indicated lower pH ranging from 5.63 - 6.16 in all the sites, this phenomenon is consistently observed in the groundwater in The Gambia. Apparently, the pH remain below WHO recommended standard of 6.5 – 8.5 even after aeration
- Although Iron content at all the sites remain within the WHO standards, however, the water sample results from the following boreholes, Dobong Kunda, Sibanor, Gunjur Nyofelleh measured 0.12, 0.11 and 0.18 (mg Fe^{+2/3}/l), it sends a signal that the iron content could increase over time due to continuous pumping.
- Meanwhile, Total and Faecal Coliform (No. 100/ml) was detected at Dobong Kunda while only Total Coliform was detected at Minna Village (see annex 1).

Generally, most of the water quality parameters tested were found to be within the recommended guideline values of the World Health Organization (WHO) for good drinking quality. However, the low pH values and Faecal Coliform bacteria registered have probably been due to the poor environmental management and dilapidated water facilities.

4.1.3. Weather and Climate

The Gambia is found within the Sahel region and thus exhibits a typical Sudano-Sahelian form of climate. It is characterized by an extended dry season stretching from October up to early June, and a brief rainy season from mid-June to mid or sometimes late October. Apparently, the months of May and November are transitional in nature (see Figure 4.5).

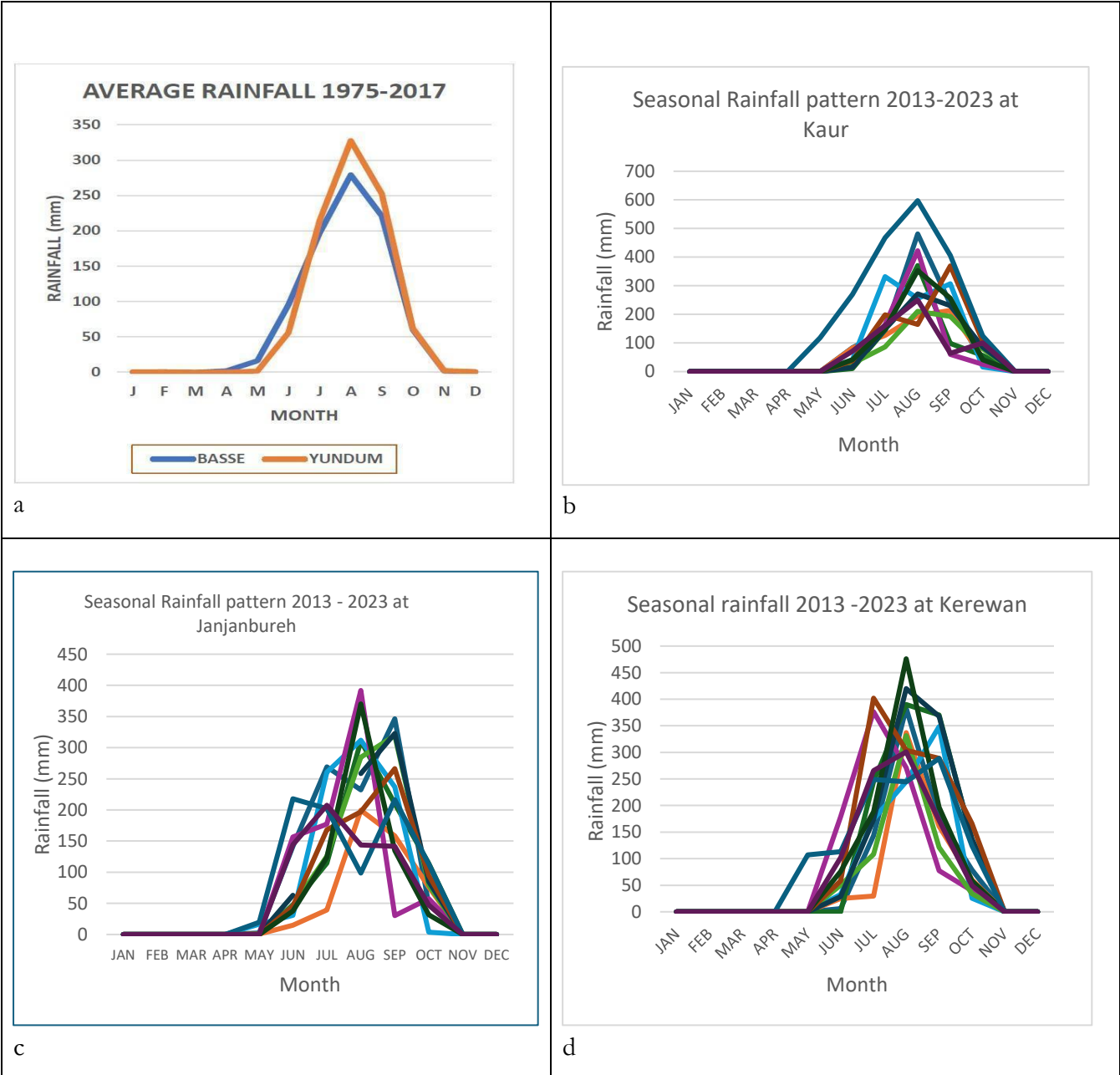
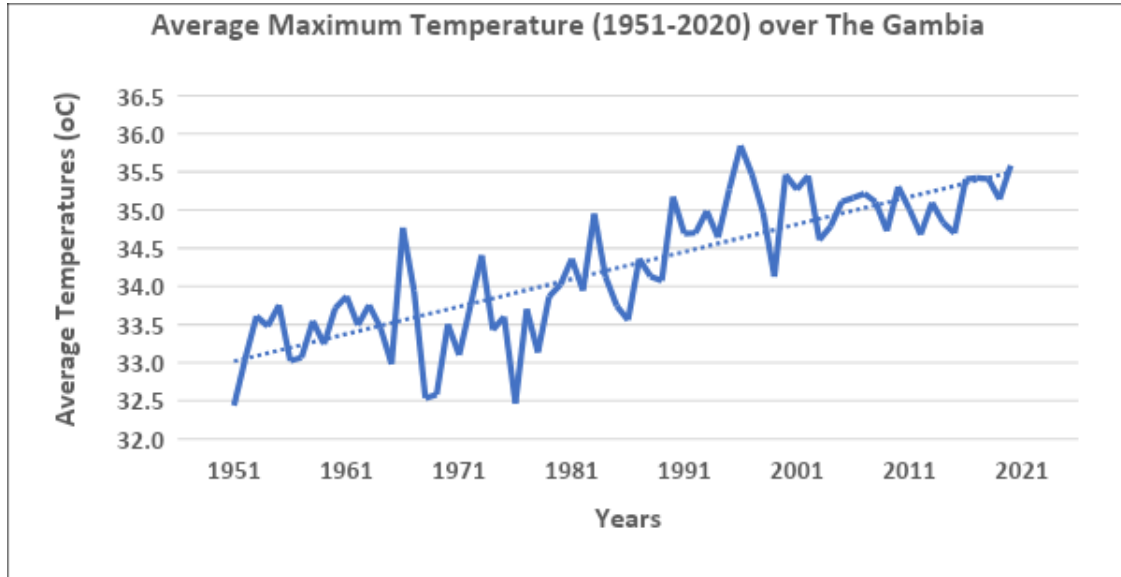


Figure 4.5. a) average monthly rainfall from 1975-2017 at Basse and Yundum; (b),(c),(d): monthly total rainfall from 2013 to 2023 at Kaur, Janjanbureh and Kerewan, respectively.

The annual average rainfall spans between 337mm observed in 1968 to 1340.9mm in 1958, while average temperatures vary from 18 to 33°C. To be precise, the maximum temperatures for the project areas (see Figure 4.6), have been observed to rise significantly especially in the last two

decades. Meanwhile, monthly mean temperatures for the project focus areas indicate a variation of mean temperatures between the hot and cold months. There is a marked decline in mean temperatures during the rainy season. These have consequences on the microclimate of the project sites and enhance water resources depletion from evaporation and evapotranspiration.



4.6. Average maximum temperature (1951-2020) over The Gambia

Figure

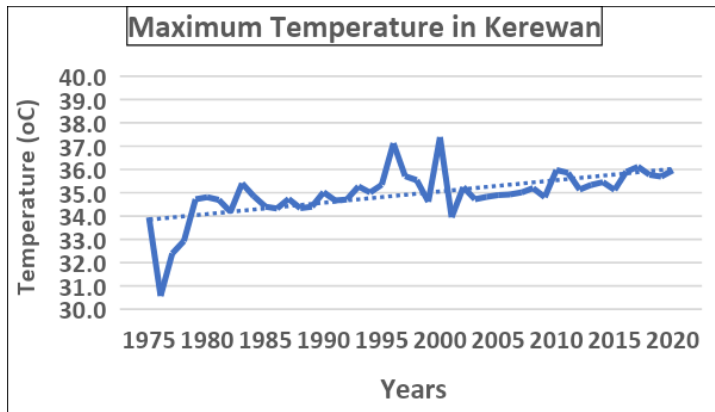


Figure 4.7: Maximum Temperature in Kerewan from 1975-2020

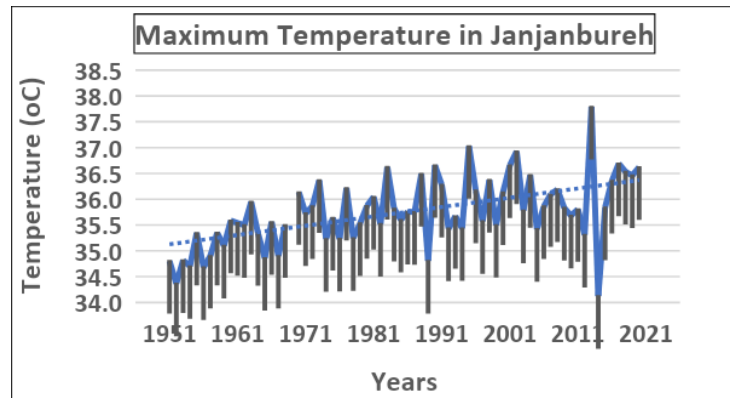


Figure 4.8: Maximum Temperature in Janjanbureh from 1975-2020

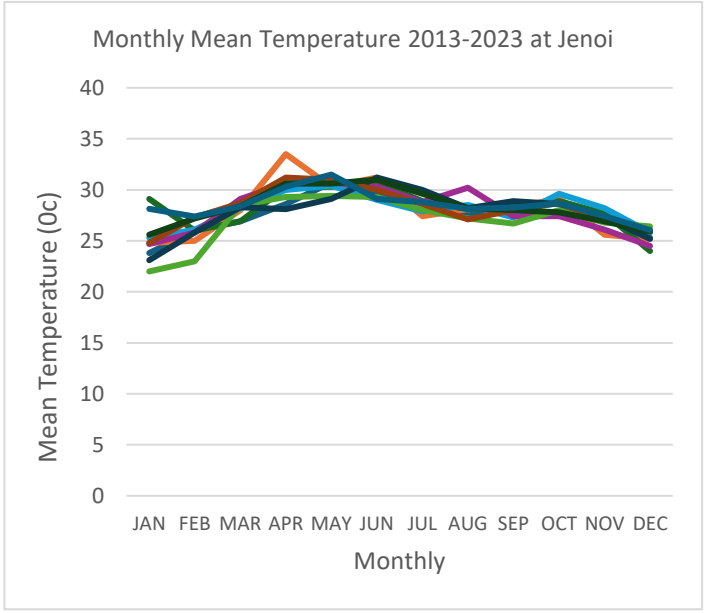


Figure 4.9: Mean monthly temperature from 2013 -2023 at Jenoi

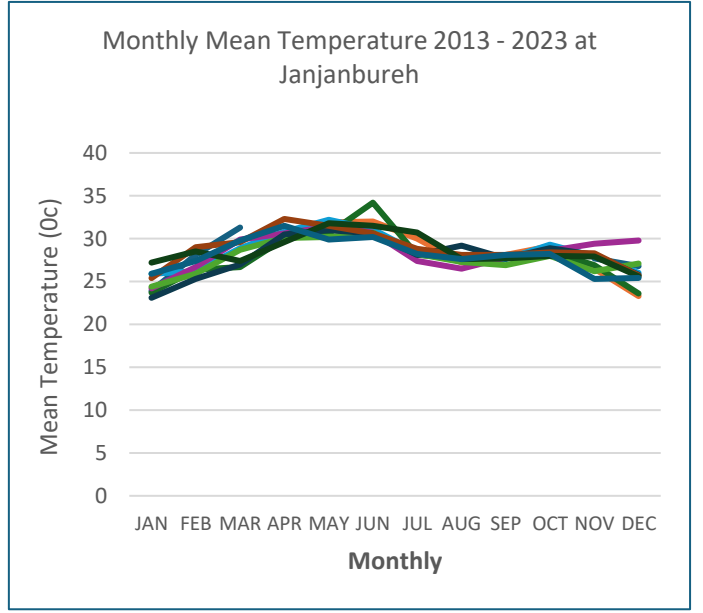
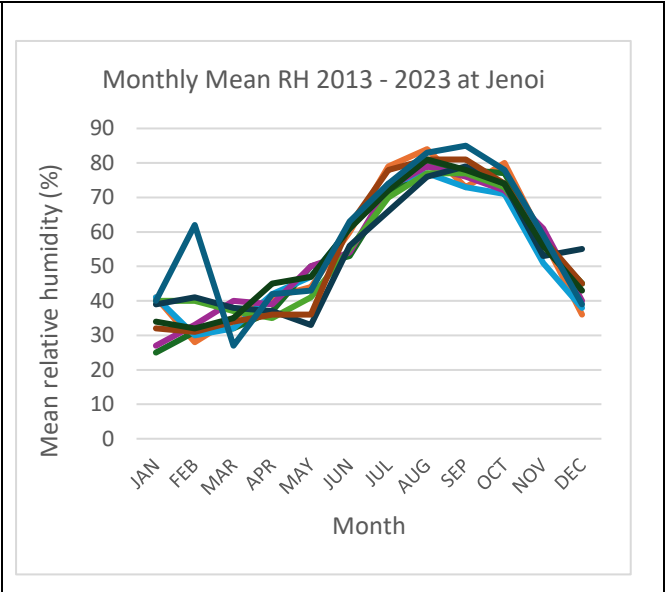
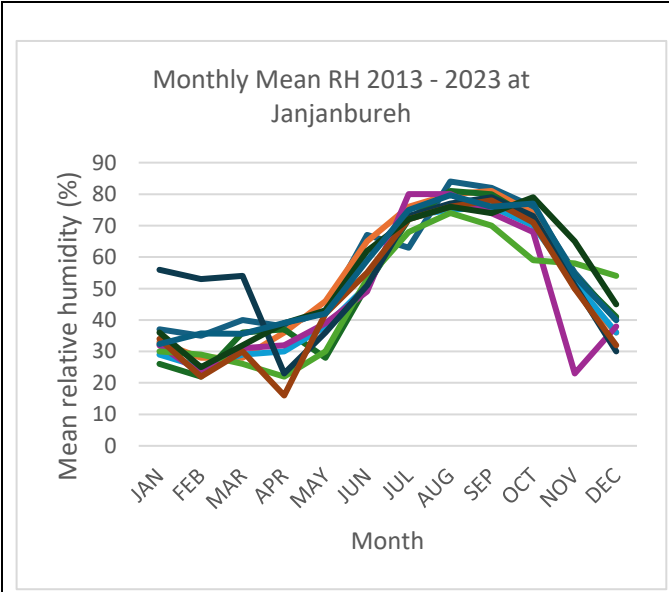


Figure 4.10: Mean monthly temperature from 2013 -2023 at Jenoi

4.1.3.1. Relative Humidity and Wind Direction

Relative humidity falls within 68% in the coastal area and the inland is about 41% during the dry season. However, during the wet season, relative humidity goes beyond 70% throughout the country. The figure below shows mark variation of relative humidity between the dry and wet season in the project intervention regions.



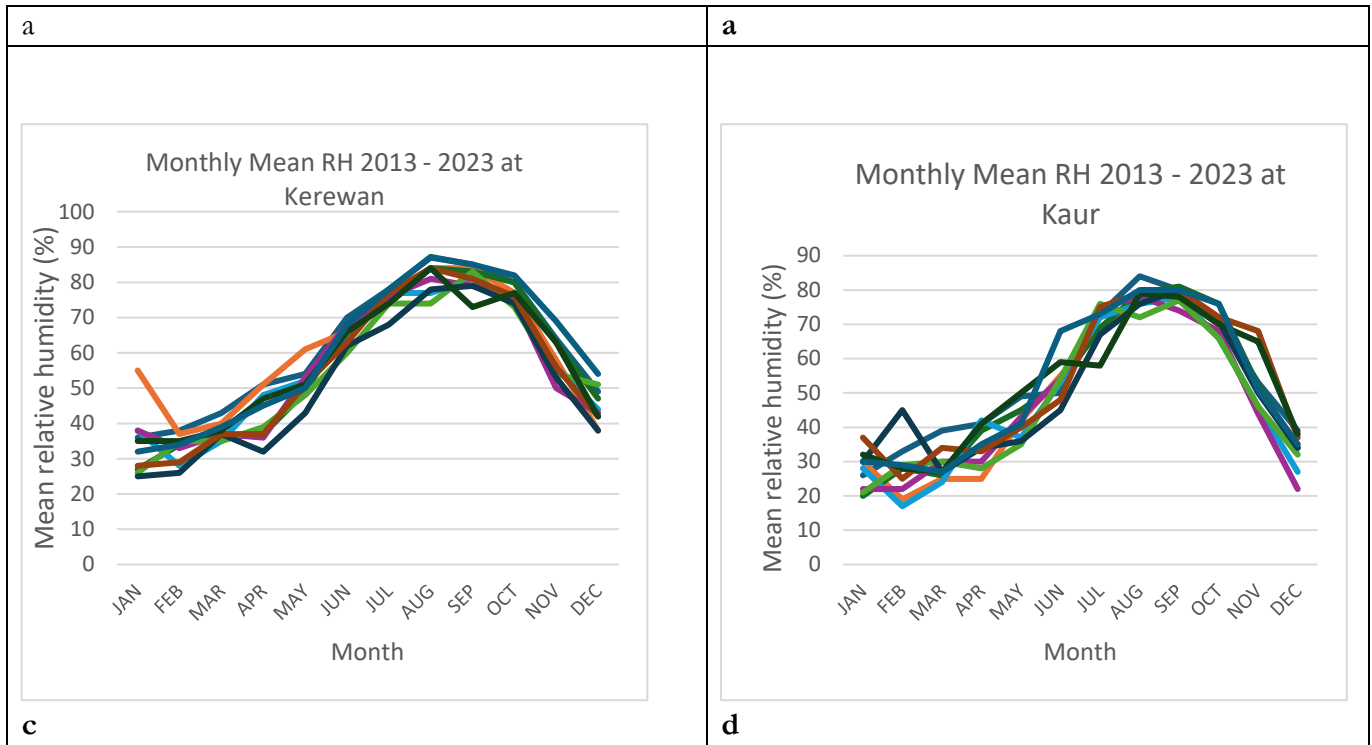


Figure 4.11: Monthly relative humidity 2013-2023 at Janjanbureh, Jenoi, Kerewan and Kaur

4.1.3.2. Rainfall pattern

The Gambia has consistently witnessed progressive decrease in the rainfall amount in the thirty-year climatic period (1951 to 1990), correlating to an estimated 39% decline over the years (see Figure 6). Likewise, shrinking of the length of the wet season coincides with an increasing surface temperature, resulting in the depletion of the moisture in the atmosphere, thus rendering it drier. Furthermore, analysis covering the thirty-year climatic period (1991 to 2020), exhibits a significant rise in average rainfall amount (114mm) when tallied with the 1971 to 1990 averages.

However, annual rainfall averages at stations in the project areas have shown a marked increase (see Figure 5.6a, b & c below). It is explicit that those increases are marked with inter-annual variation. Moreover, records have also shown unpredicted intra-seasonal rainfall patterns with extended dry spells spanning from 10-15 days.

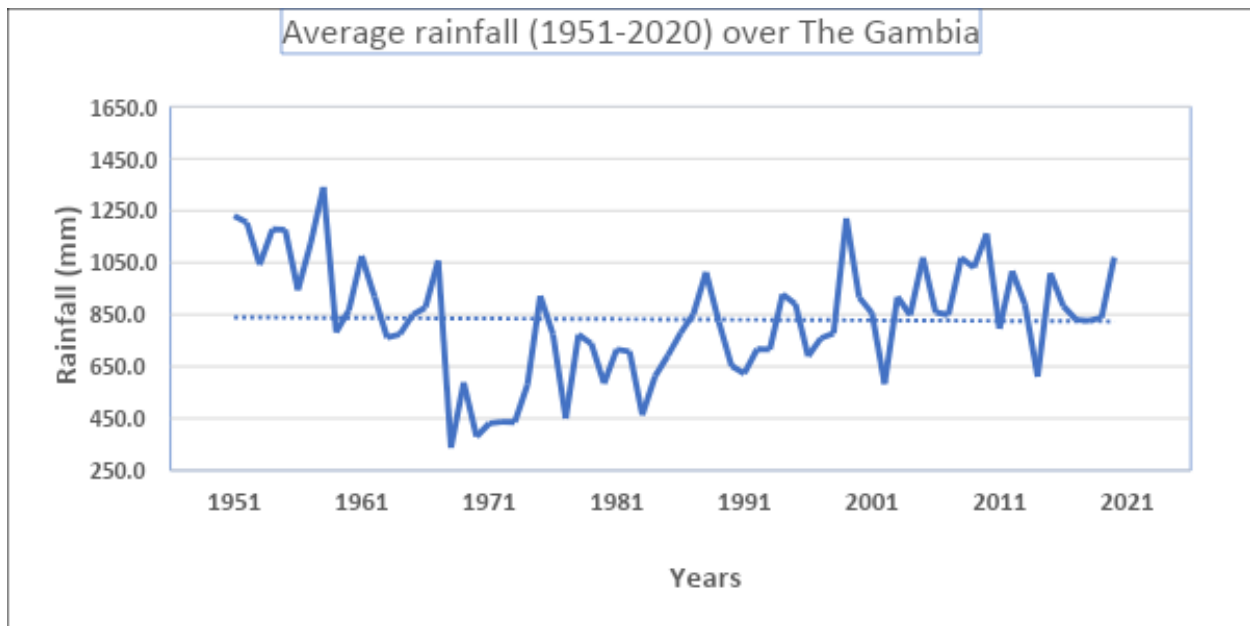


Figure 4.12: average annual rainfall from 1951-2020 over The Gambia

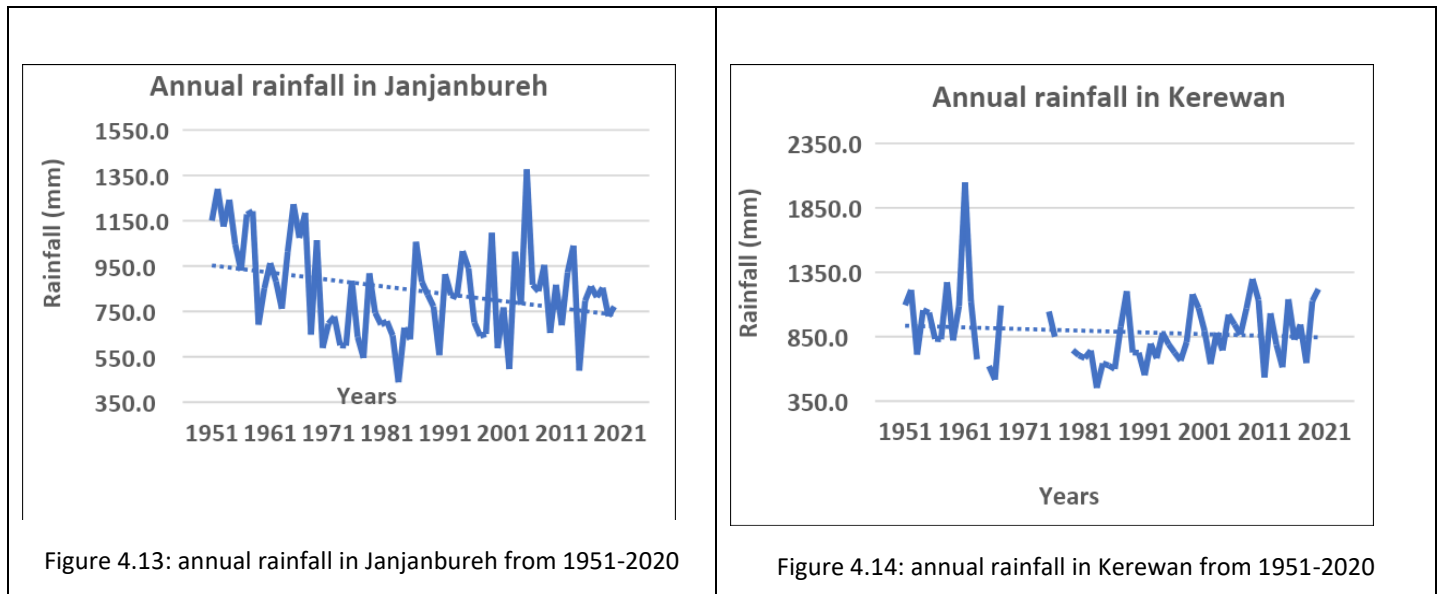


Figure 4.13: annual rainfall in Janjanbureh from 1951-2020

Figure 4.14: annual rainfall in Kerewan from 1951-2020

4.1.3.3. Climate Change Impact

Climate hazards in The Gambia range from torrential rainfall, windstorms, thunder and dust, drought, cold spells, heat waves, intra-seasonal drought or dry spells and unseasonal rains. It is anticipated that part of these hazards may likely surge in intensity and frequency and could as well become more prevalent.

Moreover, most of the productive base of the economy relies on climate sensitive activities such as water resources, livestock rearing, fisheries, energy, crop production. Thus, climate change would exert a severe burden on national development endeavors, poverty alleviation and the

overall achievement of the SDGs etc. the overall changes in rainfall and temperature are likely to constrain the productivity of some crops (SOER, 2019).

4.1.3.4. Wind direction

The northeasterly winds are the most observed wind flow in the dry season, generating mainly cloudless skies filled with dust particles in the air. However, with the interjection of extra-tropical weather systems across the Mediterranean into northwest Africa, at certain times, this flow pattern is deformed giving rise to unseasonal rainfall.

Meanwhile, southwesterly monsoon winds are mostly observed during the wet season, coupled with heat on the continent as result of the northward borne wind (see Figure...), which gives rise to the formation of thundery activities, often associated by heavy winds, torrential rains, and severe lightning flashes.

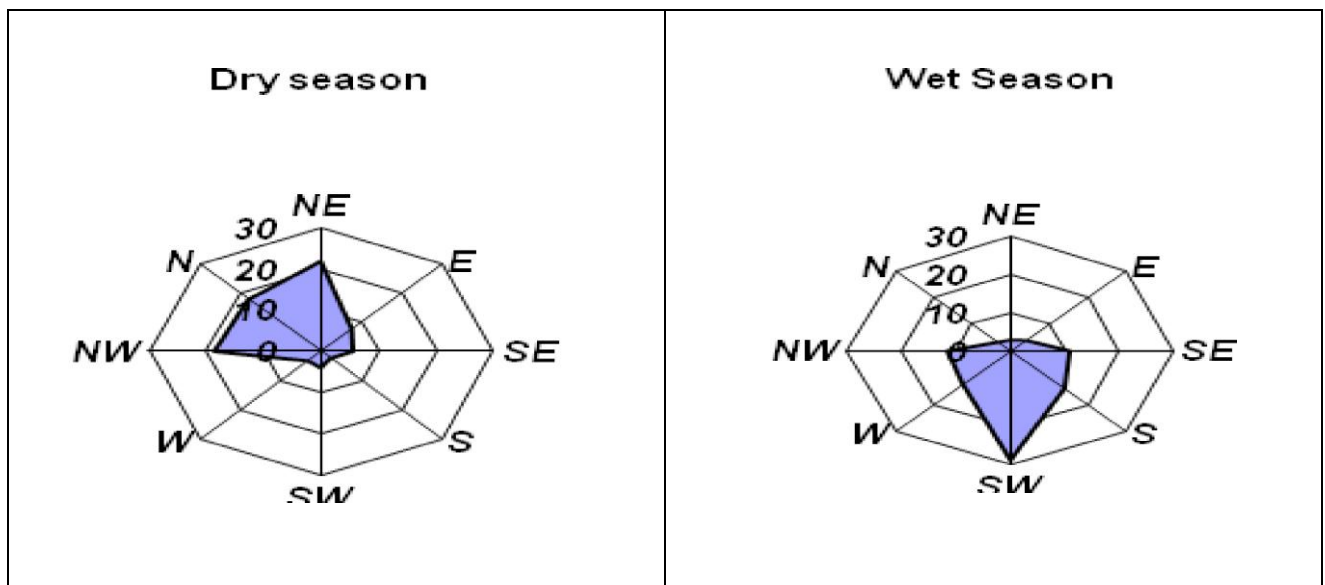


Figure 4.15: Wind direction in the dry and wet season in The Gambia (extracted from SOER, 2019)

4.1.4. Soil Characteristics

The landscape of The Gambia is made up of the following elements such as; (i) recently deposited alluvial material in the flat of areas of the floodplain, (ii) areas lying adjacent to the course of the river and its tributaries (iii) similar alluvium deposits occurring in narrow strips of land found in depressions around minor tributaries and mainly prone to waterlogging.

Colluvial slopes are found on top of the alluvial flats, these are progressively sloping areas made up of materials of the eroded tertiary plateau. The rest of the terrain consists of a tertiary plateau with two distinguished components; the upper plateau is predominantly made of elements of the

landscape in the eastern area of the country. This feature hardly exists west of Farafenni on the north bank and Bwiam on the south bank.

On the other hand, the lower plateau component is uncovered by dissection and erosion of the higher plateau and makes up the primary landscape of mainly the north Bank and West Coast Regions. However, in the far east, this feature is found in depressions generated by tributary streams.

High runoff water has accelerated soil erosion, washing significant amounts of silt and sand from the upland area into low land area (I.e. areas suitable for crop production), thus turning those low land areas unproductive. The depleted soil materials equally compound land degradation.

Severe inter-annual rainfall variation and long dry spells have intensified the salinization of the soils, resulting in low soil productivity. This is more pronounced in the areas located on the floodplains of the river, due to excessive evaporation leading to barren mud flats and acid-sulfate soils.

4.1.5. Air quality

Air quality monitoring was carried out from the 24th to 26th of February 2024 across all the project intervention sites. Three different spots were selected along the length of each proposed feeder road. The samples were replicated three times at each spot with an interval of three minutes between each reading.

The key findings of the baseline air quality monitoring reveal that the air quality in all the selected sites in URR, LRR and NBR were healthy with PM_{2.5} and PM₁₀ within the WHO Air Quality Standard (AQS). The results further unveiled the air quality (PM_{2.5} and PM₁₀) along the Bondali Bundakunda – Jorem Bundakunda road in WCR and Sinchu Alagie – Patch Sam road in CRR were found to be unhealthy.

4.1.6. Noise

The noise level of all the selected sites was found to be between 45.7 – 59.67 dB which is within the accepted limit. This is due to less human and industrial activities around these communities.

4.2. BIOLOGICAL ENVIRONMENT

4.2.1. Status of the Project Area's Forest Cover

The regions of the Gambia in term of forest covered is characteristic Sudano Savannah woodland vegetation type has different types of ecosystems, including close woodland, open woodland ecosystems, tree and shrubs savanna, wetland ecosystems, and agriculture ecosystems. The functions of forest ecosystems include provisioning (food, fuel wood, medicines), regulating (air quality, climate change, floods, soil erosion, water purification, pollination, and the biological control of pests and diseases), and supporting (soil formation and retention, nutrient cycling, and primary production). More specifically, the provisioning services directly contribute to the maintenance of rural livelihoods.

For example, *Spondias mombin* “Ninkongo” and *Zizipus Mauritania* “Tomborong” are used for food and medicine; *Gmelina Arborea* “Malaynoo”, *Khaya senegalensis* “Jaloo”, *Dialium guineense* “Mampato”, *Dialium guineense* “Kosito” are used for food and timber; *Terminalia macroptera*, *Combretum glutinosum* “Jambakatango”; and *Terminalia Albida* “Woloo” are used for firewood; and *Pterocarpus erinaceus* “Kenoo”, *Bombax costatum* “Bunkungo”, *Parkia biglobosa* “Nettoo”, and *Khaya senegalensis* “Jaloo” leaves are used as animal feed.

According to the GIRAV project intervention sites of the feeder roads corridors, *Terminalia macroptera*, *Daniella oliveiri*, *Combretum glutinosum*, *Khaya senegalensis*, *Parkia biglobosa*, *Elaeis Guinness*, *Combretum nigrans*, *Pterocarpus erinaceus*, and *Cordyla Africana* are the most found tree species across all regions. Other important species for the extraction of non-wood forest products (NWFP) include *Saba senegalensis*, *Detarium senegalensis*, *Elaeis guinersis*, *Borassus aeithiopum*, and *Moringa oleifera*.

Table 4.1: Trees found along the 10m corridors and their status nationally and within the IUCN Red List

Family Name	Botanical Name	English	National level status	Status on IUCN Red list	Source of identification and IUCN status			Growth form	Uses
					During site visit	Reported by DOF	Bibliographic research		
Palm aceae	<i>Eleais Guineensis</i>	Oil Palm	LC	LC	*	*	*	Tree	Fruits
Anacardiaceae	<i>Anacardium Occidentalis</i>	Cashew	LC	LC	*	*	*	Tree	Fuelwood, fruit & nuts
Rutaceae	<i>Citrus Aurantifolia</i>	Local Lime	LC	LC	*	*	*	Tree	Fruits
Rutaceae	<i>Citrus Sinensis</i>	Orange	LC	LC	*	*	*	Tree	Fruits
Palmaceae	<i>Cocos Nucifera</i>	Coconut Palm	LC	LC	*	*	*	Tree	Fruits
Bignoniaceae	<i>Gmelina Arborea</i>	Gmelina	LC	LC	*	*	*	Tree	Fuelwood & timber
Meliaceae	<i>Azadirachta Indica</i>	Neem	LC	LC	*	*	*	Tree	Fuelwood & timber
Bombaceae	<i>Adansonia Digitata</i>	Baobab	LC	LC	*	*	*	Tree	Fruits & medicine
Moringaceae	<i>Moringa Oleifera</i>	Drumstick	LC	LC	*	*	*	Tree	Fruits
Mimosaceae	<i>Prosopis Africana</i>	Ironwood	LC	LC	*	*	*	Tree	Firewood & fence poles
Caesalpinaceae	<i>Tamarindus Indica</i>	Tamarind	LC	LC	*	*	*	Tree	Fruits & firewood
Ramnaceae	<i>Ziziphus Mauritania</i>	Jujube	LC	LC	*	*	*	Tree	Fruits & firewood
Anacardiaceae	<i>Lannia Microcarpa</i>		LC	LC	*	*	*	Tree	Fuelwood
Moraceae	<i>Ficus Vogelii</i>	Strangler Fig	LC	LC	*	*	*	Shrub	Firewood
Borinbacaceae	<i>Ceiba Pentandra</i>	Silk Cotton Tree	LC	LC	*	*	*	Tree	Timber
Anacardiaceae	<i>Sclero Carpa Birrea</i>		LC	LC	*	*	*	Shrub	Firewood
Euphobiaceae	<i>Jatropha Curcas</i>	Pignut	LC	LC	*	*	*	Tree	Fuelwood & fruits
Anacardiaceae	<i>Spondias Mombin</i>	Hog Plum	LC	LC	*	*	*	Tree	Fuelwood & fruits
Mimosaceae	<i>Acacia Seyal</i>	Thirsty Thorn	LC	LC	*	*	*	Shrub	Firewood
Mimosaceae	<i>Parkia Biglobose</i>	Monkey Cutlass	LC	LC	*	*	*	Tree	Fuelwood, timber & fruits
Combretaceae	<i>Combretum Glutinosum</i>		LC	LC	*	*	*	Shrub	Fuelwood & medicine
Ebenaceae	<i>Diospyros Mespilitormis</i>	African Ebony	LC	LC	*	*	*	Shrub	Fuelwood
Fabaceae	<i>Pterocarpus Erinaceus</i>	African Rosewood	LC	LC	*	*	*	Tree	Fuelwood, timber & fodder
Mimosaceae	<i>Acacia Albida</i>	Winterthorn	LC	LC	*	*	*	Tree	Fuelwood & timber
Steculiaceae	<i>Cola Cordifolia</i>	Mandingo Cold	LC	LC	*	*	*	Tree	Fuelwood & timber

Meliaceae	Khaya Senegalensis	African Mohogany	LC	LC	*	*	*	Tree	Fuelwood, timber & medicine
Combretaceae	Terminalia Albida		LC	LC	*	*	*	Shrub	Fuelwood
Caesalpinaceae	Bayhina Thoningli	Camels Foot	LC	LC	*	*	*	Shrub	Fuelwood
Anacardiaceae	Mangifera Indica	Mango	LC	LC	*	*	*	Tree	Fruits, and firewood
Moraceae	Ficus Gnaphalo Carpa	Fig	LC	LC	*	*	*	Tree	Fuelwood & timber
Myrtaceae	Eucalyptus Camaldulensis	Eucalyptus	LC	LC	*	*	*	Tree	Fuelwood, timber & medicine
Annonaceae	Annona Squamosa	Sweetsop	LC	LC	*	*	*	Tree	Fuelwood & timber
Caesalpinaceae	Cordia Pinnata	Bush Mango	LC	LC	*	*	*	Tree	Fuelwood, timber & medicine
Bombaceae	Bombax Costatum	Red flowered silk cotton tree	LC	LC	*	*	*	Tree	Fuelwood, timber & medicine
Rubiaceae	Mitragyna inermis	Bark cloth tree	LC	LC	*	*	*	Tree	Fuelwood, timber & medicine
mimosoideae	Acacia macrostachys	Burburey	LC	LC	*	*	*	Tree	Fuelwood, timber & medicine
combretaceae	Anogeissus leocarpus	African birch	LC	LC	*	*	*	Tree	Fuelwood, timber & medicine
caesalpinaceae	Ditarium Senegalesis	sweet detar tree,	LC	LC	*	*	*	Tree	Fruits, and firewood
Palmae	Borassus aethiopum	Rhun palm tree	LC	LC	*	*	*	Tree	Fruit

LC = Least Concern: When evaluated against the red list criteria and does not qualify for critically endangered species.

Considering the kind of trees present in the feeder road corridors are either in the forest whether open or closed forest, the Department of Forestry should sell many of these profitable trees for the benefit of this country. Nonetheless, NAWEC used to periodically trim trees in the corridors when it comes to its transmission lines. This process is done frequently when the trees develop new branches that could endanger the lines. Therefore, before any trees are cut down, the contractors must ensure that Department of Forestry staff assess the trees and offer advice to address any potential environmental impacts. To create a restoration strategy to replace lost trees during the process, the project should collaborate with DOF.

Similar to this, no tree on private land should be felled or pruned without the owner's consent; even in cases where a tree is situated in the corridor and a Resettlement Action Plan (RAP) is necessary to address potential social consequences.

4.2.1.1. Community forestry

Community Forestry (CF) is a strategy for participatory forest management that the Department of Forestry introduced in the early 1990s. The creation of Community Forests (CFs) was deemed necessary after the government's "state-controlled-top-down-forest management" approach, which was in place at the time, caused a significant decline in closed woodlands. Its goals are to give stakeholders legally secured ownership and/or exclusive use right, as well as to encourage active participation in the management of the forest. This allows stakeholders to become involved and have a stake in the forest's protection. The main objectives of CF are outlined as follows: "to contribute to protect and maintain an adequate national forest cover and/or slow down and eventually stop environmental degradation"; and "to increase the welfare of local communities through the introduction of ecologically adapted natural resource management practices."

CFs has a vital role to play in the maintenance and management of the country's forest cover. Communities will benefit from the practice as the trees would provide multiple additional amenity values including shade, fruit and other non-wood products, windbreaks, etc. and the communities are entitled to commercialize the forest products.

Nonetheless, there are at least four Community Forests within the GIRAV project intervention sites of the road corridor that are less than 10 meters from the edge of the roads: Fass-Njage Choi (16.23 hectares), co-management of Sukuta, Duta Walli, Banni (80.4 hectares); Kuwonku-ba (259 hectares); and Kafencheng (30 hectares). It has been noted that the road expansion will encroach or destroy the forest boundaries. When extending the road by the poles' indication, workers are encouraged to take special care so as not to negatively affect the trees at the edge of the road.



Figure 4.16: Picture taken for the Co-management of Sukuta, Duta Wally and Banni 2 m from the center of the road

4.2.1.2. Open and trees Outside Forest

The trees that are chosen for preservation outside of forests are chosen based on their socioeconomic significance and the level of legal protection that they have. Most of these species are protected because they are valuable for their timber, nutrition, food, medicine, and fodder, which helps to meet the local population's needs. The following are frequent species found in open areas and outside of forests: *Adansonia digitata*, *Khaya senegalensis*, *Spondial mumbin*, *Tamarindus indica*, *Cordyla pinnata*, *Parkia biglobosa*, *Pterocarpus erinaceas*, and *Ziziphus mauritania*. As to the definition provided by the Forest Act, a "forest tree" encompasses any trees that naturally grow both outside and inside forests, regardless of whether they are planted or not.

On the other hand, farmland, fallow lands, forest reserves, or "open forest" are said to be commonly found within the GIRAV project intervention sites along the corridors, since the species mentioned above found along the edges of the feeder roads.

Therefore, the growing of native tree species to improve the sustainability and productivity of the areas must be promoted. The use of indigenous tree species needs to be more attractive to local communities than the planting of exotic trees.



Figure 4.17: Picture taken at Kussi Farmlands before Community Forest 3 m from the center of the road



Figure 4.18: Picture taken between Bulanjor and Jokoi Sibrik 3 m from the center of the road

4.2.2. Wildlife Species

Since wildlife is a vital natural resource that supports the health of ecosystems and forest ecological services, it is of utmost importance to humans as well as the environment. A significant portion of the population, including both urban and forest-dependent communities, depend on it for provisioning services (such as those that produce food and income). It also plays a crucial role in controlling natural processes at all levels of the food chain, including seed dispersal, nutrient cycling, and even landscape structure. Through activities like tourism and the trade in products made from wild animals, wildlife also helps to support national economies and livelihoods, particularly at the local level.

But along the feeder roads' corridor, the most common wildlife species seen at the GIRAV project intervention sites are the baboon, monkey, bush pig, squirrel, snake, lizard, and rat. The mammalian species that these communities use, such as squirrels and rats, as well as the reptiles, such as lizards, are frequently hunted for food to augment the availability of protein in the area.

Alternatively, hunting is scheduled for four months each year, from January to the end of April, as part of the Gambia's wildlife management program. This will give licensed foreign hunters from Europe the ability to affect the population of species of vermin that have been declared, such as warthogs, baboons, pigeons, and bush pigs, among different bird species. Except for the breeding season for the species involved, which occurs before and during the rainy season, local hunters are permitted to obtain subsistence hunting licenses for use throughout the year.

Table 4.2: Wildlife species found along the 10m corridors and their status nationally and within the IUCN Red List

English Name	Scientific Name	National level Status	Status on IUCN Red List	Source of identification and IUCN status			
				During site visit by DOF	In confirmation with the DPWM	Bibliographic research	Status
Baboon	<i>Papio papio</i>	LC	LC	*	*	*	common
Wart hog	<i>Phacochoerus africanus</i>	LC	LC	*	*	*	common
Patas monkey	<i>Erythrocebus patas</i>	LC	LC	*	*	*	common
Sun Squirrel	<i>Marmotini spp</i>	LC	LC	*	*	*	common
Giant rat	<i>Cricetomys gambianus</i>	LC	LC	*	*	*	common
Red Colobus	<i>Colobus badius</i>	LC	LC	*	*	*	common
Monitor Lizard		LC	LC	*	*	*	common

LC = Least Concern: When evaluated against the red list criteria and does not qualify for critically endangered species.

Religious convictions prevent the people from eating warthogs, but they regularly kill other small creatures to supplement the protein supplies, such as monitor lizards and squirrels, which sometimes include the Giant rat. Similarly, locals claim that red Colobus, patas monkeys, and baboons contribute to the destruction of farmlands when they grow any kind of crop or vegetable. Because of this, it is imperative that the Department of Parks and Wildlife Management promote the value of wildlife in maintaining ecosystem health and forest ecological services.

4.2.3. Domestic Animal

Livestock have a significant role in socioeconomic development because of their capacity to generate food, income, and jobs. Livestock is essential to rural residents' ability to save money and make a life. Traditional cow breeds are the main source of beef, milk, and meat from small ruminants in the Gambia. All the administrative regions raise livestock, such as cattle, sheep, goats, and donkeys, however production is concentrated in rural areas, and the aforementioned species are regularly observed there when the GIRAV project intervention sites on feeder roads were visited. Considering this, it is vital for their health and safety that they crossroads to obtain food.

Table 4.3: Domestic animals found along the 10m corridors and their English and Scientific names

English Name	Scientific Name	Source of identification	
		During site visit by DOF	In confirmation with the DLS
Cattle	<i>Bos Taurus</i>	*	*
Sheep	<i>Ovis Aries</i>	*	*
Goat	<i>Capra Aegarus Hircus</i>	*	*
Donkey	<i>Equus Asinus</i>	*	*
Horse	<i>Equus Caballus</i>	*	*

In terms of how our society functions, the animals indicated above cattle, donkeys, and horses assist in meeting needs in the areas of agriculture and service delivery. Like goats and sheep, which improve

socioeconomic standing and increase food supply. The Department of Livestock Services must therefore protect these animals' rights, especially with reference to the cattle track, to enable the simple movement of these animals.



Figure 4.19: The picture shows the feeder route between Kree Amadou and Kuntai 4 m from the center of the road

4.3. Socio-economic

The socio-economic baseline data are presented by region and district, since data at community level were challenging to obtain. The road conditions of the proposed sites and other relevant socio-economic baseline information are also discussed in the subsequent sections.

4.3.1. Sandu District - URR

4.3.1.1. Demographic Characteristics

The population structure of the Sandu district depicts a youthful population structure with a broad base and a narrow top (GBoS, 2020). There is a high dependency in the district as the 0–14-year-olds (47.1 %) are highly dependent on the working population (48.9%) who are almost of the same proportion. The average household size in Sandu is 9 people per household. In terms of sex disaggregation, females (54.5%) are more than males (45.5%).

Table 4.4: Percentage distribution of Population by Broad Age-groups, dependency ratio and districts, 2020

LGA/District	0-14 years	15-64 years	65 + years	Age Dependency Ratio
<i>URR</i>	47.8	48.7	3.4	105.1
Sandu	47.1	48.9	3.9	104.3

4.3.1.2. Education

The percentage distribution of persons aged 3+ years who attended school in Sandu was 23.4 per cent while 75.7 per cent never attended school. In Sandu, more people have primary level of education (68.1%). Followed by those with lower secondary education (11.7%). In Sandu, 73.1 per cent of the respondents cite religious reasons for not attending school (GBoS, 2020).

Table 4.5: Distribution of Population (3+ years) who Ever Attended School by district, 2020

LGA/District	Both Sexes			
	*Total	In the Past	In school	Never attended
URR	36.3	10.5	25.8	63.7
Sandu	23.3	4.9	19.4	75.7

4.3.1.3. Health

In the Sandu district, 8.3 per cent of the people were reported to be ill or injured two weeks prior to the 2020 IHS. In terms of sex distribution, females (7.2%) have a higher morbidity rate than males (5.7%). The most common illness reported was fever (18.9%). More than 80 per cent of the individuals reported consulting a health care practitioner when sick or for other reasons. A greater proportion (86.1%) of households access a health facility within 30 minutes in Sandu. The proportion of births assisted by nurses or midwives was highest in the district, at 87.6 per cent.

Table 4.6: Percentage Distribution of Population by Access to Health Facilities and Time Taken to Health Facility by district, 2020

LGA/District	Access	30	0-14	15-29	30-44	45-59	60+
	within Minutes						
URR	70.7		39.3	31.4	11.5	8.7	9.2
Sandu	86.1		10.1	76.0	10.5	0.0	3.4

4.3.1.4. Housing and Housing Characteristic

The most common source of cooking fuel in most households in Sandu districts is firewood, reported by, more than 97 per cent of households. The use of non-wood fuel is very minimal, with 0.3 per cent of households in the district using gas when cooking (GBoS, 2020).

Table 4.7: Percentage distribution of Households by Non-wood Fuel Use, Main Source of Fuel for Cooking, and district

LGA/district	Non-wood fuel	Firewood	Charcoal	Gas	Electricity	Solar power	Animal/plant waste	Does not cook	Other
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<i>URR</i>	0.0	88.5	7.1	0.1	0.0	0.1	0.0	4.0	0.3
Sandu	0.0	97.3	0.9	0.5	0.0	0.0	0.0	1.0	0.3

The most common sources of lighting fuel in Sandu are NAWEC (29.9%) and solar power (15.9%). Some households also stated that they use battery powered light as a source of lighting; about 8 per cent of households in Sandu use this. No household reported use of a kerosine lamp (GBoS, 2020).

Table 4.8: Percentage distribution of households by main source of fuel for lighting and district, 2020

LGA/district	Electricity (NAWEC)	Electricity (Generator)	Solar power	Kerosine lamp with shade	Candles	Battery Powered light	Other
<i>URR</i>	44.8	0.1	14.7	0.0	0.0	2.6	37.7
Sandu	29.9	0.0	15.9	0.0	0.3	8.4	45.4

Living in healthy and clean environments also includes proper disposal of refuse and waste. In most households in Sandu, burning is the common norm for solid waste disposal, as reported by 41.7 per cent of households. Similarly, burying (25%) and bush or open space dumping (27.3%) are also common in the district (GBoS, 2020).

Table 4.9: Percentage distribution of households by main method of waste disposal and district, 2020

LGA/district	Landfill/bury	Burnt	Use as compost	Collected by Municipal (HH provides bin)	Collected by private body	Set-Settal	Public dump	In bush/Open Space
<i>URR</i>	9.5	21.5	3.1	0.1	0.2	1.3	23.7	40.4
Sandu	25.0	41.7	2.4	0.0	0.0	0.0	3.3	27.3

4.3.1.5. Poverty

Prevalence of Poverty

The poverty rate shows the percentage of the poor. The figure below shows that 87.2 per cent of the population in Sandu is poor.

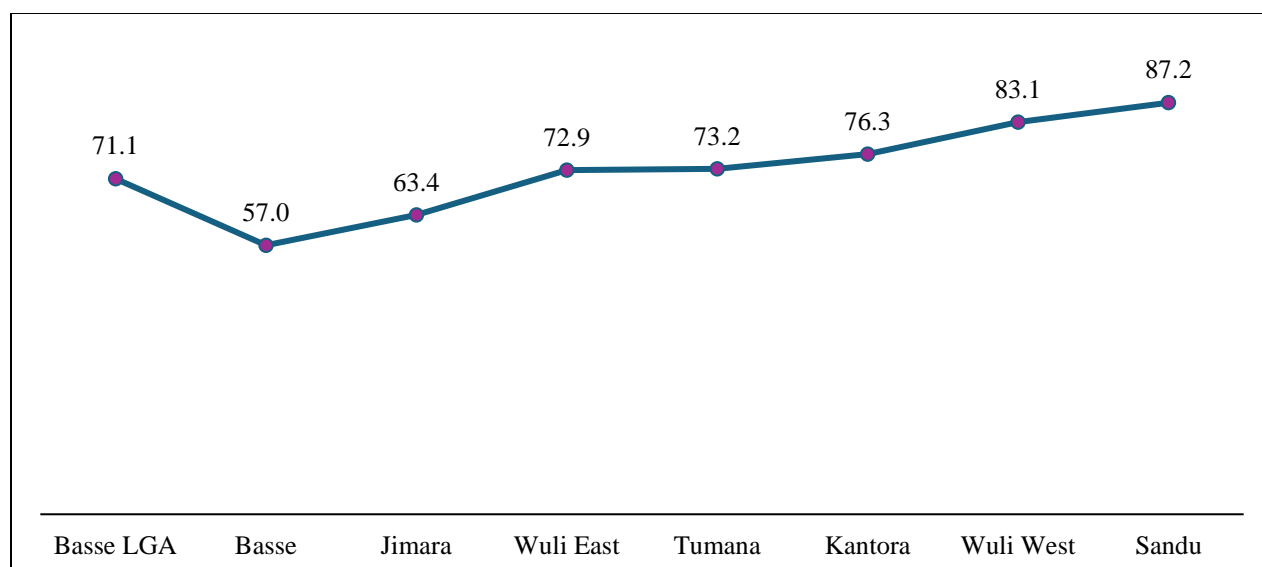


Figure 4.20: District Poverty Mountain of absolute poverty (Headcount ratio), 2020

4.3.2. Wuli West -URR

4.3.2.1. Demographic Characteristics

The population structure of Wuli West district depicts a youthful population structure with a broad base and a narrow top (GBoS, 2020). There is a high level of dependency in all the districts, as the 0–14 year olds (48.9%) are highly dependent on the working population (47.1%), who are almost of the same proportion. The average household size in Wuli West is 9 people per household. In terms of sex disaggregation, females (52.8%) are more than males (47.2%).

Table 4.10: Percentage distribution of Population by Broad Age-groups, dependency ratio and districts, 2020

LGA/District	0-14 years	15-64 years	65 + years	Age Dependency Ratio
URR	47.8	48.7	3.4	105.1
Wuli West	48.9	47.6	3.5	110.1

4.3.2.2. Education

About 34.1 per cent of the district’s population reported having attended school. In addition, like the other districts in URR, most of the population in the district—65.9 percent—has never attended school; 23.3 per cent are currently in school. In Wuli West, more people have a primary level of education (62.7%). Followed by those with lower secondary education (14.5%). More than half (62.2%) cite religious reasons for not attending school (GBoS, 2020).

Table 4.11: Distribution of Population (3+ years) who Ever Attended School by district, 2020

LGA/District	Both Sexes			
	*Total	In the Past	In school	Never attended
URR	36.3	10.5	25.8	63.7
Wuli West	34.1	10.8	23.3	65.9

4.3.2.3. Health

Those who reported being sick two weeks prior to the survey in the district make up 13.4 per cent, out of which males accounted for 5.4 per cent and females 7.5 per cent representing a higher morbidity rate among females than males (GBoS, 2020). The most common illness reported was fever (24.2%). More than 70 per cent of the individuals reported consulting a health care practitioner when sick or for other reasons. For those sick, access to a health facility within 30 minutes was reported by 84.7 per cent, and 9.6 per cent took more than an hour to access a health facility. The proportion of births assisted by nurses or midwives was highest in the district, at 88.9 per cent.

Table 4.12: Percentage Distribution of Population by Access to Health Facilities and Time Taken to Health Facility by district, 2020

LGA/District	Access within 30 minutes	0-14 minutes	15-29 minutes	30-44 minutes	45-59 minutes	60+ minutes
URR	82.6	46.3	36.3	10.8	3.8	2.8
Wuli West	84.7	43.0	41.7	5.7	0.0	9.6

4.3.2.4. Housing and Housing Characteristic

Firewood is the most common source of cooking fuel in the district, reported at 94.2 per cent. Less than one percent used either gas, charcoal, or solar power as their main source of cooking fuel, while 3.8 per cent reported that they do not cook.

Table 4.12: Percentage distribution of Households by Non-wood Fuel Use, Main Source of Fuel for Cooking and district

LGA/district	Non-wood fuel	Firewood	Charcoal	Gas	Electricity	Solar power	Animal/plant waste	Does not cook	Other
URR	0.0	88.5	7.1	0.1	0.0	0.1	0.0	4.0	0.3
Wuli West	0.0	94.2	0.9	0.3	0.0	0.3	0.0	3.8	0.5

Solar power (24.8%) and NAWEC (118.7%) are the most common sources of lighting in Wuli West. No household reported using charcoal or candles as a source of lighting.

Table 4.13: Percentage distribution of households by main source of fuel for lighting and district, 2020

LGA/district	Electricity (NAWEC)	Electricity (Generator)	Solar power	Kerosine lamp with shade	Candles	Battery Powered light	Other
URR	44.8	0.1	14.7	0.0	0.0	2.6	37.7
Wuli West	18.7	0.0	24.8	0.3	0.0	4.4	51.4

Almost half (49.1%) of the district's population used bush or open space as the most common source of waste disposal, followed by those who burn (17%), burry (16.3%), and use public dumping (15.2%).

Table 4.14: Percentage distribution of households by main method of waste disposal and district, 2020

LGA/district	Landfill/burry	Burnt	Use as compost	Collected by Municipal (HH provides bin)	Collected by private body	Set-Settal	Public dump	In bush/Open Space
URR	9.5	21.5	3.1	0.1	0.2	1.3	23.7	40.4
Wuli West	16.3	17.0	1.2	0.0	0.0	0.0	15.2	49.1

4.3.2.5. Poverty

Prevalence of Poverty

The poverty rate shows the percentage of the poor. The figure below shows that 83.1 per cent of the population in Wuli West is poor (GBoS, 2020).

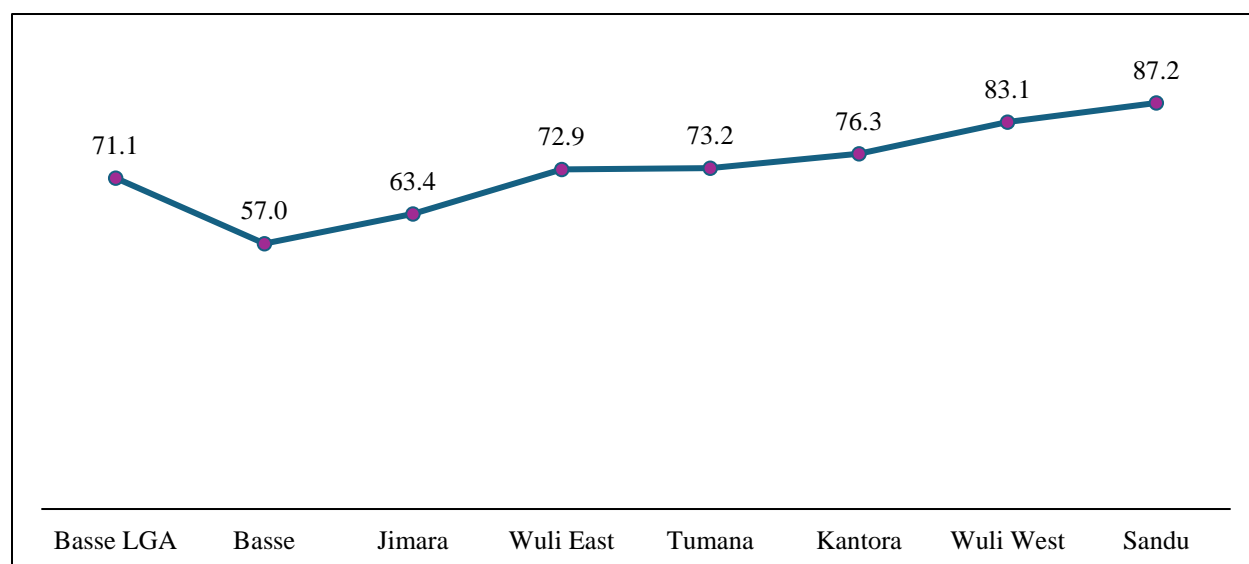


Figure 4.21: District Poverty Mountain of absolute poverty (Headcount ratio), 2020

4.3.3. Niamina East – CRR

4.3.3.1. Demographic Characteristics

The population structure of Niamina East district depicts a youthful population structure with a broad base and a narrow top (GBoS, 2020). There is a high dependency in all the districts, as the 0–14 year olds (48.6%) are highly dependent on the working population (48.2%), who are almost of the same proportion. The average household size in Niamina East is 8 people per household. In terms of sex disaggregation, females (59.3%) are more than males (46.1%).

Table 4.15: Percentage distribution of Population by Broad Age-groups, dependency ratio and districts, 2020

LGA/District	0-14 years	15-64 years	65 + years	Age Dependency Ratio
<i>CRR South</i>	47.1	49.7	3.2	101
Niamina East	48.6	48.2	3.1	107

4.3.3.2. Education

The percentage distribution of persons aged 3+ years who attended school in Niamina East was 20.4 per cent, while 79.6 per cent never attended school. In Niamina East, more people have an upper secondary education (32.2%). Followed by those with primary education (26.1%). None have completed vocational education. In Niamina East, 27.3 per cent cite religious reasons for not attending school. The GER at the primary level was 78.9 percent for both sexes, representing 82.9 per cent for females and 73.3 per cent for males in Niamina East. In terms of the net enrolment rate (NER), females have higher proportions at all levels of education (GBoS, 2020).

Table 4.16: Distribution of Population (3+ years) who Ever Attended School by district, 2020

LGA/District	Both Sexes				
	Count	*Total	In the Past	In school	Never attended
<i>CRR South</i>	116,759	42.0	14.6	27.4	58.0
Niamina East	20,112	20.4	0.0	20.4	79.6

4.3.3.3. Health

In the Niamina East district, 6.4 percent of the people were reported to be ill or injured two weeks prior to the 2020 IHS. In terms of sex distribution, females (7.2%) have a higher morbidity rate than males (5.7%). The most common illness reported was cough (17.2%), followed by fever (13.8%). More than 70 percent of the individuals reported consulting a health care practitioner when sick or for other reasons. A greater proportion of households access a health facility within 30 minutes in Niamina East. The proportion of births assisted by nurses and midwives was highest in the district, at 85.9 percent. About 90 percent of children in all the districts had vaccination cards.

Table 4.17: Percentage Distribution of Population by Access to Health Facilities and Time Taken to Health Facility by district, 2020

LGA/District	Access					
	within 30 Minutes	0-14 minutes	15-29 minutes	30-44 minutes	45-59 minutes	60+ minutes
<i>CRR South</i>	70.7	39.3	31.4	11.5	8.7	9.2
Niamina East	76.7	12.6	64.1	13	2.6	7.7

4.3.3.4. Housing and Housing Characteristic

The most common source of cooking fuel in most households in Niamina East districts is firewood, reported by more than 93 percent of households. The use of non-wood fuel is very minimal, with 0.3 percent of households in the district using gas when cooking (GBoS, 2020).

Table 4.18: Percentage distribution of Households by Non-wood Fuel Use, Main Source of Fuel for Cooking and district

LGA/district	Non-wood fuel	Firewood	Charcoal	Gas	Electricity	Solar power	Animal/plant waste	Does not cook	Other
<i>CRR South</i>	0.3	88.5	6.9	0.2	0.1	0.0	0.0	4.3	0.0
Niamina East	0.3	93.2	2.5	0.3	0.0	0.0	0.0	3.8	0.3

The most common sources of lighting fuel in Niamina East are battery-powered light and solar power, with 54.1 and 23.3 percent, respectively. Some households also stated that they use candles as a source of lighting; about 6 percent of households in Niamina East use candles. No household reported use of a kerosine lamp (GBoS, 2020).

Table 4.19: Percentage distribution of households by main source of fuel for lighting and district, 2020

LGA/district	Kerosine lamp with shade						
	Electricity (NAWEC)	Electricity (Generator)	Solar power	Candles	Battery Powered light	Other	
<i>CRR South</i>	22.2	0.4	16.3	0	4.7	55.4	1
Niamina East	13.7	0.3	23.3	0	5.6	54.1	3

Living in healthy and clean environments also includes proper disposal of refuse and waste. In most households in Niamina East, landfilling or burying is the common norm for solid waste disposal, as reported by 55 percent of households in Niamina East. Similarly, burning is also common in the district (17.9%). Recycling is non-existent in the districts (GBoS, 2020).

Table 4.20: Percentage distribution of households by main method of waste disposal and district, 2020

LGA/district	Landfill/burry	Burnt	Use as compost	Recycle	Collected by Municipal (HH provides bin)	Collected by Municipal/ bin)	private body	Set-Settal	Public dump	In bu Sp
<i>CRR South</i>	37.9	21.2	1.2	0.1	0.2	0.7	1.3	0.0	15.6	18.
Niamina East	55.0	17.9	0.5	0.0	0.0	0.0	0.0	0.0	11.6	11.

4.3.3.5. Poverty

Prevalence of Poverty

The poverty rate shows the percentage of the poor. The figure below shows that 67.4 per cent of the population in Niamina East is poor (GBoS, 2020).

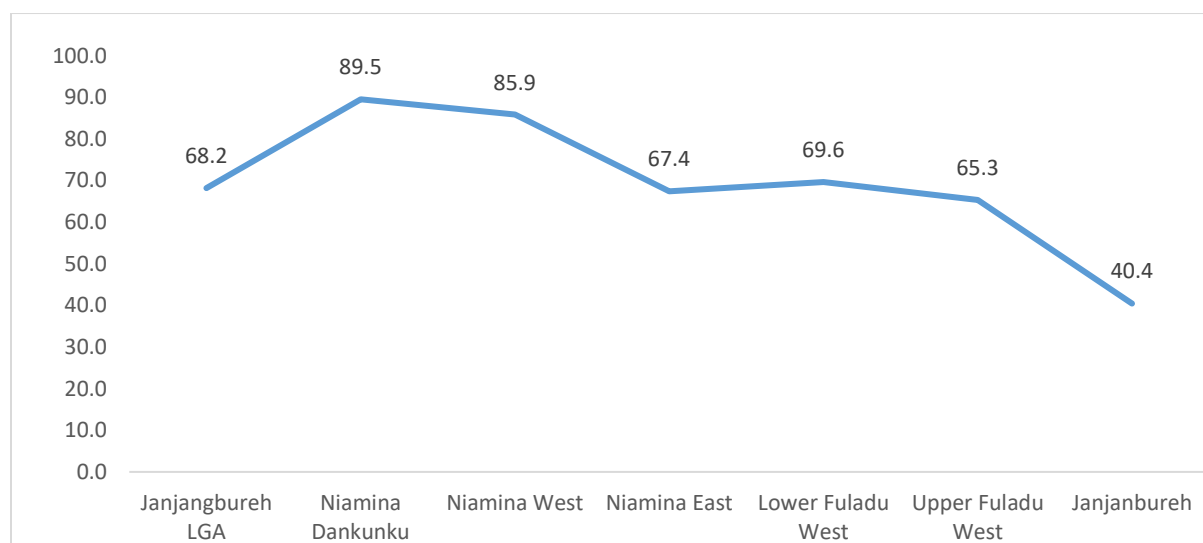


Figure 4.22: District Poverty Mountain of absolute poverty (Headcount ratio), 2020

4.3.4. Upper Fulladu West - CRR

4.3.4.1. Demographic Characteristics

The population structure of Upper Fulladu West district depicts a youthful population structure with a broad base and a narrow top. There is a high dependency in all the districts, as the 0–14 year olds and 65+ years are highly dependent on the working population, who are almost of the same proportion. The average household size in Upper Fulladu West is 8 people per household. In terms of sex disaggregation, females with 53 percent are more than males with 47 percent.

Table 4.21: Percentage distribution of Population by Broad Age-groups, dependency ratio and districts, 2020

LGA/District	0-14 years	15-64 years	65 + years	Age Dependency Ratio
<i>CRR South</i>	47.1	49.7	3.2	101
Upper Fulladu West	47.1	49.9	2.9	100

4.3.4.2. Education

The percentage distribution of persons aged 3+ years who attended school in Upper Fulladu West was 23.5 percent in 2020, while 76.4 percent never attended school. More people have a lower secondary education (30.4%) and an upper secondary education (23.3%). There are no degree holders in the district. In Upper Fulladu West, 55.5% cite religious reasons for not attending school. The gross enrolment ratio at the primary level was 79.2 percent for both sexes, representing 83.3 percent for females and 75.1 percent for males in Upper Fulladu. In terms of the Net Enrolment Rate (NER), females have higher proportions at all levels of education except tertiary (GBoS, 2020).

Table 4.22: Distribution of Population (3+ years) who Ever Attended School by district, 2020

LGA/District	Both Sexes				
	Count	*Total	In the Past	In school	Never attended
<i>CRR South</i>	116,759	42.0	14.6	27.4	58.0
Upper Fulladu West	47,781	23.5	0.2	23.3	76.4

4.3.4.3. Health

In Upper Fulladu, 5.3 percent of the people were reported to be ill or injured two weeks prior to the 2020 IHS. In terms of sex distribution, females (6.4%) have a higher morbidity rate than males (4.4%). The most common illness reported was cough (17.8%), followed by fever (14.8%). More than 70 percent of the individuals reported consulting a health care practitioner when sick or for other reasons. A greater proportion of households access a health facility within 30 minutes in Upper Fulladu West. The proportion of births assisted by nurses and midwives was highest in the district, at 73 percent. About 98.3 percent of children in all the districts had vaccination cards.

Table 4.23: Percentage Distribution of Population by Access to Health Facilities and Time Taken to Health Facility by district, 2020

LGA/District	Access within 30 Minutes	0-14 minutes	15-29 minutes	30-44 minutes	45-59 minutes	60+ minutes
	<i>CRR South</i>	70.7	39.3	31.4	11.5	8.7
Upper Fulladu West	63.9	44.4	19.5	8.4	17.1	10.6

4.3.4.4. Housing and Housing Characteristic

In Upper Fulladu West, the most common source of cooking fuel in most households is firewood, reported by more than 86 percent of households. The use of non-wood fuel is very minimal, with 0.3 percent of households in the district using electricity when cooking (GBoS, 2020).

Table 4.24: Percentage distribution of Households by Non-wood Fuel Use, Main Source of Fuel for Cooking and district, 2020

LGA/district	Non-wood fuel	Firewood	Charcoal	Gas	Electricity	Solar power	Animal/plant waste	Does not cook	Other
<i>CRR South</i>	<i>0.3</i>	<i>88.5</i>	<i>6.9</i>	<i>0.2</i>	<i>0.1</i>	<i>0.0</i>	<i>0.0</i>	<i>4.3</i>	<i>0.0</i>
Upper Fulladu West	0.3	86.7	9.9	0.0	0.3	0.0	0.0	3.1	0.0

The most common source of lighting fuel in the district is battery-powered light, at 57%. Some households also stated to use electricity from NAWEC and solar power as a source of lighting, with 28 and 11 percent, respectively (GBoS, 2020).

Table 4.25: Percentage distribution of households by main source of fuel for lighting and district, 2020

LGA/district	Electricity (NAWEC)	Electricity (Generator)	Solar power	Kerosine lamp with shade	Candles	Battery Powered light	Other
<i>CRR South</i>	<i>22.2</i>	<i>0.4</i>	<i>16.3</i>	<i>0</i>	<i>4.7</i>	<i>55.4</i>	<i>1</i>
Upper Fulladu West	28	0.5	11	0	3.4	57	0

Living in healthy and clean environments also includes proper disposal of refuse and waste. In Upper Fulladu West, landfills, or burying and burning, are the common norm for solid waste disposal, as reported by 27 and 22.4 per cent of households, respectively. Recycling is non-existent in the district (GBoS, 2020).

Table 4.26: Percentage distribution of households by main method of waste disposal and district, 2020

LGA/district	Landfill/burly	Burnt	Use as compost	Recycle	Collected by Municipal (HH provides bin)	Collected by Municipal/ bin)	by private body	Set-Settal	Public dump	In bus Sp
<i>CRR South</i>	<i>37.9</i>	<i>21.2</i>	<i>1.2</i>	<i>0.1</i>	<i>0.2</i>	<i>0.7</i>	<i>1.3</i>	<i>0.0</i>	<i>15.6</i>	<i>18.</i>
Upper Fulladu West	27.0	22.4	2.1	0.0	0.5	1.7	2.5	0.0	18.7	22.

4.3.4.5. Poverty

Prevalence of Poverty

The poverty rate shows the percentage of the poor. The figure below shows that 65.3 per cent of the population in Upper Fulladu West is poor (GBoS, 2020).

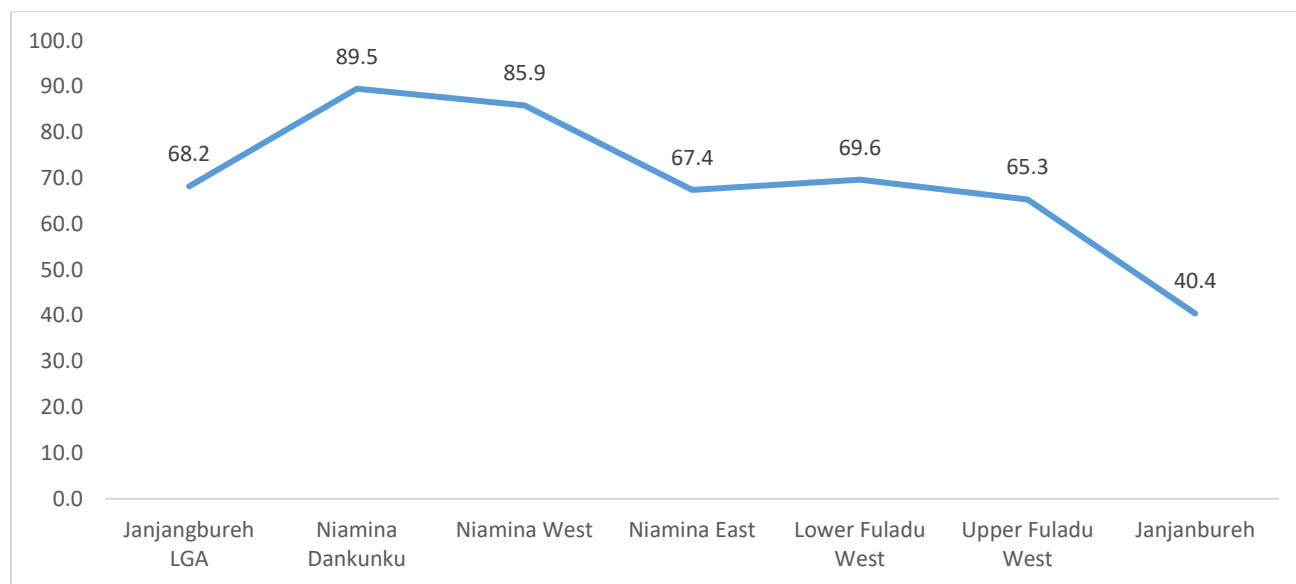


Figure 4.23: District Poverty Mountain of absolute poverty (Headcount ratio), 2020

4.3.5. Jarra West - LRR

4.3.5.1. Demographic Characteristics

The population structure of Jarra West district depicts a youthful population structure with a broad base and a narrow top (GBoS, 2020). There is a high level of dependency in all the districts, as the 0–14 year olds (44.3%) are highly dependent on the working population (51.7%), who are almost of the same proportion. The average household size in Jarra West is 7 people per household. In terms of sex disaggregation, females (55.7%) are more than males (44.3%).

Table 4.27: Percentage distribution of Population by Broad Age-groups, dependency ratio and districts, 2020

LGA/District	0-14 years	15-64 years	65 + years	Age Dependency
				Ratio
<i>LRR</i>	46.4	49.6	4.0	101.6
Jarra West	44.3	51.7	4.0	93.4

4.3.5.2. Education

The percentage distribution of persons aged 3+ years who attended school in Jarra West was 47.4 percent, while 52.7 percent never attended school. In Jarra West, more people have an upper secondary education (32.7%). Followed by those with lower secondary education (22.7%). None have completed higher education. In Jarra West, 63.5 percent of the respondents cite religious reasons for not attending school. The GER at the primary level was 91.6 percent for both sexes, representing 96.5 percent for females and 86.7 percent for males in Jarra West. In terms of the Net Enrolment Rate (NER), females have higher proportions at all levels of education except tertiary (GBoS, 2020).

Table 4.28: Distribution of Population (3+ years) who Ever Attended School by district, 2020

LGA/District	Both Sexes				
	Count	*Total	In the Past	In school	Never attended
LRR	93,432	47.4	15.8	31.6	52.7
Jarra West	23,042	33.7	4.5	33.7	66.3

4.3.5.3. Health

In the Jarra West district, 7.6 percent of the people were reported to be ill or injured two weeks prior to the 2020 IHS. In terms of sex distribution, females (8.5%) have a higher morbidity rate than males (6.6%). The most common illness reported was cough (19.1%), followed by abdominal pain (14.1%). More than 75 percent of the individuals reported consulting a health care practitioner when sick or for other reasons. A greater proportion of households take more than 60 minutes to access a health facility in Jarra West. The proportion of births assisted by nurses and midwives was highest in the district, at 88.5 percent. About 99.1 percent of children in all the districts had vaccination cards.

Table 4.29: Percentage Distribution of Population by Access to Health Facilities and Time Taken to Health Facility by district, 2020

LGA/District	Access	30-44	45-59	60+		
	within Minutes					
LRR	64.4	13.9	7.7	1.8	12.2	64.4
Jarra West	73.9	10.0	10.3	0.0	5.7	73.9

4.3.5.4. Housing and Housing Characteristic

The most common source of cooking fuel in most households in Jarra West districts is firewood, reported by more than 75.1% of households. The use of non-wood fuel is nonexistent among households in the district (GBoS, 2020).

Table 4.30: Percentage distribution of Households by Non-wood Fuel Use, Main Source of Fuel for Cooking and district

LGA/district	Non-wood fuel	Firewood	Charcoal	Gas	Electricity	Solar power	Animal/plant waste	Does not cook	Other
<i>LRR</i>	0.0	91.1	6.9	0.0	0.0	0.0	0.0	1.7	0.2
Jarra West	0.0	75.1	19.8	0.0	0.0	0.0	0.0	4.4	0.7

The most common source of lighting fuel in Jarra West is NAWEC-generated electricity, with 78.2 percent. Some households also stated that they use battery-powered light as a source of lighting; 17 percent of households in Jarra West use battery-powered light. No household reported use of a kerosine lamp (GBoS, 2020).

Table 4.31: Percentage distribution of households by main source of fuel for lighting and district, 2020

LGA/district	Electricity (NAWEC)	Electricity (Generator)	Solar power	Kerosine lamp with shade	Candles	Battery Powered light	Other
<i>LRR</i>	26.2	0.9	27.9	0.1	6.3	38.4	0.2
Jarra West	78.2	0.4	2.5	0.0	1.0	17.2	0.6

Living in healthy and clean environments also includes proper disposal of refuse and waste. In most households in Jarra West, burning, public dumps, landfills, or burying is the common norm for solid waste disposal, as reported by 24.9, 22.7, and 20.3 per cent of households in Jarra West, respectively. Recycling (0.2%) is minimal in the districts (GBoS, 2020).

Table 4.32: Percentage distribution of households by main method of waste disposal and district, 2020

LGA/district	Landfill/burial	Burnt	Use as compost	Recycle	Collected by Municipal (HH provides bin)	Collected by Municipal/ private body	Set-Settal	Public dump	In bu Sp
<i>LRR</i>	22.0	31.5	7.4	0.1	0.3	0.1	0.2	0.0	16.2
Jarra West	20.3	24.9	1.1	0.2	0.5	0.3	0.7	0.0	22.7

4.3.5.5. Poverty

Prevalence of Poverty

The poverty rate shows the percentage of the poor. The figure below shows that 64.5 per cent of the population in Jarra West is poor (GBoS, 2020).

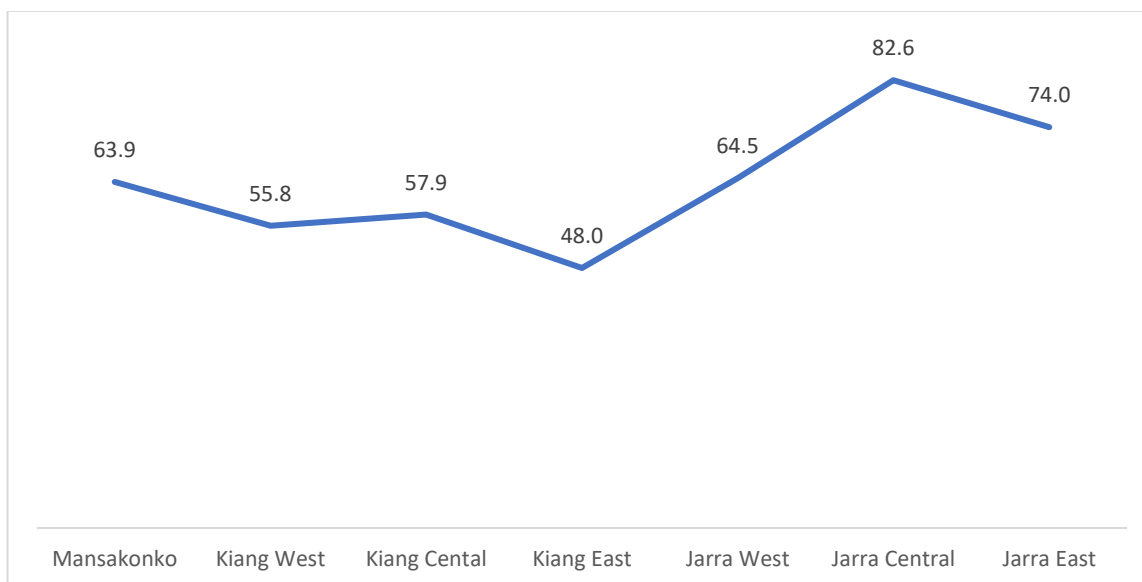


Figure 4.24: District Poverty Mountain of absolute poverty (Headcount ratio), 2020

4.3.6. Kiang Central - LRR

4.3.6.1. Demographic Characteristics

The population structure of Kiang Central District depicts a youthful population structure with a broad base and a narrow top. There is a high dependency in all the districts, as the 0–14 year olds and 65+ years are highly dependent on the working population, who are almost of the same proportion. The average household size in Kiang Central is 8 people per household. In terms of sex disaggregation, females with 52.9 percent are more than males with 47.1 percent.

Table 4.33: Percentage distribution of Population by Broad Age-groups, dependency ratio and districts, 2020

LGA/District	0-14 years	15-64 years	65 + years	Age Dependency Ratio
LRR	46.4	49.6	4.0	101.6
Kiang Central	45.2	50.8	4.0	96.9

4.3.6.2. Education

The percentage distribution of persons aged 3+ years who attended school in Kiang Central was 21.2 percent in 2020, while 78.7 percent never attended school. More people have a primary education (39.4%) and a lower secondary education (27.6%). There are no degree holders in the district. In Kiang Central, 50.5 percent of the population considered the unusefulness of school as a reason for not attending school. The Gross Enrolment Ratio (GER) at the primary level was 86.1 percent for both sexes, representing 89.7 percent for females and 82.4 percent for males in Upper Fulladu. In terms of Net Enrolment Rate (NER), females have higher proportions at all levels of education; however, both sexes have no NER at the tertiary level (GBoS, 2020).

Table 4.34: Distribution of Population (3+ years) who Ever Attended School by district, 2020

LGA/District	Both Sexes				
	Count	*Total	In the Past	In school	Never attended
LRR	93,432	47.4	15.8	31.6	52.7
Kiang Central	10,980	21.2	0.7	20.5	78.7

4.3.6.3. Health

In Upper Fulladu, 16.3 percent of the people were reported to be ill or injured two weeks prior to the 2020 IHS. In terms of sex distribution, females (17.3%) have a higher morbidity rate than males (15.3%). The most common illness reported was headache (22.3%), followed by body pain, general body pain, and internal pain (17.1%). More than 80 percent of the individuals reported consulting a health care practitioner when sick or for other reasons. A greater proportion of households access a health facility within 30 minutes in Kiang Central. The proportion of births assisted by nurses and midwives was the highest in the district, at 75 percent. About 96.6 percent of children in all the districts had vaccination cards.

Table 4.35: Percentage Distribution of Population by Access to Health Facilities and Time Taken to Health Facility by district, 2020

LGA/District	Access	30	0-14	15-29	30-44	45-59	60+
	within						
LRR	64.4		13.9	7.7	1.8	12.2	64.4
Kiang Central	45.8		20.0	3.9	2.7	27.5	45.8

4.3.6.4. Housing and Housing Characteristic

In Kiang Central, the most common source of cooking fuel in most households is firewood, reported by more than 97.0 per cent of households. No household uses non-wood fuel in Kiang Central (GBoS, 2020).

Table 4.36: Percentage distribution of Households by Non-wood Fuel Use, Main Source of Fuel for Cooking and district

LGA/district	Non-wood fuel	Firewood	Charcoal	Gas	Electricity	Solar power	Animal/plant waste	Does not cook	Other
<i>LRR</i>	0.0	91.1	6.9	0.0	0.0	0.0	0.0	1.7	0.2
Kiang Central	0.0	97.0	2.5	0.0	0.0	0.0	0.0	0.5	0.0

The most common sources of lighting fuel in the district are battery-powered light and solar power, with 42.4 and 40.8 percent, respectively. Some households also stated that they use candles as a source of lighting (11.3%) (GBoS, 2020).

Table 4.37: Percentage distribution of households by main source of fuel for lighting and district, 2020

LGA/district	Electricity (NAWEC)	Electricity (Generator)	Solar power	Kerosine lamp with shade	Candles	Battery Powered light	Other
<i>LRR</i>	26.2	0.9	27.9	0.1	6.3	38.4	0.2
Kiang Central	1.5	4.0	42.4	0.0	11.3	40.8	0.0

Living in healthy and clean environments also includes proper disposal of refuse and waste. In Kiang Central, burning and landfilling, or burying, are the common norms for solid waste disposal, as reported by 31.5 and 22.0 percent of households, respectively. Recycling is non-existent in the district (GBoS, 2020).

Table 4.38: Percentage distribution of households by main method of waste disposal and district, 2020

LGA/district	Landfill/burury	Burnt	Use as compost	Recycle	Collected by Municipal (HH provides bin)	Collected by Municipal/ bin)	private body	Set-Settal	Public dump	In bu Sp
<i>LRR</i>	22.0	31.5	7.4	0.1	0.3	0.1	0.2	0.0	16.2	
Kiang Central	24.0	38.6	13.6	0.0	0.0	0.0	0.0	0.0	17.0	

4.3.6.5. Poverty

Prevalence of Poverty

The poverty rate shows the percentage of the poor. The figure below shows that 57.9 per cent of the population in Kiang Central is poor (GBoS, 2020).

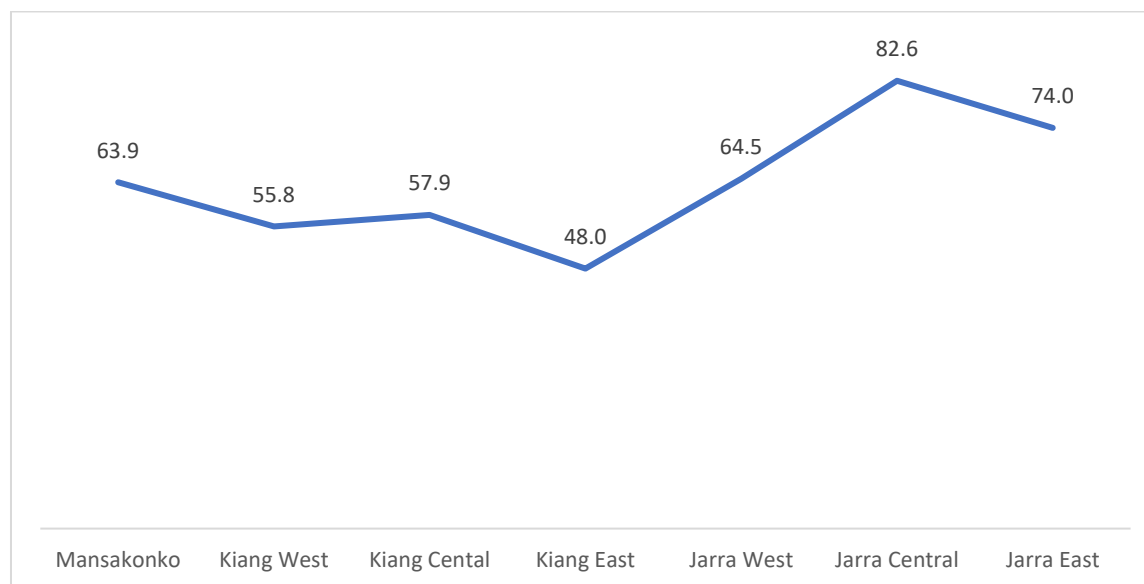


Figure 4.25: District Poverty Mountain of absolute poverty (Headcount ratio), 2020

4.3.7. Jokadu -NBR

4.3.7.1. Demographic Characteristics

Jokadu has a high dependency ratio of 104; this shows that the children who make up the population 0–14 years (50.4%) and 65+ years (2.8%) are highly dependent on the working-age population 15–64 years (46.8%).

Table 4.39: Percentage distribution of Population by Broad Age-groups, dependency ratio and districts, 2020

LG/District	0-14 years	15-64 years	65 + years	Age Dependency Ratio
<i>NBR</i>	47.8	49.1	3.1	101
Jokadu	50.4	46.8	2.8	104

4.3.7.2. Education

In the district of Jokadu, 21.7 percent of the population reported having attended school. Out of this, 78.3 percent never attended school, 21.7 percent are currently attending school, and no one was reported to have attended school in the past in Jokadu.

Table 4.40: Distribution of Population (3+ years) who Ever Attended School by district, 2020

LGA/District	Both Sexes				
	Count	*Total	In the Past	In school	Never attended
<i>NBR</i>	251,895	45.0	15.8	29.2	55.0
Jokadu	30,227	21.7	0.0	21.7	78.3

4.3.7.3. Health

Jokadu district shows that 3.6 percent of its population reported being sick two weeks prior to the IHS survey, of which 3.2 percent were males and 3.9 percent were females (GBoS, 2020). Distribution of population by access to health facilities and time taken to health facilities shows that 27.4 percent reported having access to a health facility within 30 minutes. More than half of the population in the district had access to a health facility between 30-44 minutes, and 15.7% could access a health facility within 60 minutes or more.

Table 4.41: Distribution of Population by Access to Health Facilities and Time Taken to Health Facility by district, 2020

LGA/District	Access within 30 minutes	0-14 minutes	15-29 minutes	30-44 minutes	45-59 minutes	60+ minutes
<i>NBR</i>	82.6	46.3	36.3	10.8	3.8	2.8
Jokadu	27.4	15.4	12.0	56.9	0.0	15.7

4.3.7.4. Housing and Housing Characteristic

The most common source of cooking fuel in Jokadu is firewood (94.4%), followed by charcoal at 3 percent. While less than one percent reported using either gas or solar power as the main cooking fuel, However, 1.4 percent reported that they do not cook.

Table 4.42: Percentage distribution of Households by Non-wood Fuel Use, Main Source of Fuel for Cooking and district

LGA/district	Non-wood fuel*	Firewood	Charcoal	Gas	Electricity	Solar power	Animal/plant waste	Does not cook	Other
<i>NBR</i>	0.7	83.2	13.5	0.5	0.1	0.1	0.0	2.6	0.0
Jokadu	0.0	94.4	3.0	0.8	0.0	0.3	0.0	1.4	0.0

More than half of the district's population uses solar power as the main source of light; 39.2 percent uses battery-powered light; and 2.5 percent uses candles. NAWEC is used by 1.5 percent, 1.0 percent

uses electricity powered by a generator, and less than one percent uses kerosene with a shaded lamp or other sources of lighting.

Table 4.43: Percentage distribution of households by main source of fuel for lighting and district, 2020

LGA/district	Electricity (NAWEC)	Electricity (Generator)	Solar power	Kerosine lamp with shade	Candles	Battery Powered light	Other
<i>NBR</i>	31.7	0.5	33.7	0.2	2.5	31.3	0.3
Jokadu	1.5	1.0	54.7	0.9	2.3	39.2	0.4

Bush/open space (31.9%) is the most common way for waste disposal in Jokadu, followed by landfill/burying (28.9%), 21.4 percent use a public dump site, and 11.3 percent burn it. Four percent dispose by compost, 2.3 percent recycle, and less than one percent dispose by “set settal.”

Table 4.44: Percentage distribution of households by main method of waste disposal and district, 2020

LGA/District	Landfill/burrying	Burnt	Use as compost	Recycle	Collected by Municipal (HH provides bin)	Collected by Municipal (Municipality provided bin)	Collected by private body	Use set Settal	Public dump
<i>NBR</i>	26.1	18.2	3.4	1.4	0.4	0.3	2.2	0.2	19.4
Jokadu	28.9	11.3	4.0	2.3	0.0	0.0	0.0	0.2	21.4

4.3.7.5. Poverty

Prevalence of Poverty

The poverty rate shows the percentage of the poor. The figure below shows that 84.1 per cent of the population in Jokadu is poor (GBoS, 2020).

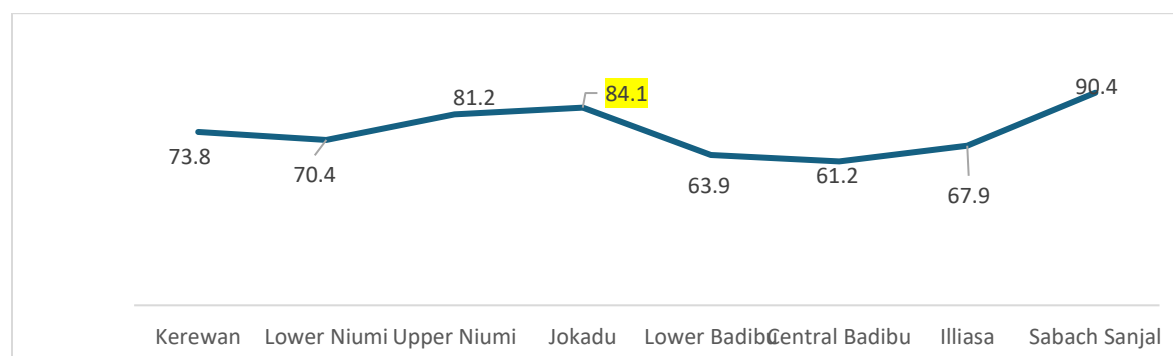


Figure 4.26: District Poverty Mountain of absolute poverty (Headcount ratio), 2020

4.3.8. Lower Nuimi - NBR

4.3.8.1. Demographic Characteristics

Lower Nuimi has the lowest dependency ratio (99) in NBR. The working-age population is dominated by slightly more than half (51.2%) of the population in the district; 45.9 percent make up the age group 0–14 years, and 2.9 percent represent the 65+ years.

Table 4.45: Percentage distribution of Population by Broad Age-groups, dependency ratio and districts, 2020

LGA/District	0-14 years	15-64 years	65 + years	Age Dependency Ratio
<i>NBR</i>	<i>47.8</i>	<i>49.1</i>	<i>3.1</i>	<i>101</i>
Lower Nuimi	45.9	51.2	2.9	99

4.3.8.2. Education

Thirty-three percent of the district’s population reported having ever attended school; out of this, 66.3 percent never attended school, and 33.3 percent are currently in school. However, the district did not report any proportion of those who attended school in the past.

Table 4.46: Distribution of Population (3+ years) who Ever Attended School by district, 2020

LGA/District	Both Sexes				
	Count	*Total	In the Past	In school	Never attended
<i>NBR</i>	<i>251,895</i>	<i>45.0</i>	<i>15.8</i>	<i>29.2</i>	<i>55.0</i>
Lower Nuimi	68,011	33.3	0.0	33.3	66.3

4.3.8.3. Health

Lower Nuimi reported four percent of its population being sick two weeks prior to the survey. Females (4.5%) had a higher morbidity rate than males (3.5%) (GBoS, 2020). Out of those who reported being sick in the district, 71.8 percent reported that they could access a health facility within 30 minutes, and 28.2 percent could access a health facility between 45 and 59 minutes.

Table 4.47: Percentage Distribution of Population by Access to Health Facilities and Time Taken to Health Facility by district, 2020

LGA/District	Access within 30 minutes	0-14 minutes	15-29 minutes	30-44 minutes	45-59 minutes	60+ minutes
	<i>NBR</i>	<i>82.6</i>	<i>46.3</i>	<i>36.3</i>	<i>10.8</i>	<i>3.8</i>
Lower Nuimi	71.8	32.7	39.1	0.0	28.2	0.0

4.3.8.4. Housing and Housing Characteristic

Firewood (74.7%) and charcoal (20.3%) are the most common sources of cooking fuel in the district. Less than one percent use either gas or solar power, and 4.1 percent reported that they do not cook.

Table 4.48: Percentage distribution of Households by Non-wood Fuel Use, Main Source of Fuel for Cooking and district

LGA/district	Non-wood fuel*	Firewood	Charcoal	Gas	Electricity	Solar power	Animal/plant waste	Does not cook	Other
<i>NBR</i>	0.7	83.2	13.5	0.5	0.1	0.1	0.0	2.6	0.0
Lower Nuimi	0.0	74.7	20.3	0.5	0.0	0.3	0.0	4.1	0.0

NAWEC (34.7%), solar power (31.9%), and battery-powered light (30.3%) are the most common sources of lighting in Lower Nuimi. Two percent use candles, and less than one percent use either electricity powered by a generator or other sources of lighting.

Table 4.49: Percentage distribution of households by main source of fuel for lighting and district, 2020

LGA/district	Electricity (NAWEC)	Electricity (Generator)	Solar power	Kerosine lamp with shade	Candles	Battery Powered light	Other
<i>NBR</i>	31.7	0.5	33.7	0.2	2.5	31.3	0.3
Lower Nuimi	34.7	0.4	31.9	0.0	2.0	30.3	0.8

The most common sources of waste disposal in Lower Nuimi are bush/open space (32.5%), burning (20.7%), and landfill/burying (20.5%). A public dump site is used by 18.9 percent, and 2.3 percent reported that their waste was collected by a private body. Less than 2 percent either disposed of their waste either by recycling, collected by municipal (HH provides a bin), or collected by municipal (municipality provides a bin).

Table 4.50: Percentage distribution of households by main method of waste disposal and district, 2020

LGA/District	Landfill/burury	Burnt	Use as compost	Recycle	Collected by Municipal (HH provides bin)	Collected by Municipal (Municipality provided bin)	Collected by private body	Use set Settal	Public dump
<i>NBR</i>	26.1	18.2	3.4	1.4	0.4	0.3	2.2	0.2	19.5
Lower Nuimi	20.5	20.7	0.8	1.6	1.4	1.1	2.3	0.3	18.9

4.3.8.5. Poverty

Prevalence of Poverty

The poverty rate shows the percentage of the poor. The figure below shows that 70.4 per cent of the population in Lower Niumi is poor (GBoS, 2020).

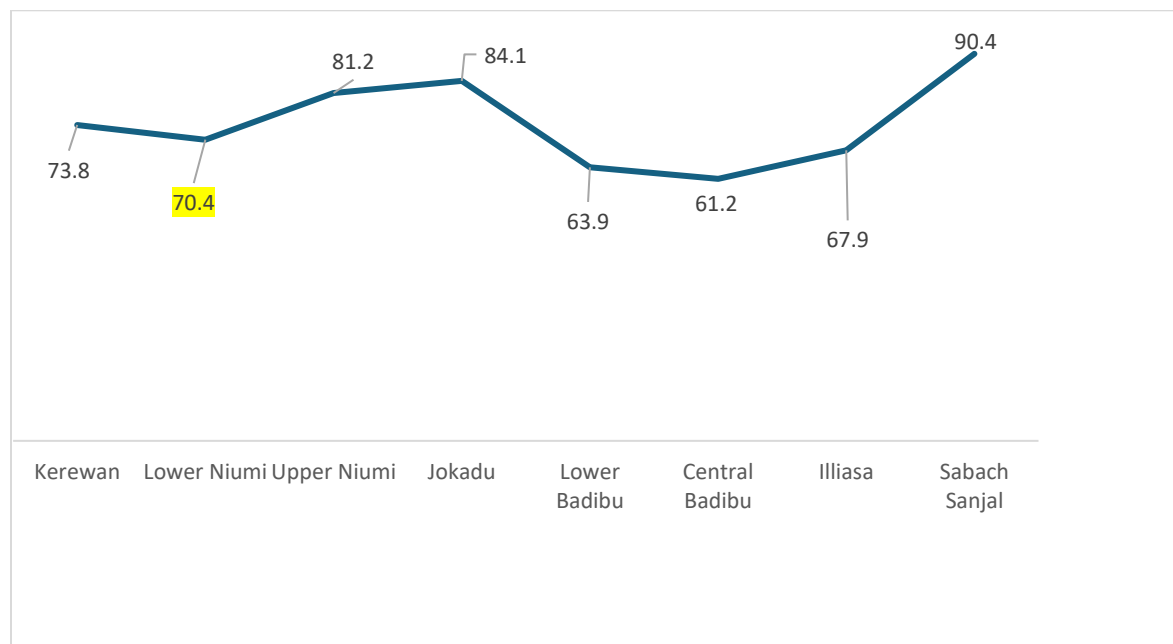


Figure 4.27: District Poverty Mountain of absolute poverty (Headcount ratio), 2020

4.3.9. Lower Badibu - NBR

4.3.9.1. Demographic Characteristics

Lower Badibu has the highest dependency ratio in NBR. It shows that most of its population is between the ages of 0-14 (49.2%). Four percent are above the working-class age group, and only 46.7 percent are currently working.

Table 4.51: Percentage distribution of Population by Broad Age-groups, dependency ratio and districts, 2020

LGAs/District	0-14 years	15-64 years	65 + years	Age Dependency Ratio
<i>NBR</i>	47.8	49.1	3.1	101
Lower Badibu	49.2	46.7	4.1	107

4.3.9.2. Education

About 32 percent of the district’s population reported having attended school. In addition, like the other districts in NBR, the majority of the population in the district—68.3 percent—has never attended school; 31.7 percent are currently in school; and no one has been reported to have attended school in the past.

Table 4.52: Distribution of Population (3+ years) who Ever Attended School by district, 2020

LGA/District	Both Sexes				
	Count	*Total	In the Past	In school	Never attended
<i>NBR</i>	251,895	45.0	15.8	29.2	55.0
Lower Badibu	20,152	31.7	0.0	31.7	68.3

4.3.9.3. Health

Those who reported being sick two weeks prior to the survey in the district make up 6.5 percent, out of which males accounted for 5.4 percent and female’s 7.5 percent, representing a higher morbidity rate among females than males (GBoS, 2020). For those sick, access to a health facility within 30 minutes was reported by 86.9 percent, 7.1 percent reported having access within 60+ minutes, and 6.1 percent between 30-44 minutes.

Table 4.53: Percentage Distribution of Population by Access to Health Facilities and Time Taken to Health Facility by district, 2020

LGA/District	Access within 30 minutes	0-14 minutes	15-29 minutes	30-44 minutes	45-59 minutes	60+ minutes
<i>NBR</i>	82.6	46.3	36.3	10.8	3.8	2.8
Lower Badibu	86.9	51.4	35.5	6.1	0.0	7.1

4.3.9.4. Housing and Housing Characteristic

Firewood is the most common source of cooking fuel in the district, reported at 93.5 percent, followed by charcoal at 4.2 percent. Less than one percent used either gas or animal or plant waste as their main source of cooking fuel, while 1.3 percent reported that they do not cook.

Table 4.54: Percentage distribution of Households by Non-wood Fuel Use, Main Source of Fuel for Cooking and district

LGA/district	Non-wood fuel*	Firewood	Charcoal	Gas	Electricity	Solar power	Animal/plant waste	Does not cook	Other
<i>NBR</i>	0.7	83.2	13.5	0.5	0.1	0.1	0.0	2.6	0.0
Lower Badibu	0.0	93.5	4.2	0.6	0.0	0.0	0.4	1.3	0.0

NAWEC (72.0%), solar power (16.5%), and battery-powered light (10.7%) are the most common sources of lighting in Lower Badibu. Less than one percent used either electricity powered by a generator or candles.

Table 4.55: Percentage distribution of households by main source of fuel for lighting and district, 2020

LGA/district	Electricity (NAWEC)	Electricity (Generator)	Solar power	Kerosine lamp with shade	Candles	Battery Powered light	Other
<i>NBR</i>	31.7	0.5	33.7	0.2	2.5	31.3	0.3
Lower Badibu	72.0	0.2	16.5	0.0	0.6	10.7	0.0

About 33 percent of the district's population uses landfills or bury as the most common source of waste disposal, followed by those who use bush or open space (24.0%) and 19.2 percent who burn it. Eighteen percent use public dump sites, and 4.4 percent use compost.

Table 4.56: Percentage distribution of households by main method of waste disposal and district, 2020

LGA/District	Landfill/burrry	Burnt	Use as compost	Recycle	Collected by Municipal (HH provides bin)	Collected by Municipal (Municipality provided bin)	Collected by private body	Use set Settal	Pul du
<i>NBR</i>	26.1	18.2	3.4	1.4	0.4	0.3	2.2	0.2	19
Lower Badibu	32.9	19.2	4.4	0.9	0.0	0.0	0.0	0.0	18

4.3.9.5. Poverty

Prevalence of Poverty

The poverty rate shows the percentage of the poor. The figure below shows that 63.9 per cent of the population in Lower Badibu is poor (GBoS, 2020).

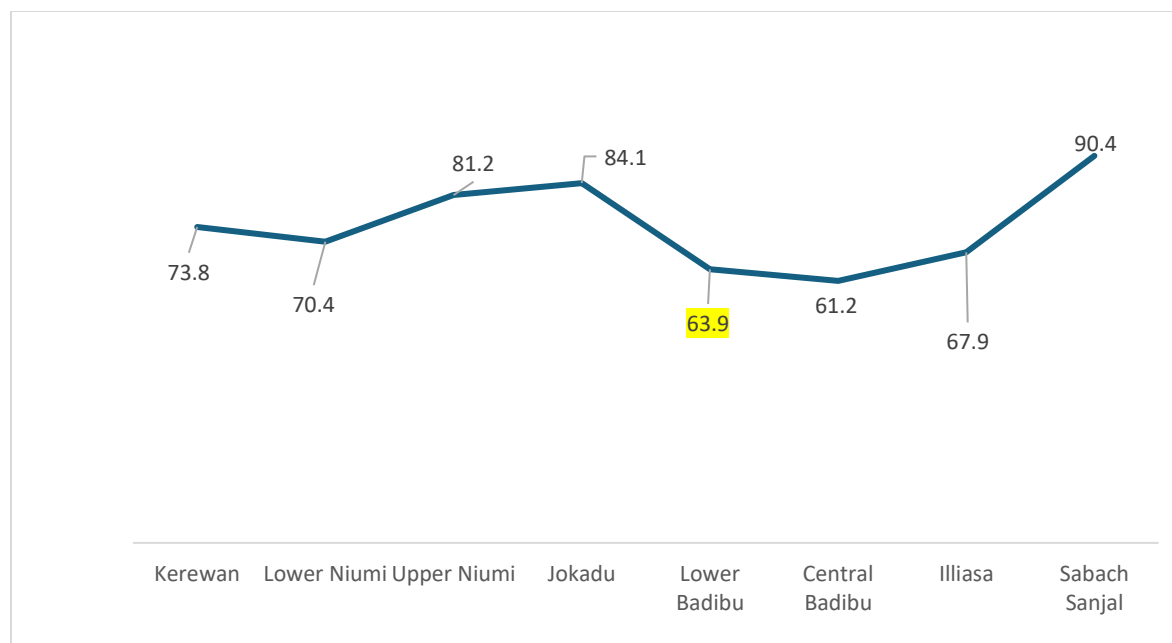


Figure 4.28: District Poverty Mountain of absolute poverty (Headcount ratio), 2020

4.3.10. Illiasa - NBR

4.3.10.1. Demographic Characteristics

The district of Illiasa has a youthful population with a dependency ratio of 101. Showing that those in the working age population (51.0%) have a higher proportion than the children in the in the age groups 0–14 years (45.8%) and 65+ years (3.2%).

Table 4.57: Percentage distribution of Population by Broad Age-groups, dependency ratio and districts, 2020

LGA/District	0-14 years	15-64 years	65 + years	Age Dependency Ratio
<i>NBR</i>	47.8	49.1	3.1	101
Illiasa	45.8	51.0	3.2	101

4.3.10.2. Education

Twenty-five percent of the people in the district are reported to have ever attended school. Out of this, 24.8 are currently in school, 0.2 attended in the past, and most of the district's population (75.0%) never attended school.

Table 4.58: Distribution of Population (3+ years) who Ever Attended School by district, 2020

LGA/District	Both Sexes			
	Count	*Total	In the Past	In school

<i>NBR</i>	251,895	45.0	15.8	29.2	55.0
Illiasa	57,935	25.0	0.2	24.8	75.0

4.3.10.3. Health

A proportion of 7.1 percent in Illinois reported having been sick two weeks prior to the survey, with females (7.8%) accounting for a higher morbidity rate than their male counterparts (6.2%). Nine in 10 people in the district reported having access to a health facility within 30 minutes. While 6.6 percent had access between 30-44 minutes and 2.1 percent reported 60+ minutes.

Table 4.59: Percentage Distribution of Population by Access to Health Facilities and Time Taken to Health Facility by district, 2020

LGA/District	Access within 30 minutes	0-14 minutes	15-29 minutes	30-44 minutes	45-59 minutes	60+ minutes
<i>NBR</i>	82.6	46.3	36.3	10.8	3.8	2.8
Illiasa	91.3	44.8	46.5	6.6	0.0	2.1

4.3.10.4. Housing and Housing Characteristic

Firewood (67.5%) and charcoal (28.1%) are the most common sources of cooking fuel in the district. Less than one percent use gas, and 3.8 percent reported that they do not cook.

Table 4.60: Percentage distribution of Households by Non-wood Fuel Use, Main Source of Fuel for Cooking and district

LGA/district	Non-wood fuel*	Firewood	Charcoal	Gas	Electricity	Solar power	Animal/plant waste	Does not cook	Other
<i>NBR</i>	0.7	83.2	13.5	0.5	0.1	0.1	0.0	2.6	0.0
Illiasa	0.0	67.5	28.1	0.5	0.0	0.0	0.0	3.8	0.0

NAWEC (45.3%), battery-powered light (28.7%), and solar power (24.0%) are the most common sources of lighting. About 3 percent use candles, while less than 1 percent use either electricity powered by a generator or kerosene with a lamp shade.

Table 4.61: Percentage distribution of households by main source of fuel for lighting and district, 2020

LGA/district	Electricity (NAWEC)	Electricity (Generator)	Solar power	Kerosine lamp with shade	Candles	Battery Powered light	Other
<i>NBR</i>	31.7	0.5	33.7	0.2	2.5	31.3	0.3

Illiasa	45.3	0.2	23.0	0.2	2.6	28.7	0.0
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The most common sources of waste disposal in the district are landfills (26.8%), burning, and bush/open space (21.3%), and 21.0 percent use public dump sites. A significant proportion of 6.6 percent have their waste collected by a private body, and 2.4 percent use compost.

Table 4.62: Percentage distribution of households by main method of waste disposal and district, 2020

LGA/District	Landfill/burrry	Burnt	Use as compost	Recycle	Collected by Municipal (HH provides bin)	Collected by Municipal (Municipality provided bin)	Collected by private body	Use set Settal	Public dump
<i>NBR</i>	26.1	18.2	3.4	1.4	0.4	0.3	2.2	0.2	19.5
Illiasa	26.8	21.3	2.4	0.2	0.2	0.0	6.6	0.0	21.0

4.3.10.5. Poverty

Prevalence of Poverty

The poverty rate shows the percentage of the poor. The figure below shows that 67.9 per cent of the population in Illiasa is poor (GBoS, 2020).

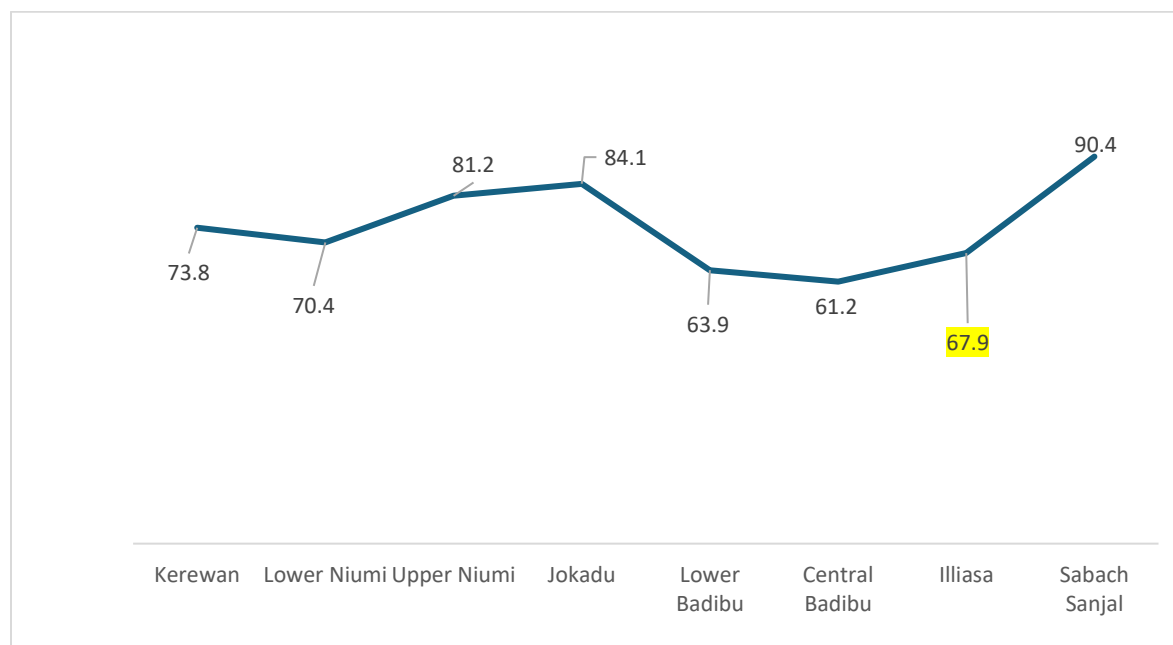


Figure 4.29: District Poverty Mountain of absolute poverty (Headcount ratio), 2020

4.3.11. Foni Kansala -WCR

4.3.11.1. Demographic Characteristics

The population of Foni Kansala shows a youthful population. However, the dependency ratio in the district is 83, which means the age groups of 0–14 years (44.3%) and 65+ (5.3%) years are highly dependent on the working-age population of 15–64 years (50.4%).

Table 4.63: Percentage distribution of Population by Broad Age-groups, dependency ratio and districts, 2020

LGA/District	0-14	15-64	65+	Age Dependency Ratio
<i>WCR</i>	42.8	54.7	2.6	83
Foni Kansala	44.3	50.4	5.3	98

4.3.11.2. Education

The percentage distribution of the population aged 3 years and older who ever attended school was 60.0 percent in Foni Kansala. Out of this, 39.4 percent attended school in the past, 20.6 percent are currently in school, and 40.0 percent never attended school. The proportion of males who ever attended school (64.2 percent) is higher than that of females (56.4 percent) (GBoS, 2020).

Table 4.64: Distribution of Population (3+ years) who Ever Attended School by district, 2020

LGA/District	Both Sexes				
	Count	*Total	In the Past	In school	Never attended
<i>WCR</i>	583,022	63.7	34.9	28.8	36.3
Foni Kansala	14,350	60.0	39.4	20.6	40.0

4.3.11.3. Health

A proportion of 6.1 percent of Foni Kansala reported having been sick two weeks prior to the IHS survey. Furthermore, males were reported to have had a higher morbidity rate than their female counterparts, 5.8 percent (GBoS, 2020). The table below shows that 81.3 percent of the population in Foni Kansala had access to a health facility within 30 minutes. While 13 percent could access a health facility between 30-44 minutes and 5.8 percent had access to a facility with 60+ minutes,

Table 4.65: Percentage Distribution of Population by Access to Health Facilities and Time Taken to Health Facility by district, 2020

LGA/District	Access within 30 minutes	0-14 minutes	15-29 minutes	30-44 minutes	45-59 minutes	60+ minutes
<i>WCR</i>	78.1	51.2	26.9	13.8	2.0	6.1

Foni Kansala **81.3** **41.6** **39.7** **13.0** **0.0** **5.8**

4.3.11.4. Housing and Housing Characteristic

The most common source of cooking fuel in Foni Kansala is firewood (91.2%), followed by charcoal (4.0%). Electricity and other sources make up 0.3 percent each. While 3.4 percent reported that they do not cook.

Table 4.66: Percentage distribution of Households by Non-wood Fuel Use, Main Source of Fuel for Cooking and district

LGA/district	Non wood fuel use*	Firewood	Charcoal	Gas	Electricity	Solar power	Animal/plant waste	Does not cook	Other
WCR	2.1	46.2	41.7	1.9	0.1	0.0	0.1	9.7	0.3
Foni Kansala	1.2	91.2	4.0	0.9	0.3	0.0	0.0	3.4	0.3

The most common source of lighting in the district is from the national grid supply, NAWEC (49.5%). This is followed using battery-powered light (34.9%) and 12.3 percent solar power. A small proportion of 1.6 and 1.1 percent used candles and electricity powered by a generator, respectively.

Table 4.67: Percentage distribution of households by main source of fuel for lighting and district, 2020

LGA/district	Electricity (NAWEC)	Electricity (Generator)	Solar power	Kerosene lamp with shade	Other Kerosene lamp	Candles	Battery Powered light	Other
WCR	69.2	0.1	9.6	0.1	0.1	2.7	18.2	0.1
Foni Kansala	49.2	1.1	12.3	0.0	0.0	1.6	35.9	0.0

The main source of waste disposal in Foni Kansala is by burning (53.7% of the waste). Twenty-four percent of waste is disposed of in landfills or buried, while 12.5% is disposed of in the bush or open space. A significant proportion of 8.2 percent use a public dump, while 0.9 percent and 0.3 percent use compost, or it gets collected by a private body, respectively.

Table 4.68: Percentage distribution of households by main method of waste disposal and district, 2020

LGA/District	Landfill/bury	Burnt	Use as compost	Collected by Municipal	Collected by Municipal	Collected by private body	Use set Settal	Public dump	In bush/Open Space	Other
WCR	20.0	48.5	0.7	3.0	1.2	15.6	0.2	7.0	3.8	0.2
Foni Kansala	24.4	53.7	0.9	0.0	0.0	0.3	0.0	8.2	12.5	0.0

4.3.11.5. Poverty

Prevalence of Poverty

The poverty rate shows the percentage of the poor. The figure below shows that 87.0 per cent of the population in Foni Kansala is poor (GBoS, 2020).

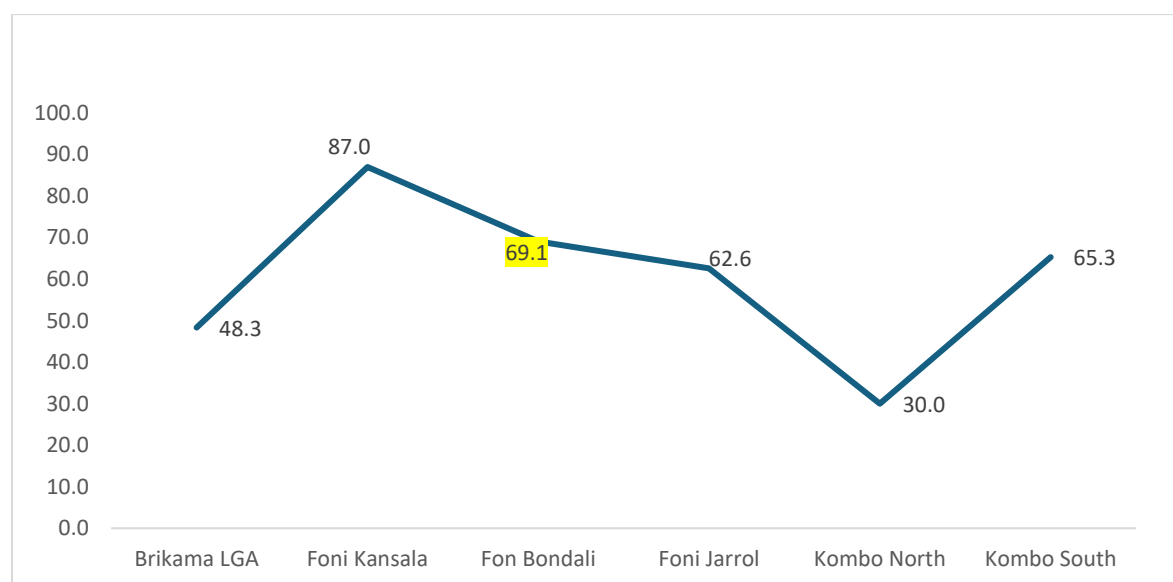


Figure 4.30: District Poverty Mountain of absolute poverty (Headcount ratio), 2020

4.3.12. Foni Bondali -WCR

4.3.12.1. Demographic Characteristics

The dependency ratio (103) is very high in the district, showing that the 0–14 years (46.8%) and 65+ years (4.0%) are highly dependent on the working-age population (15–64 years) (49.2%). Nonetheless, it also shows that the population is rather youthful.

Table 4.69: Percentage distribution of Population by Broad Age-groups, dependency ratio and districts, 2020

LGA/District	0-14	15-64	65+	Age Dependency Ratio
<i>WCR</i>	42.8	54.7	2.6	83
Foni Bondali	46.8	49.2	4.0	103

4.3.12.2. Education

The proportion of students who attended school in the district is 55.5%, which shows that more than half of the population in the district is educated. The proportion of males at 57.6 percent is higher than that of females at 53.2 percent (GBoS, 2020). Out of the 55.5 percent that ever-attended school in the district,

36.6 percent attended in the past, 18.8 percent are currently in school, and 44.5 percent attended in the past.

Table 4.70: Distribution of Population (3+ years) who Ever Attended School by district, 2020

LGA/District	Both Sexes				
	Count	*Total	In the Past	In school	Never attended
WCR	583,022	63.7	34.9	28.8	36.3
Foni Bondali	10,119	55.5	36.6	18.8	44.5

4.3.12.3. Health

About 14 percent of the population of the district reported having been sick two weeks prior to the IHS survey, with females (15.5%) having a higher morbidity rate than males (12.4%). Furthermore, in the district, 57.7 percent reported having access to a health facility within 30 minutes. This is followed by those who had access for 60+ minutes (16.0%), those who had access between 45-59 minutes (14.5%), and 11.9 percent who had access to a health facility between 30-44 minutes.

Table 4.71: Percentage Distribution of Population by Access to Health Facilities and Time Taken to Health Facility by district, 2020

LGA/District	Access within 30 minutes	0-14 minutes	15-29 minutes	30-44 minutes	45-59 minutes	60+ minutes
WCR	78.1	51.2	26.9	13.8	2.0	6.1
Foni Bondali	57.7	25.8	31.9	11.9	14.5	16.0

4.3.12.4. Housing and Housing Characteristic

The main source of cooking fuel in Foni Bondali, like other districts in WCR, is firewood, which accounted for 96.1 percent. About one percent uses charcoal, and 0.4 and 0.2 percent use electricity or other sources for cooking, respectively. However, 2.8 percent of the population in the district reported that they do not cook.

Table 4.72: Percentage distribution of Households by Non-wood Fuel Use, Main Source of Fuel for Cooking and district

LGA/district	Non wood fuel use*	Firewood	Charcoal	Gas	Electricity	Solar power	Animal/plant waste	Does not cook	Other
WCR	2.1	46.2	41.7	1.9	0.1	0.0	0.1	9.7	0.3

Foni Bondali	0.4	96.1	0.5	0.0	0.4	0.0	0.0	2.8	0.2
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Battery-powered light is the main source of light in the district, used by 47.9 percent, followed by solar power (36.1%). A significant proportion also use light from the national grid, NAWEC (10.1%), and 5.5 percent use candles.

Table 4.73: Percentage distribution of households by main source of fuel for lighting and district, 2020

LGA/district	Electricity (NAWEC)	Electricity (Generator)	Solar power	Kerosene lamp with shade	Other Kerosene lamp	Candles	Battery Powered light	Other
<i>WCR</i>	69.2	0.1	9.6	0.1	0.1	2.7	18.2	0.1
Foni Bondali	10.1	0.0	36.1	0.0	0.0	5.5	47.9	0.5

Waste disposal by burning is the most common means in the district, used by 51.3%. Landfill/burying is used by 21.8 percent, followed by 11.4 percent who dispose using compost, and 9.3 percent dispose in the bush or open space. Less than one percent use other sources to dispose of their waste.

Table 4.74: Percentage distribution of households by main method of waste disposal and district, 2020

LGA/District	Landfill/bury	Burnt	Use as compost	Collected by Municipal authority	Collected by Municipal authority	Collected by private body	Use set Settal	Public dump	In bush/Open Space	Other
<i>WCR</i>	20.0	48.5	0.7	3.0	1.2	15.6	0.2	7.0	3.8	
Foni Bondali	21.8	51.3	11.4	0.0	0.0	0.0	0.0	5.9	9.3	

4.3.12.5. Poverty

Prevalence of Poverty

The poverty rate shows the percentage of the poor. The figure below shows that 69.1 per cent of the population in Foni Bondali is poor (GBoS, 2020).

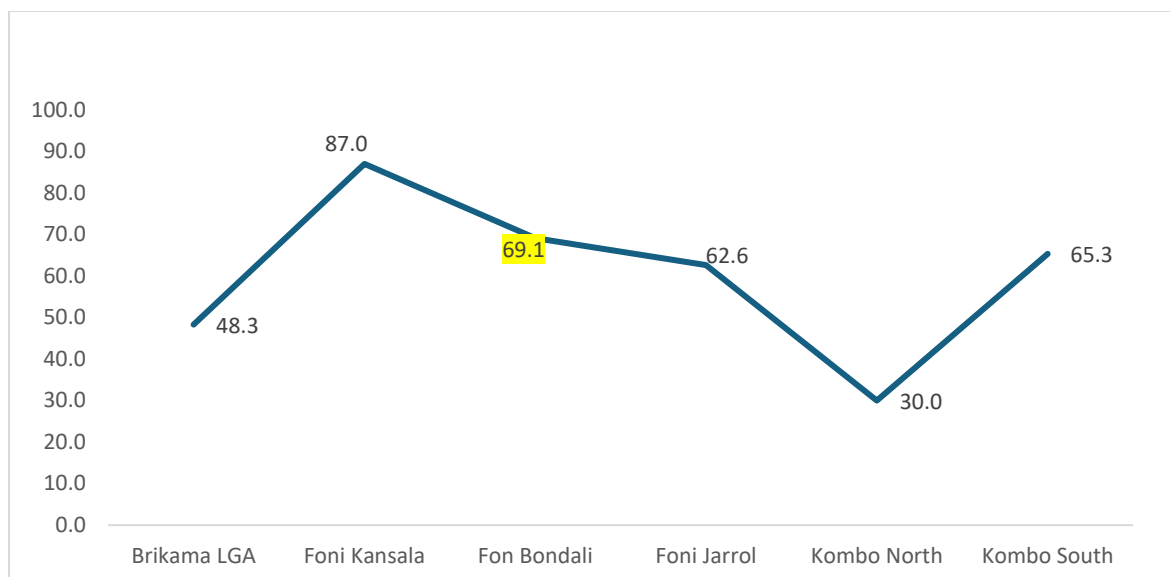


Figure 4.31: District Poverty Mountain of absolute poverty (Headcount ratio), 2020

4.3.13. Foni Jarrol -WCR

4.3.13.1. Demographic Characteristics

The dependency ratio in Foni Jarrol is the highest among the districts in WCR. It shows that the age groups 0–14 years (48.1%) and 65+ years (2.9%) are completely dependent on the working-age population of 15–64 years (49.0%).

Table 4.75: Percentage distribution of Population by Broad Age-groups, dependency ratio and districts, 2020

LGA/District	0-14	15-64	65+	Age Dependency Ratio
WCR	42.8	54.7	2.6	83
Foni Jarrol	48.1	49.0	2.9	104

4.3.13.2. Education

The proportion of people age 3 years and older in Foni Jarrol shows that almost half of the district’s population has attended school (49.8%). In addition, the proportion of males who ever attended school in the district, 49.3 percent, is slightly less than females, 50.4 percent (GBoS, 2020). Out of those who have ever attended school, 32.7 attended in the past, 17.2 are currently attending, and 50.2 percent have never attended school.

Table 4.76: Distribution of Population (3+ years) who Ever Attended School by district, 2020

LGA/District	Both Sexes			
	Count	*Total	In the Past	In school

<i>WCR</i>	583,022	63.7	34.9	28.8	36.3
Foni Jarrol	11,770	49.8	32.7	17.2	50.2

4.3.13.3. Health

A proportion of 15.4 percent in the district reported having been sick two weeks prior to the HIS survey, with females accounting for a higher morbidity rate of 18.0 percent than males at 13.1 percent. (GBoS, 2020). Out of those who reported being sick, 68.2 percent said they could access a health facility within 30 minutes. About 14 percent reported that they could access a health facility between 30-44 minutes, which is slightly higher than those who reported 60+ minutes (14.4%). Only 2.8 percent reported being able to access a health facility between 45-59 minutes.

Table 4.77: Percentage Distribution of Population by Access to Health Facilities and Time Taken to Health Facility by district, 2020

LGA/District	Access within 30 minutes	0-14 minutes	15-29 minutes	30-44 minutes	45-59 minutes	60+ minutes
<i>WCR</i>	78.1	51.2	26.9	13.8	2.0	6.1
Foni Jarrol	68.2	44.6	23.6	14.7	2.8	14.4

4.3.13.4. Housing and Housing Characteristic

Firewood (92.2%), like most of the districts in WCR, is the most common source of cooking fuel. Charcoal (4.9%) and gas (1.2%) were also reported by a significant proportion of the population in the district. However, 1.6 percent reported that they do not cook.

Table 7.78: Percentage distribution of Households by Non-wood Fuel Use, Main Source of Fuel for Cooking, and district

LGA/district	Non wood fuel use*	Firewood	Charcoal	Gas	Electricity	Solar power	Animal/plant waste	Does not cook	Other
<i>WCR</i>	2.1	46.2	41.7	1.9	0.1	0.0	0.1	9.7	0.3
Foni Jarrol	1.2	92.2	4.9	1.2	0.0	0.0	0.0	1.6	0.0

The main source of lighting in Foni Jarrol is battery-powered light, which accounts for 40.0 percent of the population in the district. Thirty percent reported using NAWEC as their source of light, 23.6 percent use solar, and 5.1 percent use candles. Less than one percent of the district's population uses electricity powered by a generator.

Table 4.79: Percentage distribution of households by main source of fuel for lighting and district, 2020

LGA/district	Electricity (NAWEC)	Electricity (Generator)	Solar power	Kerosene lamp with shade	Other Kerosene lamp	Candles	Battery Powered light	Other
WCR	69.2	0.1	9.6	0.1	0.1	2.7	18.2	0.1
Foni Jarrol	30.0	1.3	23.6	0.0	0.0	5.1	40.1	0.0

Most of the population in the district disposes of their waste by burning (44.0%), followed by landfill/burying (23.9%) and bush/open space (15.0%). Use of compost (11.5%) and 6.7 percent of those that use public dumps also reported significant proportions.

Table 4.80: Percentage distribution of households by main method of waste disposal and district, 2020

LGA/District	Landfill/bury	Burnt	Use as compost	Collected by Municipal	Collected by Municipal	Collected by private body	Use set Settal	Public dump	In bush/Open Space	Other
WCR	20.0	48.5	0.7	3.0	1.2	15.6	0.2	7.0	3.8	0.0
Foni Jarrol	23.9	43.0	11.5	0.0	0.0	0.0	0.0	6.7	15.0	0.0

4.3.13.5. Poverty

Prevalence of Poverty

The poverty rate shows the percentage of the poor. The figure below shows that 62.6 per cent of the population in Foni Jarrol is poor (GBoS, 2020).

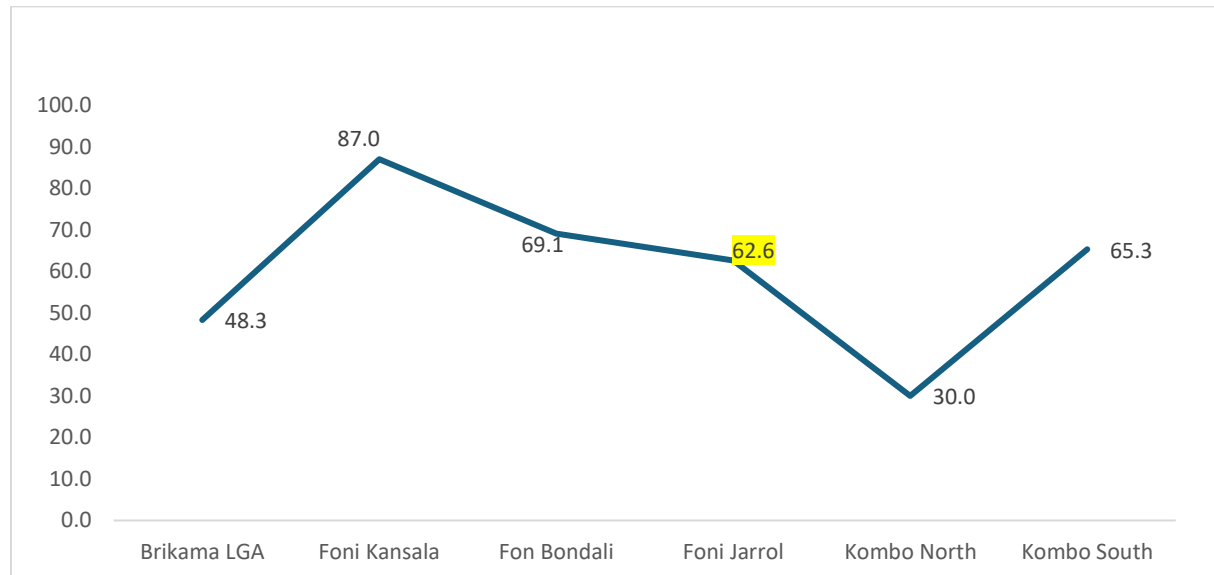


Figure 4.32: District Poverty Mountain of absolute poverty (Headcount ratio), 2020

4.3.14. Kombo North - WCR

4.3.14.1. Demographic Characteristics

Kombo North has the lowest dependency ratio (78) among the districts in WCR. The children's population 0–14 years old accounts for 41.7 percent of the district's population, while more than half (56.1 percent) are in the working age population and 2.3 are 65+ years old. This shows why the dependency ratio is lower in this district because more than half of its population is of working age.

Table 4.81: Percentage distribution of Population by Broad Age-groups, dependency ratio and districts, 2020

LGA/District	0-14	15-64	65+	Age Dependency Ratio
WCR	42.8	54.7	2.6	83
Kombo North	41.7	56.1	2.3	78

4.3.14.2. Education

The distribution of the population age 3 years and above shows that 66.5 percent of the people in Kombo North district have ever attended school. Furthermore, there is little difference between the proportion of males (66.7%) and females (66.2%) who have ever attended school in the district. The population that has ever attended school in the district is made up of those who attended in the past (34.2%), those who are currently attending (32.3%), and those who have never been to school (33.5%).

Table 4.82: Distribution of Population (3+ years) who Ever Attended School by district, 2020

LGA/District	Both Sexes				
	Count	*Total	In the Past	In school	Never attended
WCR	583,022	63.7	34.9	28.8	36.3
Kombo North	297,421	66.5	34.2	32.3	33.5

4.3.14.3. Health

About six percent of respondents in the district reported that they were sick two weeks prior to the survey, of which 5.8 are males and 5.9 are females (GBoS, 2020). The majority (73.3%) of the population in the district was able to access a health facility within 30 minutes. Those who reported having access to a health facility between 30-44 minutes accounted for 21.5 percent, and those who reported having it for 60+ minutes accounted for 5.2 percent of the district's population.

Table 4.83: Percentage Distribution of Population by Access to Health Facilities and Time Taken to Health Facility by district, 2020

LGA/District	Access within 30 minutes	0-14 minutes	15-29 minutes	30-44 minutes	45-59 minutes	60+ minutes
<i>WCR</i>	<i>78.1</i>	<i>51.2</i>	<i>26.9</i>	<i>13.8</i>	<i>2.0</i>	<i>6.1</i>
Kombo North	73.3	50.1	23.2	21.5	0.0	5.2

4.3.14.4. Housing and Housing Characteristic

Unlike the other districts in WCR, the main source of cooking fuel in Kombo North is charcoal (57.3%), followed by firewood (28.3%), and those who reported using gas (2.8%). Less than one percent of the district's population uses either other sources or animal or plant waste as their source of cooking fuel. However, 11.1 percent reported that they do not cook.

Table 4.84: Percentage distribution of Households by Non-wood Fuel Use, Main Source of Fuel for Cooking and district

LGA/district	Non wood fuel use*	Firewood	Charcoal	Gas	Electricity	Solar power	Animal/plant waste	Does not cook	Other
<i>WCR</i>	<i>2.1</i>	<i>46.2</i>	<i>41.7</i>	<i>1.9</i>	<i>0.1</i>	<i>0.0</i>	<i>0.1</i>	<i>9.7</i>	<i>0.3</i>
Kombo North	2.8	28.3	57.3	2.8	0.0	0.0	0.2	11.1	0.3

NAWEC (81.8%) is the main source of lighting in the district, followed by 10.8 percent who use battery-powered light and 5.6 percent who use solar power. About 2 percent of people in the district use candles as their source of light.

Table 4.85: Percentage distribution of households by main source of fuel for lighting and district, 2020

LGA/district	Electricity (NAWEC)	Electricity (Generator)	Solar power	Kerosene lamp with shade	Other Kerosene lamp	Candles	Battery Powered light	Other
<i>WCR</i>	<i>69.2</i>	<i>0.1</i>	<i>9.6</i>	<i>0.1</i>	<i>0.1</i>	<i>2.7</i>	<i>18.2</i>	<i>0.1</i>
Kombo North	81.8	0.0	5.6	0.0	0.0	1.8	10.8	0.0

The percentage distribution of households by the main method of waste disposal shows that 44.9 percent dispose of their waste by burning. Twenty-six percent dispose of waste through a private body, 6.9 through a public dump, and 4.5 have their waste collected by the municipal (HH) bins. Less than 2 percent dispose of their waste through the bush or open space or collected by the municipality (the municipality provides a bin), and less than 1 percent dispose of it by compost, another source, or during "settlement."

Table 4.86: Percentage distribution of households by main method of waste disposal and district, 2020

LGA/District	Landfill/bury	Burnt	Use as compost	Collected by Municipality (HH)	Collected by Municipality	Collected by private body	Use set Settling	Public dump	In bush/Open Space	Other
WCR	20.0	48.5	0.7	3.0	1.2	15.6	0.2	7.0	3.8	0.2
Kombo North	13.7	44.9	0.2	4.5	1.5	26.3	0.2	6.9	1.6	0.3

4.3.14.5. Poverty

Prevalence of Poverty

The poverty rate shows the percentage of the poor. The figure below shows that 30.0 per cent of the population in Kombo North is poor (GBoS, 2020).

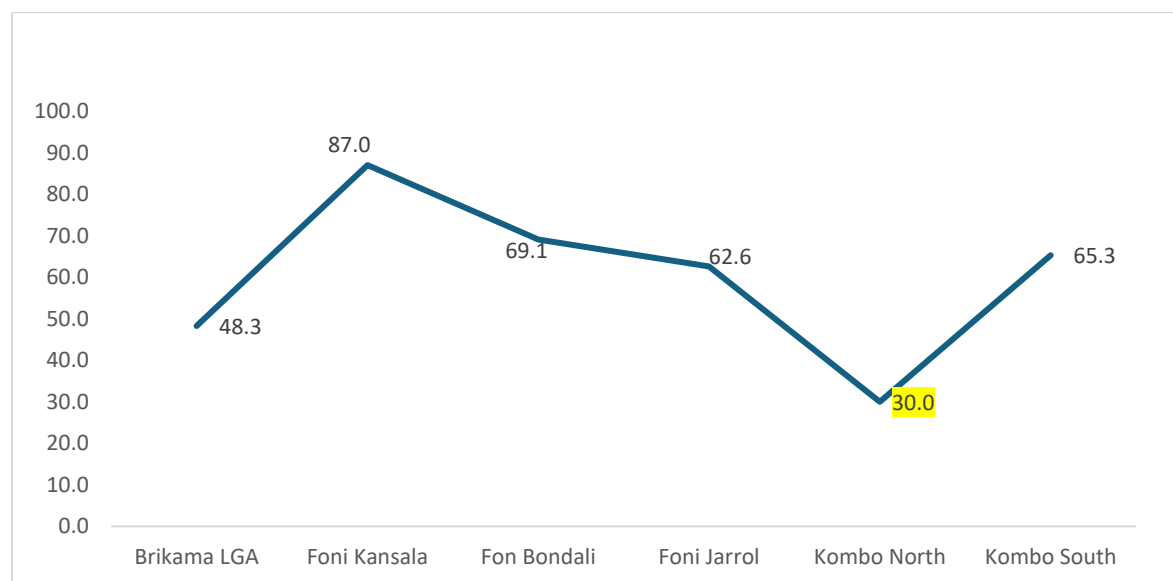


Figure 4.33: District Poverty Mountain of absolute poverty (Headcount ratio), 2020

4.3.15. Kombo South - WCR

4.3.15.1. Demographic Characteristics

The age dependency ratio in Kombo South, like the North, is lower than in the other districts, accounting for 85. In addition, the population in the district is very youthful, with more than half (54.1%) of its population in the working age group. The dependent population, which is made up of 0–14 years (43.1%) and 65+ years (2.8%), is far less than the working age group.

Table 4.87: Percentage distribution of Population by Broad Age-groups, dependency ratio and districts, 2020

LGA/District	0-14	15-64	65+	Age Dependency Ratio
WCR	42.8	54.7	2.6	83
Kombo South	43.1	54.1	2.8	85

4.3.15.2. Education

Distribution of Population (3+ years) Who Ever Attended School shows that 61.3 percent of the population in the district has ever attended school, with males having a higher proportion (64.5 percent) than females (58.2 percent) (GBoS, 2020). Furthermore, 34.4 percent of students in the district have attended school in the past, 26.9 percent are currently attending school, and 38.7 percent never went to school.

Table 4.88: Distribution of Population (3+ years) who Ever Attended School by district, 2020

LGA/District	Both Sexes				
	Count	*Total	In the Past	In school	Never attended
WCR	583,022	63.7	34.9	28.8	36.3
Kombo South	74,707	61.3	34.4	26.9	38.7

4.3.15.3. Health

The population in Kombo South reported that five percent were sick prior to the survey, with more males (5.1%) having a higher morbidity rate than females (4.8%). The percentage of the district's population who were sick further reported that they had access to a health facility within 30 minutes (87.6%), and 12.4 percent had access to a health facility between 30-44 minutes.

Table 4.89: Percentage Distribution of Population by Access to Health Facilities and Time Taken to Health Facility by district, 2020

LGA/District	Access within 30 minutes	0-14 minutes	15-29 minutes	30-44 minutes	45-59 minutes	60+ minutes
WCR	78.1	51.2	26.9	13.8	2	6.1
Kombo South	87.6	62.7	24.9	12.4	0.0	0.0

4.3.15.4. Housing and Housing Characteristic

The main source of cooking fuel in the district is firewood (61.6%), which is the most common in WCR, followed by charcoal (26.3%). Only less than 2 percent use gas as a source of cooking fuel, and less than 1 percent use either electricity or other sources. Ten percent reported that they do not cook.

Table 4.90: Percentage distribution of Households by Non-wood Fuel Use, Main Source of Fuel for Cooking and district

LGA/district	Non wood fuel use*	Firewood	Charcoal	Gas	Electricity	Solar power	Animal/plant waste	Does not cook	Other
WCR	2.1	46.2	41.7	1.9	0.1	0.0	0.1	9.7	0.3
Kombo South	1.7	61.6	26.3	1.3	0.4	0.0	0.0	10.1	0.4

Slightly more than half (50.9%) use NAWEC as the main source of lighting. Battery-powered light is used by 27.6 percent, solar is used by 14.9 percent, and candles are used by 5.7 percent. Less than one percent use either kerosene with lamp shades or other sources.

Table 4.91: Percentage distribution of households by main source of fuel for lighting and district, 2020

LGA/district	Electricity (NAWEC)	Electricity (Generator)	Solar power	Kerosene lamp with shade	Other Kerosene lamp	Candles	Battery Powered light	Other
WCR	69.2	0.1	9.6	0.1	0.1	2.7	18.2	0.1
Kombo South	50.9	0.0	14.9	0.4	0.0	5.7	27.6	0.6

Most households in the district dispose of their waste through burning (56.1%), 30.4 through landfills or burials, and 6.6 through public dumps. Four percent use the bush or open space, and 1.5 percent use compost.

Table 4.92: Percentage distribution of households by main method of waste disposal and district, 2020

LGA/District	Landfill/burial	Burnt	Use as compost	Collected by Municipal (HH provides)	Collected by Municipal (Municipality provides)	Collected by private body	Use set Setal	Public dump	In bush/Open Space
WCR	20.0	48.5	0.7	3.0	1.2	15.6	0.2	7.0	3.8
Kombo South	30.4	56.1	1.5	0.3	0.3	0.8	0.0	6.6	4.0

4.3.15.5. Poverty

Prevalence of Poverty

The poverty rate shows the percentage of the poor. The figure below shows that 65.3 per cent of the population in Kombo South is poor (GBoS, 2020).

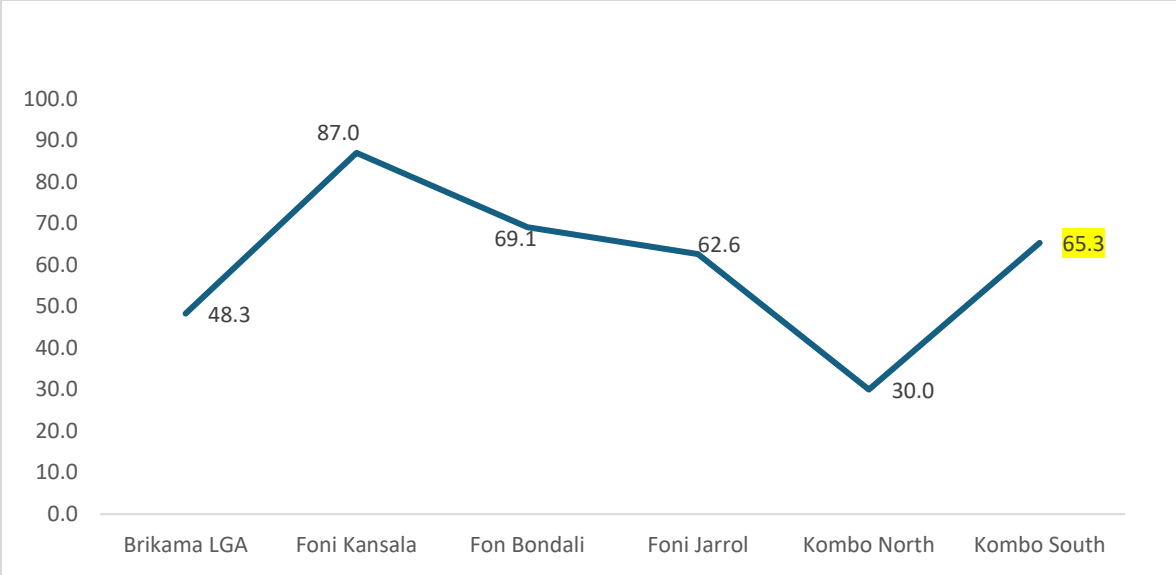


Figure 4.34: District Poverty Mountain of absolute poverty (Headcount ratio), 2020

5. Stakeholder Consultation

Community consultations involved 71 communities across all regions affected by the project, using focus group discussions and key informant interviews. Institutional consultations engaged 10 key organizations—including ministries, technical agencies, and NGOs to collect their views on environmental and social impacts, mitigation strategies, and their responsibilities in project implementation. The stakeholder engagement brought together 927 males and 924 females across the communities indicating equal gender representation.

Communities hold positive expectations, anticipating advantages like better access to markets, healthcare, and education, along with poverty alleviation, job opportunities, and greater social unity. Environmental issues raised include dust, noise, deforestation, erosion, flooding, and negative effects on farmland and biodiversity. Social worries involve displacement, loss of income sources, accidents, gender-based violence (GBV), cultural shifts from incoming workers, and risks related to child labor. To address these, communities recommend fair compensation, prioritizing local hires, scheduling construction during dry seasons, controlling dust and noise, increasing GBV awareness, and ensuring their continued participation in decision-making.

At the institutional level, entities stress adherence to both national and international standards, cross-sector collaboration, safeguarding vulnerable populations such as women and children, and establishing strong grievance mechanisms (GM).

5.1. Community Engagement

As part of the stakeholder consultation, the consultant team undertook a community engagement/consultation with the 71 communities identified for the ESIA. The consultation took place from the 2nd to 10th February 2024. During the visit, Focus Group Discussions for both mixed gender and same gender and Key Informant Interviews were carried out.

The discussions were centered on environmental and social impacts expected during the implementation of the project. Participants were also given the opportunity to discuss the infrastructural condition of their gardens but to also propose mitigative solutions on how to minimize negative environmental and social impacts and to what extent the proposed interventions contribute to communities’ socio-economic conditions of the beneficiaries. The key concerns raised in the consultation meetings with the communities are presented in Table 5.1.

Table 5.1: Summary of Consultation at West Coast Region with 32 communities

Major concern	communities
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<p>Livelihood activities The main livelihood activity for all the beneficiaries is farming to generate income and enhance their livelihoods. Some communities also involve in groundnut farming, animal rearing, Groundnut production, maize, millet, cassava, orchard, rice cultivation and vegetable gardening cashew production, and salt extraction (Bondali Tenda).</p>	<p>All communities</p>
<p>Physical Environment (Climatic Condition) The climatic condition is said to be unfavorable by all communities due to the long dry season, however the air, water and soil quality is considered good except for Tampoto village, Wassadou Village and Kangiramba village.</p>	<p>All Communities Except for Tampoto village, Wassadou Village and Kangiramba village.</p>
<p>Biological Environment (<i>Flora and Fauna</i>) The community members mentioned to have existing mature trees, shrubs and few domestic animals and rodents and monkeys.</p>	<p>All Communities</p>
<p>Some communities along the wetland observed mangroves plants and some can be classified as savanna grasslands.</p>	<p>Balleng village, Kapa village, Kampanti village, Bondali Tenda, Lamin daranka village, Bulanjor village</p>
<p>Social Amenities (Schools; Health Center; Police; Football Field; Market etc) The respondents mentioned there are Limited existing social amenities in their communities which includes primarily of Schools, Football field, market and health center.</p>	<p>Bulanjor, Somita, Bulunto, Nyofele, Berending, Bondali tenda, Bondali Jola, Kampanti, Kapa, Kassa Kunda, Jakoi, Bambara, Wassadou, Bussary, Bullenghat, Kampasa, Lamin Daranka, Kanmamadou, Balleng.</p>
<p>The members in these communities mentioned there is no school, hospitals, police station and no market in the village.</p>	<p>Gifanga village, Balleng village, Kampanti village, Jorren Bunda Kunda, Kan-Sambou village, Gifanga village, Nyafee village, Fass Chamen village, Adully village, Kangiramba village, Burambang village, Kankurang Village, Tampoto village,</p>
<p>Public Utilities (Electricity; Water; Telecommunication; etc) The community members mentioned there is electricity from NAWEC but no water from NAWEC they use boreholes. All the community members use GSMs in the country for telecommunication.</p>	<p>Gifanga, Somita, Burambang, Bulunto, Gifanga, Kampasa, Kassa Kunda, Nyofele, Berending, Bondali tenda, Bondali Jola, Kampanti, Kapa,</p>

<p>There is no Electricity and water from NAWEC in these communities</p>	<p>Lamin daranka village, Balleng village, Jorren Bunda Kunda, Kan-Mamadou village, Kan-Sambou village, Nyafee village, Fass Chamen village, Adully village, Bullenghat village, Busary Village, Kangiramba village, Wassadou Village, Kankurang Village, Bambara Village, Tampoto village, Jakoi Sibirik village, Bulanjor village,</p>						
<p>Description of the road condition The community members mentioned the roads are earth roads and not very conducive for travelling. However, some communities mentioned their roads are deeply eroded due to heavy flow of storm water on the road which causes floods as well.</p>	<p>Gifanga village, Bulanjor village, Jakoi Sibirik village, Wassadou Village, Fass Chamen village, Kampasa Village, Nyafee village, Bulunto village, Somita Village, Kan-Sambou village, Kan-Mamadou village, Lamin daranka village, Nyofele village, Kampanti village, Balleng village</p>						
<p>Challenges Caused by the Current Road Condition</p> <table border="1"> <thead> <tr> <th>Challenges</th> <th>Proposed mitigation measures</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> • Soil Erosion: the participants mentioned some compounds along the road to the women’s garden are all eroded due to heavy flow of storm water into those areas hence may increase the impact to soil erosion. </td> <td> <ul style="list-style-type: none"> • Construction of proper culverts for runoff water and avoid excess clearing of the area. </td> </tr> <tr> <td> <ul style="list-style-type: none"> • Difficult to Access: the participants mentioned that it is very difficult to access and use the road especially in the rainy season especially Nyafee village. </td> <td> <ul style="list-style-type: none"> • Expanding the size of the road to accommodate increased traffic and improve accessibility. </td> </tr> </tbody> </table>	Challenges	Proposed mitigation measures	<ul style="list-style-type: none"> • Soil Erosion: the participants mentioned some compounds along the road to the women’s garden are all eroded due to heavy flow of storm water into those areas hence may increase the impact to soil erosion. 	<ul style="list-style-type: none"> • Construction of proper culverts for runoff water and avoid excess clearing of the area. 	<ul style="list-style-type: none"> • Difficult to Access: the participants mentioned that it is very difficult to access and use the road especially in the rainy season especially Nyafee village. 	<ul style="list-style-type: none"> • Expanding the size of the road to accommodate increased traffic and improve accessibility. 	<p>Gifanga village, Tampoto village, Bambara Village, Kankurang Village, Wassadou Village, Kangiramba village, Busary Village, Adully village, Bulunto village, Kampasa Village, Kan-Sambou village, Kan-Mamadou village, Lamin daranka village, Berending village, Bondali Tenda, Bondali Jola, Kapa village, Balleng village.</p> <p>Nyafee village</p>
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<p>Perception of the proposed project and the positive impacts</p> <p>The community members alluded that the proposed project will be a great benefit to them and will enhance their lives and livelihoods in several ways:</p> <ul style="list-style-type: none"> • It will ease transportation and the development of their community. • It will improve their livelihood as they will be able to access their markets easily. • The respondents believed that the project would increase their opportunities for a better living standard in the area. • It will improve the road networks especially with cluster communities. • Improve access to various opportunities, fostering overall development and well-being within the community. • The respondents believed the project will enhance development in their communities. • Employment opportunities either skill or unskilled labor during the construction phase. • It will prevent their garden productions from getting spoiled due to lack of market accessibility. 		All Communities.										
<p>Negative Environmental impacts and mitigation measures</p> <table border="1"> <thead> <tr> <th>Impact</th> <th>Mitigation Measures</th> </tr> </thead> <tbody> <tr> <td>Dust Pollution: The participants anticipated that there will be too much dust during the construction phase which may affect their health.</td> <td>The community members recommended to frequently water the area during the construction phase to reduce dust pollution.</td> </tr> <tr> <td>Deforestation: The participants mentioned the cutting down of trees during the road construction will increase loss of biodiversity</td> <td>The community members recommended replanting the number of trees affected by the project.</td> </tr> <tr> <td>Water Pollution: The participants had concern that their water system may be affected for drinking during construction phase of project</td> <td>Proper monitoring of water pipes to avoid damage or breakage.</td> </tr> <tr> <td>Improper Drainage system: The participants raised the concern that</td> <td>They Recommended the project to get proper engineers to do their work.</td> </tr> </tbody> </table>		Impact	Mitigation Measures	Dust Pollution: The participants anticipated that there will be too much dust during the construction phase which may affect their health.	The community members recommended to frequently water the area during the construction phase to reduce dust pollution.	Deforestation: The participants mentioned the cutting down of trees during the road construction will increase loss of biodiversity	The community members recommended replanting the number of trees affected by the project.	Water Pollution: The participants had concern that their water system may be affected for drinking during construction phase of project	Proper monitoring of water pipes to avoid damage or breakage.	Improper Drainage system: The participants raised the concern that	They Recommended the project to get proper engineers to do their work.	<p>Gifanga village, Bulanor village, Jakoi Sibirik village, Tampoto village, Tampoto village, Bambara Village, Kankurang Village, Burambang village, Wassadou Village, Kangiramba village, Busary Village, Bullenghat village, Adully village, Fass Chamen village, Nyafee village, Bulunto village, Gifanga village, Kan-Mamadou village, Lamin daranka village, Kasakunda village, Nyofele village, Berending village, Jorren Bunda Kunda, Bondali Tenda, Bondali Jola, Kampanti village, Kapa village, Balleng village,</p> <p>Kankurang Village, Burambang village, Wassadou Village, Kangiramba village, Busary Village, Bullenghat village, Adully village, Bulunto village, Kampasa Village, Kan-Sambou village, Kan-Mamadou village, Kasakunda village, Jorren Bunda Kunda, Kampanti village, Kapa village, Balleng village</p> <p>Bambara Village,</p>
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lack of proper drainage system has caused flooding in their area.		Bulanjor village, Jakoi Sibirik village, Burambang village, Fass Chamen village, Busary Village, Bullenghat village, Adully village, Gifanga village, Kampasa Village, Kan-Sambou village, Kan-Mamadou village, Lamin daranka village,
Gravel Extraction: the community members mentioned the Extraction of gravel within their environment will cause some impact on the environment if the project happens to extract gravel from there.	The participants mentioned if the project wants to extract gravel in their community, then they need to be compensated for any destruction to the environment.	Jorren Bunda Kunda
Negative Social Impacts and Mitigation Measures		
Impact	Mitigation Measures	
Sexual Exploitation: During construction phase the community members feared that their women and girls may be involved in illicit sexual activities with the contractors as they bribe them with money	The participants recommended the project to impose strict rules and conduct on the workers as they will also sensitize their family members as well.	Bansang, Gifanga village, Bulanjor village, Tampoto village, Kankurang Village, Burambang village, Wassadou Village, Kangiramba village, Busary Village, Bullenghat village, Adully village, Gifanga village, Kampasa Village, Kan-Mamadou village, Lamin daranka village, Kasakunda village, Nyofele village, Bondali Tenda, Bondali Jola, Kampanti village,
Key Concerns/Recommendation		
Possible Accidents during road construction: The participants raise the concern that there may be possible accidents during and after road construction on domestic animals and school going children as their school is along the roadside.		Bulanjor village, Fass Chamen village, Nyafee village, Kan-Mamadou village, Lamin daranka village, Nyofele village, Berending village, Bondali Tenda, Kampanti village, Kapa village,
Destruction of homes during road construction: The members in the community raised the concern that their compounds should be spared in order to continue living there. Hence when any compound is affected then requires compensation.		Bansang, Jakoi Sibirik village, Tampoto village, Bambara Village, Kankurang Village, Wassadou Village, Kangiramba village, Busary Village, Bullenghat village, Adully village, Nyafee village, Bulunto village, Gifanga village, Kampasa Village, Kan-Sambou village, Kan-Mamadou village, Nyofele village, Jorren Bunda Kunda,
Rehabilitation/construction of a community garden: The community members requested rehabilitation of their community garden as the cluster gardens are not functioning, and individual gardens are not enough to accommodate all.		Bansang, Tampoto village, Bambara Village, Kankurang Village, Burambang village, Wassadou Village, Bullenghat village, Adully village, Kampasa Village, Kasakunda village,
Preferred Garden to road Construction: The participants mentioned they used to have a cluster garden but is not functioning and their individual gardens not sufficient, so they need construction of new gardens rather than road construction.		Burambang village,

Vibration from heavy machinery: they alluded that vibration from heavy machineries used during construction may crack their mod blocks buildings and collapse.	Nyafee village,
Broken water pipes: the members emphasized that a survey to be done to identify where the water pipes to avoid it being damage. Any damage should be repair by the contractor.	Fass Chamen village,
The participant strongly recommended a tarred road between those cited communities. Proper engineering methods were recommended at the lagoons to avoid blockage and allow flow of water storm or natural water. Provide drainage systems and water channels to reduce the impact of floods, stagnant water, and soil erosion. Speed limits and signboard were recommended by the participants. They strongly emphasize that during the road construction, let them not leave some big trees that were fallen to block some streets. Hence recommended to Provide drainage systems and Irish crossing to reduce the impact of soil erosion. Rehabilitate the road linked to the women’s garden.	All Communities

Table 5.2: Summary of Consultation at North Bank Region with 21 communities	
MAJOR CONCERN	COMMUNITIES
<p>Livelihood activities</p> <p>The primary livelihood activities of the beneficiaries are farming, gardening, livestock rearing and petty trading. Agriculture is the main source of income with men more involved in cash crop production such as millet, groundnut, maize, and the women more involved in gardening and petty trading.</p>	All communities
<p>Physical Environment (Climatic Condition)</p> <p>The communities experience distinct wet and dry seasons. The air and water qualities are acceptable, while soil quality is generally poor and not very fertile for agricultural activities. Most households rely on the community boreholes and wells for their water supply.</p>	All communities
<p>Biological Environment (<i>Flora and Fauna</i>)</p> <p>The flora in the community includes various types of trees such as Mangoes, Cashew, Oranges, Lime etc. bush trees, shrubs and crops cultivated by the community. The fauna in the area consists of different bird species, ruminant such as Cattle, Goats, sheep etc. and some reptiles such as Snakes, Agama lizards, Monitor Lizards etc. However, due to</p>	All communities except Kerr Ousman Busso

<p>increasing human activities and deforestation, the biodiversity status has been impacted, with some species becoming endangered or facing extinction.</p>					
<p>Social Amenities <i>(Schools; Health Center; Police; Football Field; Market etc.)</i> The communities have basic social amenities such as a school, health center, football field, market and police station (Kuntaya Village). The school provides education for the children in the village, while the health center offers basic medical services. The football field serves as a recreational space for the villagers. The market provides a platform for buying and selling goods.</p>	<p>All communities except Kerr Amadou, Kerr Omar Sene</p>				
<p>Public Utilities <i>(Electricity; Water; Telecommunication; etc.)</i> Electricity is available in the community, and most households rely on electricity with few depending on solar power. The main source of water for domestic use is the community borehole through taps. Telecommunication services are available and accessible through mobile networks.</p>	<p>All communities except Kerr Amadou, Kerr Omar Sene, Ndofan, Kerr Wally, Minteh Kunda, Katchang, Lang Sarr, and Yalal Tangkongjali</p>				
<p>Description of the road condition The road conditions in the communities are poor, with unpaved and rough passages. During the rainy season, the roads become muddy and impassable, making transportation difficult as the roads are prone to natural disasters such as floods due to their topography. This hampers transportation and makes it difficult for farmers to transport their produce to markets. It also limits access to essential services such as healthcare and education. The poor road conditions also reduce opportunities for economic development and limit the communities' connection to their neighbors.</p>	<p>All communities</p>				
<p>Challenges Caused by the Current Road Condition The numerous challenges encountered because of the poor road conditions are as follows:</p> <table border="1"> <thead> <tr> <th>Challenges</th> <th>Proposed mitigation measures</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> Limited access to essential services and </td> <td> <ul style="list-style-type: none"> The proposed recommendations </td> </tr> </tbody> </table>	Challenges	Proposed mitigation measures	<ul style="list-style-type: none"> Limited access to essential services and 	<ul style="list-style-type: none"> The proposed recommendations 	<p>Kuntaya, Kerr Amadou, Kerr Omar Sene, Ndofan, Makkah Farafenni, Yalal Tangkongjali, Kerr Ousman Busso, Kerr Malick Nana, and Kerr Sele</p>
Challenges	Proposed mitigation measures				
<ul style="list-style-type: none"> Limited access to essential services and 	<ul style="list-style-type: none"> The proposed recommendations 				

<p>facilities such as healthcare and markets.</p> <ul style="list-style-type: none"> • Difficulties in transportation of goods affecting trade and economic activities. • limited access to social amenities increases transportation costs for the community, making it difficult to transport farm produce to other markets, thereby limiting economic opportunities and development. 	<p>encompass rehabilitation of the road to improve accessibility and transportation.</p> <ul style="list-style-type: none"> • Regular maintenance of the road to ensure its durability as well as construction of alternative routes to provide multiple access points in the community. 	<p>Kerr Amadou, Kerr Omar Sene, Ndoфан, Ndungu Kebbeh, Minteh Kunda, Illiyasa, Katchng, Makkah Farafenni, Yalal Tangkongjali, Kerr Ousman Busso, Kerr Malick Nana, and Kerr Sele</p>
<ul style="list-style-type: none"> • Accessibility: The road becomes impassable during the rainy season, rendering the community cut off from nearby communities. 	<ul style="list-style-type: none"> • The rehabilitation of the road is recommended to address the transportation challenges faced by the community. • Regular maintenance and drainage systems should be established to prevent erosion and improve the overall road condition. • Improving the drainage system and the construction of gutters to reduce flooding within the community as well as community involvement in the project. • the communities should establish a road committee or management system to oversee the maintenance and rehabilitation efforts. 	<p>Kerr Omar Sene, Ndoфан, Ndungu Kebbeh, Illiyasa, Katchang, Yalal Tangkongjali, Kerr Ousman Busso, Kerr Malick Nana, and Kerr Sele</p>
<ul style="list-style-type: none"> • Poor roads hamper transportation and access to markets, limiting the villagers' ability to sell 	<ul style="list-style-type: none"> • Paving the roads, widening them to accommodate vehicles. 	<p>Jajari</p>

<p>their agricultural products and engage in petty trade.</p> <ul style="list-style-type: none"> • It also affects the delivery of essential services such as healthcare and education. • Increases the risk of accidents and causes difficulties during emergencies, where timely assistance may be required. 	<ul style="list-style-type: none"> • Implementing proper drainage systems to prevent waterlogging. • Regular maintenance and repairs should also be carried out to ensure the sustainability of the road infrastructure. 	<p>Ndungu Kebbeh, Minteh Kunda, Yalal Tangkongjali, Kerr Ousman Busso, Kerr Malick Nana, and Kerr Sele</p>				
<p>Perception of the proposed project and the positive impacts</p> <p>The communities generally support the proposed road rehabilitation project as it will bring significant improvements to their daily lives as well as view it as a positive development that will enhance their access to essential services and promote economic growth of the community:</p> <ul style="list-style-type: none"> • The project will improve access to healthcare facilities, schools, and markets, thereby improving the overall well-being of the community. • Enhanced mobility and transportation making it easier for farmers to access markets and sell their produce. • Facilitating trade and economic activities as well as reducing travel time • Increased economic activities, community development and good prices for agricultural products. • Increased income will contribute to poverty reduction. • Contribute to increased safety on the roads by reducing the risk of accidents and emergency response time. • Enhance the overall connectivity of the village with neighboring communities. 		<p>All communities</p>				
<p>Negative Environmental impacts and mitigation measures</p> <table border="1"> <thead> <tr> <th>Impacts</th> <th>Measures</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> • Soil erosion and increased sedimentation in nearby water bodies during the road construction process. • Disruption of natural habitats and potential disturbance to local flora and fauna. </td> <td> <ul style="list-style-type: none"> • Construction of gutters to lessen the occurrence of erosion. • Minimizing noise and vibration • Using of environmentally friendly machines to </td> </tr> </tbody> </table>		Impacts	Measures	<ul style="list-style-type: none"> • Soil erosion and increased sedimentation in nearby water bodies during the road construction process. • Disruption of natural habitats and potential disturbance to local flora and fauna. 	<ul style="list-style-type: none"> • Construction of gutters to lessen the occurrence of erosion. • Minimizing noise and vibration • Using of environmentally friendly machines to 	<p>All communities</p>
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<ul style="list-style-type: none"> • Increased emission of gases leading to air pollution during the construction • Dust pollution. • Cutting of fruit trees • Increased pollution from vehicles and the use of construction materials. • Increased soil erosion, air pollution, and destruction of natural habitats • Habitat disruption for certain plant and animal species, soil erosion during construction, and increased air and noise pollution from vehicles. • Soil erosion, deforestation, and disturbance to daily lives. • The construction work may lead to temporary disruptions and inconveniences for the community, such as noise, dust, and limited access to certain areas. • 	<p>lessen the rate of emissions.</p> <ul style="list-style-type: none"> • Frequent watering of the road amid the construction • Raise awareness on the importance of tree planting in the community and beyond. • Promoting the use of environmentally friendly vehicles and ensuring proper waste management during construction should be implemented. • Mitigation measures could include erosion control, reforestation, and proper waste management. • Implementing erosion control measures and promoting sustainable transportation practices can be adopted. • Implementing erosion control measures, planting trees along the road to compensate for any loss • Implementing proper project management and communication strategies, such as providing timely information to the community, minimizing disruption to daily activities, and 	
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	<p>ensuring the safety of community members during the construction process</p> <ul style="list-style-type: none"> • Planting vegetation along the road and implementing erosion control techniques. 	
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Negative Social Impacts and Mitigation Measures		All communities
Impact	Measures	
<ul style="list-style-type: none"> • Temporary inconvenience and disruptions to daily activities during the construction phase. • Potential noise and dust pollution during construction. • Quality of the road as most roads in the community are not sustainable. • Vulnerability of their womenfolk (child and wives) to workers • Child labor • Increase in traffic accidents. 	<ul style="list-style-type: none"> • Communicate and coordinate with the community to minimize disruptions and inform them about the construction schedule. • Implement measures to minimize dust and noise pollution such as the use of water trucks for sprinkling. • Construction of a standard road that will be everlasting. • Workers to be cognizant of the norms and values of the community. • Contractors to be aware of child labor act. • This can be mitigated through road safety campaigns along with the 	

	<p>construction of speed bumps and other measures.</p>	
<p>Key Recommendation/ Concern</p>		<p>All communities</p>
<p>The recommendations from the focus group discussion and key informant interviews are comprehensive and address several key areas for consideration:</p> <ul style="list-style-type: none"> • Smooth coordination and communication between project implementers and the community. Ensuring that the road rehabilitation project includes provisions for maintenance and repair. Involving community members in the decision-making process and considering their needs and preferences. • The need for the project to prioritize the rehabilitation of the feeder roads within the community, ensuring the engagement of community members in the project, and ensuring the transparency of the project implementation. • Ensuring the project benefits the entire community and does not disproportionately favor certain groups. It is important to engage the community throughout the project's implementation and address any grievances or concerns promptly. Additionally, consideration should be given to the cultural significance of the community, ensuring that any construction does not harm or destroy important cultural sites. • The need for community participation and consultation in the planning and implementation of the project, ensuring that the project provides long-term benefits for the community, the need to address the lack of basic facilities in the community, workers to be conscious and respect societal norms and values of the community for the protection of the community's womenfolk against sexual harassment and so on. • Ensuring the inclusion of local people in the construction and maintenance of the roads to provide employment opportunities and skill development. • Ensuring the involvement and consultation of community members in the decision-making process, proper compensation for any land acquisition, and accountability for the use of project funds. Recommendations include establishing a community consultation committee, transparent procedures for compensation, and regular monitoring and reporting on project progress. • Proper maintenance of the road and the desire for increased access to public utilities such as electricity and clean water. • Maintaining proper communication with the community during construction works, ensuring that the rehabilitated road can 		

withstand heavy vehicle usage, and the creation of more job opportunities for the residents.	
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Table 5.3: Summary of Consultation at Lower River Region with 5 communities	
MAJOR CONCERN	COMMUNITIES
<p>Livelihood activities</p> <p>In the communities of the Lower River Region (LRR), various socioeconomic activities serve as the primary sources of livelihood. These activities include farming, petty trading, charcoal production, skill jobs, vegetable production, and livestock rearing. Approximately 80 percent of men engage in farming, skill jobs, and livestock rearing, while 20 percent of women are involved in farming and livestock rearing. Conversely, about 90 percent of women participate in petty trading, charcoal production, and vegetable production, whereas only 10 percent of men are involved in petty trading and vegetable production. This distribution of socioeconomic activities highlights the diverse roles and contributions of both men and women in sustaining livelihoods within the communities of LRR.</p>	Nema, Sibito, Sareh Jamma, and Minna
<p>Physical Environment (Climatic Condition)</p> <p>During field engagements, respondents from these communities described the air quality as poor, characterized by heat and dustiness. While the water was deemed clean, it was noted to be insufficient to meet the population's needs. Additionally, the productivity of the soil was classified as poor due to anthropogenic activities and inadequate agricultural practices occurring in the farmlands. These observations underscore the environmental challenges facing the communities, including air pollution, water scarcity, and soil degradation, which may necessitate interventions to improve environmental quality and agricultural sustainability.</p>	Nema, Sibito, Sareh Jamma, and Minna
<p>Biological Environment (<i>Flora and Fauna</i>)</p> <p>The surrounding areas of the community exhibit a scarcity of trees and shrubs, largely attributed to the community members' predominant activity of charcoal production. Among the tree species present, including mango, cashew, melaena, Baobab, wolo, and keno, their numbers are notably diminished due to this activity. Furthermore, there is a decline in the population of wild animals, with some species experiencing extinction while others have migrated to more suitable ecosystems. The remaining wildlife, such as monkeys, warthogs/bush pigs, snakes, and scorpions, are among the few that still inhabit the area.</p>	Nema, Sibito, Sareh Jamma, and Minna

<p>Social Amenities <i>(Schools; Health Center; Police; Football Field; Market etc)</i></p> <p>Within the communities, essential infrastructure includes a school, a health facility, a mosque, and a football field, catering to various aspects of community life. Notably, there is no public market in the vicinity; instead, goods are sold at the village bantaba, serving as the central marketplace for residents to access essential items and engage in economic transactions.</p>	<p>Nema and Sibito</p>						
<p>During the visit, it was observed that the community lacks most of the basic social amenities. The only facilities present were a mosque and a football field, indicating a significant gap in essential infrastructure such as schools, health facilities, and public markets.</p>	<p>Sareh Jamma and Minna</p>						
<p>Public Utilities <i>(Electricity; Water; Telecommunication; etc)</i></p> <p>The primary public utilities benefiting the communities include the tar road network and telecommunication services provided by GSM operators. However, the community does not have access to electricity supply from the national grid (NAWEC). Instead, residents rely on solar energy to meet their energy needs, highlighting a reliance on renewable sources for power generation within the community.</p>	<p>Sareh Jamma and Nema</p>						
<p>The community primarily relies on a borehole for their water supply, while telecommunication services are provided by GSM companies. However, electricity is not available throughout the community, with only a few compounds equipped with solar energy systems for power. This indicates a partial dependency on renewable energy sources to meet the energy needs of some residents.</p>	<p>Sibito and Minna</p>						
<p>Description of the road condition</p> <p>The road condition was reported to be poor, characterized by gullies and rocky terrains. Shrubs dominate both sides of the road, and certain sections are prone to flooding.</p>	<p>Nema, Sibito, Sareh Jamma, and Minna</p>						
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<p>posed by the road conditions.</p>	<p>increased traffic and improve accessibility.</p>	<p>Sibito, Minna</p>
<ul style="list-style-type: none"> • Health complications may arise from fugitive dust emitted by passing vehicles, impacting the well-being of individuals in the area. 	<ul style="list-style-type: none"> • Implementing dust suppression measures such as spraying with water to reduce dust levels. 	
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Negative Environmental impacts and mitigation measures		
Impacts	Measures	
<ul style="list-style-type: none"> • The road construction project will result to significant dust pollution in the surrounding areas. • As part of the road construction efforts, trees are to be cut down, which will impact the local ecosystem. • Noise pollution is anticipated to occur during the road rehabilitation work which might cause disturbance to the inhabitants of those communities. • There is potentials of farmers being displaced from their lands because of the road construction project. • The migration patterns of animals could be disrupted during the construction of the proposed project. • 	<ul style="list-style-type: none"> • Implementing water spraying measures to mitigate dust pollution. • Undertaking tree planting initiatives to enhance the local environment. • Providing compensation to individuals affected by the project 	Nema, Sibito, Sareh Jamma, and Minna
Negative Social Impacts and Mitigation Measures		
Impact	Measures	
<ul style="list-style-type: none"> • The communities are anticipating that changing cultural beliefs, norms and values may be tempered with as a result of the workforce. • The Influx of people has the potential of influencing the lifestyles of youths residing in the communities. • There are potentials for gender-based violence, sexual harassment, abuse, 	<ul style="list-style-type: none"> • The workforce should be well-oriented before they are deployed in their respective communities. • The workforce should respect and adhere to the norms and values of the community to avoid 	Nema, Sibito, Sareh Jamma, and Minna

<p>and rape cases to occur within these communities.</p> <ul style="list-style-type: none"> • There is anticipated case of child labor that could be reported during the implementation of the project. 	<p>any conflict or misunderstanding between them.</p> <ul style="list-style-type: none"> • The community members are urged to advise families on how to comfort themselves and closely monitor them most especially the girl child. 	
<p>Key Recommendation/ Concern</p> <p>The recommendations from the focus group discussion and key informant interviews are comprehensive and address several key areas for consideration:</p> <ol style="list-style-type: none"> 1. Employment of Local Youths: Prioritize hiring from the community to engage and empower local youths. 2. Personal Protective Equipment (PPE): Ensure all workers wear appropriate PPE, such as earmuffs, in noisy work areas to protect against hearing damage. 3. Vehicle Management: Train drivers to switch off idle construction vehicles to minimize noise pollution and maintain all machinery in good condition to reduce excessive noise. 4. Environmental Conservation: Minimize tree and vegetation destruction during construction and consider mature trees' locations when planning access roads and clearing for quarry and borrow sites. 5. Compensation for Farmers: Implement a compensation mechanism for farmers affected by road construction to mitigate impacts on their lands. <p>Implementing these recommendations can enhance community engagement, promote safety, reduce environmental impact, and address concerns of local stakeholders during the project's execution.</p>		<p>Nema, Sibito, Sareh Jamma, and Minna</p>

<p>Table 5.4: Summary of Consultation at Central River Region with 9 communities</p>	
<p>Major concern</p>	<p>communities</p>

<p>Livelihood activities</p> <p>The primary livelihood activities through which beneficiaries generate income to enhance their lives and livelihoods include farming (such as rain fed agriculture involving cereals, rice cultivation, and livestock rearing), vegetable growing, engaging in skilled work, and participating in petty trading.</p>	<p>All communities in CRR North and South.</p>
<p>Physical Environment (Climatic Condition)</p> <p>The air quality is perceived to be unhealthy due to fugitive dust and other forms of pollution, a sentiment reinforced by the hot and strong winds typically observed. Conversely, the water quality is perceived to be clean and suitable for drinking but not sufficient to meet the demands of the communities, sourced from a borehole and wells; however, there is room for improvement in its quality. Additionally, the soil quality in the communities is described as unfertile, poor, and weak which are because of the erosion and over cultivation.</p>	<p>Bansang, Dobong Kunda, Cha Kunda, Chargel, Sarreh Soffie, Madina Duta wally, Pateh Sam, Sinchu Alagie, and Nyameng Kunda.</p>
<p>Biological Environment (Flora and Fauna)</p> <p>The villages boast a variety of flora, including (<i>Jalo, Keno, Wula Konoduto, Fara Wolol, and Jambankatang</i>) Cashia, Mango, Malaina, few Baoba In contrast, community members observed fewer animals, such as bush pigs, monkeys, <i>Sulol</i>, antelopes, Snakes, hippos and various birds.</p>	<p>Bansang, Dobong Kunda, Cha Kunda, Chargel, Sarreh Soffie, Madina Duta wally, Pateh Sam, Sinchu Alagie, and Nyameng Kunda.</p>
<p>Social Amenities (Schools; Health Center; Police; Football Field; Market etc)</p> <p>Limited social amenities are available to the communities, consisting primarily of a Football field, Schools and mosques (masjids). Only madina duta wally that does not have a school.</p>	<p>All in CRR S/N</p>
<p>Fortunately, there are healthcare centers/post, police post and accessible market.</p>	<p>Bansang, Dobong Kunda, Cha Kunda, Sarreh Soffie, Pateh Sam.</p>
<p>Public Utilities (Electricity; Water; Telecommunication; etc)</p> <p>The limited public utilities available in the project sites are as follows: Electricity, and water supply. And only Sinchu Alagie and Bansang have proper access road.</p>	<p>Bansang</p>
<p>There are no public utility services to the other beneficiaries except for Telecommunication.</p>	<p>Dobong Kunda, Cha Kunda, Chargel, Sarreh Soffie, Madina Duta wally, Pateh Sam, and Nyameng Kunda.</p>
<p>Description of the road condition</p> <p>The current road network is in poor condition, as indicated by the presence of ditches, erosion, and narrowness, making it prone to stagnant water accumulation during the rainy season.</p>	<p>Bansang, Dobong Kunda, Cha Kunda, Chargel, Sarreh Soffie, Madina Duta wally, Pateh Sam, Sinchu Alagie, and Nyameng Kunda.</p>

Challenges Caused by the Current Road Condition

The numerous challenges encountered because of the poor road conditions are as follows:

Challenges	Proposed mitigation measures
<ul style="list-style-type: none"> The poor road conditions make it challenging for businessmen traveling to those communities, affecting their ability to conduct business effectively. 	<ul style="list-style-type: none"> Constructing a proper road with asphalt (tar road) to improve road quality.
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<ul style="list-style-type: none"> Health complications may arise from fugitive dust emitted by passing vehicles, impacting the well-being of individuals in the area. 	<ul style="list-style-type: none"> Implementing dust suppression measures such as spraying with water to reduce dust levels.
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Bansang, Dobong Kunda, Cha Kunda, Chargel, Sarreh Soffie, Madina Duta wally, Pateh Sam, Sinchu Alagie, and Nyameng Kunda.

Madina Duta Wally.

	alleviate transportation costs.	
<ul style="list-style-type: none"> • During the rainy season, accessing the market becomes challenging due to road blockages caused by water. • The poor road infrastructure poses a security threat to the community. • Diversions taken by people are resulting in the destruction of farms. • Engines and machines are susceptible to spoilage due to the poor road conditions. • Agricultural farmlands are experiencing erosion as a result of the road conditions. 	<ul style="list-style-type: none"> • Constructing a proper road with asphalt (tar road) to improve road quality. • Establishment of a police post to enhance security and reduce threats to the community. • Building large culverts, bridges, and implementing a proper drainage system to mitigate flooding and erosion. • Constructing dikes to prevent water erosion on farmlands. 	Dobong Kunda, Cha Kunda, Chargel, Sarreh Soffie, Madina Duta wally, Pateh Sam, Sinchu Alagie, and Nyameng Kunda.

Major Concern	Communities
<p>Livelihood activities Inhabitants of these communities earn their livelihood through various socioeconomic activities ranging from: agricultural activities such as farming (80% men and 20% women), gardening (100% women), fishing (100% men), poultry farming (100% men), and livestock rearing (100% women). In addition to this, some inhabitants also engage in skilled work (100% men), petty trading (75% women and 25% men).</p>	Chamoibunda, Limbambulu, Sareh Jamma Mballow, Kwonkuba

<p>The farming activity is dominated by women as they consist of the major percentage.</p>	<p>Kwonkuba</p>
<p>Physical Environment (Climatic Condition) Air Quality: Considered unhealthy, particularly during bushfires, indicating potential air pollution issues that need to be addressed to safeguard public health. Water Quality: Perceived as clean and suitable for drinking, sourced from a borehole. However, there is room for improvement in its quality, suggesting a need for water treatment or management practices to enhance its purity. Soil Quality: Reported as poor due to erosion signs in farmlands, highlighting the need for soil conservation measures to prevent further degradation and maintain agricultural productivity.</p>	<p>Chamoibunda, Limbambulu, Sareh Jamma Mballow, Kwonkuba</p>
<p>Biological Environment (Flora and Fauna) The respondent's observation highlights two critical environmental issues in the community: Loss of Indigenous Trees: Many indigenous trees in the community and its surroundings are either extinct or at risk of extinction. This loss is attributed to high pressure on forest resources and the conversion of forests into farmlands. Wildlife Migration: The pressure on forest resources and expansion of farmlands has led to the migration of many wild animals. This migration can disrupt ecosystems and impact biodiversity.</p>	<p>Chamoibunda, Limbambulu, Sareh Jamma Mballow, Kwonkuba</p>
<p>Social Amenities (Schools; Health Center; Police; Football Field; Market etc) Limited social amenities are available to the communities, consisting primarily of a Football field, Schools, mosques (masjids), Health Post and a small market.</p>	<p>Chamoibunda, Limbambulu, Kwonkuba</p>
<p>There is no school, health post and a market in this community at Sandu district.</p>	<p>Sareh Jama Mballow</p>
<p>Public Utilities (Electricity; Water; Telecommunication; etc) The primary public utilities benefiting the communities include the tar road network and telecommunication services provided by GSM operators. However, the community does not have access to electricity supply from the national grid (NAWEC). Instead, residents rely on solar energy to meet their energy needs, highlighting a reliance on renewable sources for power generation within the community.</p>	<p>Chamoibunda, Kwonkuba</p>

<p>The community primarily relies on a borehole for their water supply, while telecommunication services are provided by GSM companies. However, electricity is not available throughout the community, with only a few compounds equipped with solar energy systems for power.</p>		Sareh Jamma Mballow and Limbambulu								
<p>Description of the road condition The road condition was reported to be poor, characterized by gullies and rocky terrains. Shrubs dominate both sides of the road, and certain sections are prone to flooding.</p>		Chamoibunda, Limbambulu, Sareh Jamma Mballow, Kwonkuba								
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<ul style="list-style-type: none"> The communities are anticipating for the death of livestock due to the construction activities. The potential for road accidents is a major safety concern for communities. 	<ul style="list-style-type: none"> Installing speed humps to reduce the risk of road accidents. 		<p>Chamoibunda</p>
<ul style="list-style-type: none"> The road construction could lead to runoff water intrusion into people's compounds and the community, potentially causing flooding and related issues. The establishment of a laterite mining site could significantly impact community farmlands, forcing a shift in livelihood activities and potentially disrupting local economies. 	<ul style="list-style-type: none"> Avoid creating a diversion that enters the community. Mining sites should be distances away from human settlements and farmlands. 		

Negative Social Impacts and Mitigation Measures	
Impact	Measures
<ul style="list-style-type: none"> • The Influx of people has the potential of influencing the lifestyles of youths residing in the communities. • There are potentials for gender-based violence, sexual harassment, abuse, and rape cases to occur within these communities. • 	<ul style="list-style-type: none"> • The workforce should be well-oriented before they are deployed in their respective communities. • The workforce should respect and adhere to the norms and values of the community to avoid any conflict or misunderstanding between them. •
<ul style="list-style-type: none"> • There is high risk of theft of livestock and properties by incoming workforce in their communities. 	<ul style="list-style-type: none"> • Employment of community youths to minimize or avoid the change of lifestyle and cultural influence. •
<ul style="list-style-type: none"> • The communities are anticipating that changing cultural beliefs, norms and values may be tempered with because of of the workforce. • 	<ul style="list-style-type: none"> • The workforce should respect and adhere to the norms and values of the community to avoid any conflict or misunderstanding between them. •

Chamoibunda , Limbambulu, Sareh Jamma Mballow

Kwonkuba

Limbambulu

<p>Key Recommendation/ Concern</p> <p>The respondents' concerns about employing local youths to reduce social conflict, lifestyle changes, and potential harassment are valid, emphasizing the importance of integrating community members into the project to foster peace and harmony. Additionally, their request to ensure that materials meant for road construction remain in the community until the project is completed reflects a desire for transparency and accountability. Finally, their recommendation to start the road implementation during the dry season aligns with previous suggestions to minimize disruptions and protect farmland during construction.</p>	Chamoibunda
<p>The community express a great concern about the type of people that will be deployed in Limbambulu Bambo , as they likely want skilled and trustworthy individuals working on the road project. Additionally, their suggestion to extend the road project to the neighboring community, where essential facilities like a clinic and junior secondary school are located, is important for improving accessibility and ensuring that neighboring communities also benefit from the infrastructure development. This broader approach can enhance overall community well-being and development.</p>	Limbambulu
<p>The community's recommendation to include a comprehensive drainage system in the road construction project is crucial, especially considering their vulnerability to floods. Implementing proper drainage infrastructure will help mitigate flood risks, ensuring the safety and well-being of the community while also protecting the integrity of the road infrastructure.</p>	Kwonkuba
<p>The respondents recommend that starting the project implementation during the dry season to mitigate potential damage to cultivated crops in farmlands by avoiding the rainy season when trucks could cause destruction. Additionally, employing local youths for the project can help reduce unemployment rates in the community, fostering economic growth and benefiting both the project and the local population.</p>	Sareh Jamma Mballow
<p>GBV-SH and Abuse</p> <p>The respondent's concern about the possibility of gender-based violence during the project implementation is valid and underscores the need for thorough vetting and supervision of workers entering the community.</p>	Chamoibunda and Limbambulu
<p>The community has received training on gender-based violence and sexual harassment (GBV-SH) from NGOs. These trainings</p>	Sareh Jama Mballow

can empower community members to recognize and address any potential issues that may arise during the project intervention phase, promoting a safer and more inclusive work environment for all involved.	

5.2. Institutional Stakeholder Consultation

This section of the report highlights the key findings from the consultation with relevant institutions/stakeholders about their roles and their mandates including their perceptions about the GIRAV projects in terms of their engagement as well as social and environment impacts the project is likely to have during implementation and their recommendations. The report entails stakeholders’ opinion on the current levels of environmental impact and mitigation measures that can be adopted to reduce these adverse effects and maximize the potential benefits of the action. The objective of the assessment is to develop a sustainable intervention that has minimal environmental and social impact.

The following ten (10) institutions were consulted:

1. Department of Physical Planning and Housing
2. Department of Women’s Bureau – Ministry of Gender, Children and Social Welfare
3. Department of Parks and Wildlife
4. Department of Forestry
5. National Roads Authority
6. Ministry of Environment, Climate Change and Natural Resources
7. Central Project Coordinating Unit – Ministry of Agriculture
8. Directorate of Public Health
9. Department of Water Resources
10. GAMTECH

The key points of the consultation are outlined in Table 5.6:

Table 5.6: Summary of Institutional Stakeholder Consultation

<p>Department of Physical Planning and Housing</p>	<p><u>Key points from the consultation with Principal Housing Officer on the 26th of February 2024</u></p> <ul style="list-style-type: none"> • PHO mentioned the project will improve the standards of the community members as they use donkey carts for transportation thus the rehabilitation of these roads will be of benefit to them and will ease transportation. • He mentioned having gone with the GIRAV team on all the intervention sites as they cannot do any road constructions without engaging physical planning to give them proper documentation and guidance to land resources. • He emphasized that the construction should be of a proper standard to ensure long term benefits and not the just do rough work that will not last long. Thus recommended the road to be a TAR Road. • During the construction of these feeder roads, there must be some communities that may be affected along the way therefore it is important to budget adequate compensation mechanism to the affected people as per guideline on physical planning. • Usually, the physical planning standard on road construction is 10.5m however, when it is recommended to pave at least 7.5m. • PHO mentioned there should be promotion of business and marketing strategy to these women who are involved in gardening and other activities also to the youths to reduce the movement of rural urban migration in their communities. • He buttresses to continuity on advocacy for community enhancement and livelihood improvement as they are the beneficiaries.
<p>Ministry of Gender, Children and Social Welfare (Department of Women's Bureau)</p>	<p><u>Key points from consultation with Principal Gender Officer on the 27th of February 2024</u></p> <ul style="list-style-type: none"> • PGO mentioned the gender department's mandate is to promote gender equality, equity and empowerment of women and girls at all levels in The Gambia. He mentioned they had a field visit to across the country on sensitization and went with GIRAV Project to all their intervention sites. • The said the reconstruction of feeder roads will be of great benefit to the people living in the community as it will improve their livelihoods and enhance accessibility especially to the school going children and women. • It will also reduce the death rate of pregnant women and women to easily access their gardens. • He emphasizes the safety and health conditions during this construction as there can be no rehabilitation without considering the safety of people since they will be dealing with heavy materials that may be harmful and the dust pollution may also impact the health of individuals. • Due to poor road conditions, he mentioned there will be increase in the loss of production either by not accessing the market early in some areas to sell their products and the perishable ones easily gets spoiled due to lack of storage and cold facilities.

	<ul style="list-style-type: none"> • Considering the increase in Gender Based Violence and sexual harassment mostly done by some workers during the time spent in the community, he recommended the project team to strictly warn the workers and train them and sign a code of conduct to ensure they follow the rules, and anyone found wanted will be dismiss or their contract will be terminated. • He mentioned that the department does training on child abuse and GBV across the regions and to sensitize the women and youths in the communities. • Access to ownership of land for women is still a major issue in the rural Gambia thus, he encourages the project to involve the government to compensate the people whose land are been touch during clearing for road construction. Thus, the government should come with reform on land ownership for both men and women equally. • He recommended the long te-rm sustainability of projects should always be considered as beneficiaries need to continuous sustainability to help themselves. • Monitoring and Evaluation should be consistent and promote the participation of persons with disabilities in the communities.
<p>Department of Parks and Wildlife</p>	<p><u>Key points from consultation with Park Warden and member of the EIA working group</u></p> <ul style="list-style-type: none"> • She mentioned the project is a good one and will benefit women because it will ease movement for them, and their production may be accessible faster. It will also improve food security and bring more income to the people working in the community. • She highlighted that the project should consider the environmental protect as there will be some habitats affected and cutting of some trees during the construction phase thus should also collaborate with the department to ensure the protected areas are save and any affected place should be compensated. • The department of parks and wildlife can be contacted to do the scoping to identify whether the protected areas are being affected or not. Thus, it is important for the department to be contacted to know all the intervention sites.
<p>Department of Forestry</p>	<p>Key points from consultation with Forest Officer on the 4th of March 2024</p> <p>The Officer mentioned the role of the forestry department is to manage the entire forest cover in The Gambia and offer technical assistance to communities to manage their adjacent forest as the idea of participatory forest management came in 1998. They are also responsible for forest enterprise development and managing livelihoods, mangroves management and related forest covers.</p> <ul style="list-style-type: none"> • He mentioned the project will ease accessibility and communication within the sites when feeder roads are constructed. • However, he emphasizes that the project should always call for partnership and put the right technicians on board as there cannot be any

	<p>infrastructural development without the cutting of trees, and there is a regulation for trees protection in the gambia.</p> <ul style="list-style-type: none"> • Maintaining the trees with high content of nitrogen is important as it minimizes the chemicals used in the farmlands. Thus, there are calculations done on the number of hectares of trees that need to be cut or how to avoid the cutting but if the department is not consulted in this phase for supervision, then the penalty will not be on their side. • Compensation can be made in a form of establishing community woodlots rather than giving them full cash to the village heads which sometimes will not use the money for its right purpose. • He recommended the project to use experts to survey the project sites and topography to give the right guideline on minimizing the destruction of the vegetation cover.
<p>National Roads Authority (NRA)</p>	<p><u>Key points from consultation with feeder road engineer and a liaison person to the GIRAV Project on the 1st of March 2024:</u></p> <ul style="list-style-type: none"> • The Engineer mentioned the role of NRA is to provide a safe, reliable, and well-maintained road network for socio-economic development in The Gambia. He mentioned the GIRAV Project signed an MOU with NRA to provide technical assistance that will always include prospective contractors, tender documents, and feasibility study report. Thus, the NRA will serve as the reviewing body to the feeder road project under GIRAV. • He further mentioned they take the lead during site visits in order to provide alignment for the GIRAV team on how the road should be, as component 1.4 is on road connecting with the gardens then it is important to either avoid or shift routes that may affect the vegetation cover or minimize damage as this is a mandate at NRA level. • The vegetation cover of some communities is on virgin lands thus the inhabitants of the area are highly affected due to the cutting of trees that destroys the area. He recommended the team to reduce access through the virgin lands and replant trees as it is mandatory on the ESM budget line. • The construction face will increase the level of pollution as the aggregate use will increase dust pollution and the black stone basalt which is very hot may cause severe injury when accidentally touched. He mentioned the institute has serious protective equipment and safety gears that are always in place. • The institution conducts sensitization to the community members to hold their kids during construction times and avoid passing though those areas, as they are dealing with heavy and dangerous materials. • Cultural change due to the behavior of contractors who are assigned to the community for duration of their work, do influence the people in those communities leading to violence, becoming drug addicts and sexual assault increases as these contractors are highly paid warranting the poor women in the communities to be tempted to indulge in sexual acts to get money from them.

	<ul style="list-style-type: none"> • The Engineer mentioned there has never been any code of conduct signed by the contractors from their previous projects except with the GIRAV project where all the contractors were asked to sign a code of conduct. • He buttresses the positive impact that the project will reduce travel rants and enhance decentralization. • It will also increase the socio-economic benefits for the people and will ease access to their farms, gardens, and market. • Will bring more Social amenities within the community as there will be accessibility to electricity, schools, hospitals and so on. • It will also enhance social cohesion within villages. • He recommended the code of conduct to be applied correctly and fully with penalties if any contractor is found to be a victim.
<p>Ministry of Environment Climate Change and Natural Resources (MECCNAR)</p>	<p><u>Key points from consultation with Deputy Permanent Secretary on the 1st of March 2024:</u> DPS mentioned that the Ministry of Environment Climate Change and Natural Resources (MECCNAR) is the policy institution mandated for environmental management. The ministry has two- line departments namely, Department of Forestry and Department of Parks and Wildlife. The ministry also has a climate change secretariat that provides national climate change policy, climate adaptation and mitigation, and conservation. With regards to the GIRAV Project, DPS mentioned they are a permanent member of the Project steering committee (PSC).</p> <ul style="list-style-type: none"> • DPS mentioned the Proposed project will improve the value chains, businesses, and will ease accessibility for farmers and gardeners. • The construction of these feeder roads will build resilience and increase the social amenities, such as easy access to markets, schools, and healthcare. As it will also allow the middlemen to buy products from the gardeners easily. • He emphasized that the project should have strong collaboration with the ministry and department of forestry as they are dealing with construction thus this will need clearing of vegetation cover thus forestry can give them recommendations on what is needed and how to avoid cutting the indigenous trees. • Proper mitigation measures needs to be highlighted to the community members and contractors as the area will be prone to dust pollution during the construction phase, proper road signs should also be put in place, speed bumps and potential culverts and proper drainage system for waterways in the area and community participation should take to before constructing the drainage as some area experienced a blockage of water that kills mangroves because the roads are built on it. • Engaging the community and focal points on any decision regarding the community is important and is part of the work plan. And involving the stakeholders at the right time to get their input earlier. • A Code of conduct should be enforced and strictly come with penalties to reduce the violence by contractors in the community.
<p>Central Projects Coordinating Unit,</p>	<p><u>Key points from consultation with CPCU/ GIRAV Project Coordinator on the 4th of March 2024:</u></p>

<p>Ministry of Agriculture (CPCU)</p>	<ul style="list-style-type: none"> • The PC mentioned that the role of the CPCU is to coordinate and implement projects in the ministry, to also appraise and mobilize resources for poverty alleviation in the Gambia through these projects. • He mentioned the unit is the one implementing the GIRAV Project and it happens to be designed in a way that is relevant to support the needs of the communities in the project. • The project will promote linkages between the producers and buyers as there will be access to markets when these roads are constructed and will ease transportation of their goods as most of the time, they use donkey carts from their gardens to the markets or even trek by foot a times. • The GIRAV project which happens to be the second phase of GECAF project, the first phase did not have feeder roads on the project causing it very hard for women to access the “lumos” on time or even to sell their products. That is why it was put to construct feeder roads to ease the issue of transportation within the communities in the project. • Both the community members and contractors have been sensitized on code of conduct, social safeguards in the project as there will be interaction between them so there should be limits and what is to be done and not in terms of behavior, cultural values, and violence. • He mentioned that the indigenous trees have been preserved during the study and will not be cut during construction stages. • He also mentioned certain trees that cannot be avoided so when cut down, there has been negotiations done with the government to compensate the affected areas and communities during diversion to farmlands.
<p>Department of Public Health</p>	<p><u>Key points from consultation with Director of Public Health and his team</u></p> <ul style="list-style-type: none"> • Director mentioned the role of the unit is to investigate environmental health issues across the Gambia working closely to ensure the mitigation and sensitization of the public in accordance with the public health regulations. • He also mentioned since the project is construction of roads then it is a must to have some environmental damages in the community thus during the construction phase, there may be blockage of waterways due improper construction causing flooding in some areas so the contractors should be advised on working in a standard way to avoid blockages. • The health and safety of both workers and members in the community should be investigated and provide a safety mechanism for all as the possible air pollution during work may affect the health of the people. • The specifications areas to be supervised efficiently to have proper road systems with the right targets at selected areas. • PM Bojang mentioned the project will bring greater benefits as it will lead to an easy referral of patients and women in labor when these roads are constructed. • It will help them in their immunization campaign and work by reaching communities that are difficult to reach due to improper roads to access the area. Which they term as ‘hard to reach areas’ .

	<ul style="list-style-type: none"> • The project will promote the interaction of communities and will make schools accessible, markets and so on. • It will bring immense benefit to the women and youths for easy access to healthcare services and during the public health campaign make youths to be willing to travel and volunteer within their communities during sensitization and reduce the defaulter rate who hardly access some areas due to poor road condition. • They recommended the project management to engage community participation efficiently to make them feel involved as the project is their own so their views and recommendations should be taken. • Also recommended the project team to have stakeholder meetings with all the departments involved to show their role and responsibility and what can be done together to make a successful project. • The influx of people in society, change of lifestyle and GBV should be a component that needs to be taken seriously taking. Also, by addressing grievances redress mechanism. • Compensate people or farmlands that have been affected during the construction of roads.
<p>Department of Water Resources</p>	<p><u>Key points from consultation with Deputy Director</u></p> <p>He mentioned the department serve as the technical arm of the government of The Gambia to ensure proper utilization of water, weather and climate information to people and early warning to sectors.</p> <ul style="list-style-type: none"> • He mentioned there will be erosion if roads are not properly constructed and improper culverts and drainage systems can cause blockages in the waterways. And when materials are not compacted, they become loose that will also affect it. • Through deposition of loose materials in the surface water bodies may cause stagnant water bodies and prevent water flows easily which causes flooding. • Trees that absorb water may be affected when cut down for road construction that will tamper the biodiversity. • He also mentioned that the project will enhance development in the community, it will make women and farmers to easily access their markets to sell products, and it will also promote commercial marketing within the communities. • It will promote access to healthcare services and easy access to projects in terms of borehole drilling projects based on site specifics. • He recommended the project to develop an exit strategy that be put in place after the phase out of the project to promote sustainability of the project. • To also consider water facilities in some intervention areas that are hard to reach. And provide them with cold storage to store the goods. • He recommends the participation of community members to get their views and also engage them in any decision processes and what they want the most.

	<ul style="list-style-type: none"> • To also engage the technical experts in all sectors that should be included as stakeholders for an easy work process. And promote water harvesting with a proper water management system.
<p>GAMTECH</p>	<p><u>Key points from consultation with Environmental Specialist of GAMTECH on the 26th of March 2024:</u></p> <ul style="list-style-type: none"> • He mentioned he was put on the GAMTECH team as the environmental specialist and went with GAMTECH at the field during the feasibility study for GIRAV Project. His role was to investigate the detail design of the project by looking at the environmental implication of the project. During this study, he mentioned that there is no completely new road that is a virgin forest as all are existing roads or footpath roads. • He mentioned that the major environmental impact may be the issue of increased erosion if care is not taken during the construction to take care of the runoff. • There were no tree protected areas, however some big trees found across the roadside that may be cut down for construction needs to be avoided. • Some sections of the roads go through swamp areas and rivers, he recommended diversion of those areas especially during the rainy season. • Since most compounds are on the roadside, and road alignment can cause lots of displacement, he recommended diversion through farmlands than destructing homes of people. • He recommended proper construction of culverts as the swampy areas are connected to rivers or wetlands. • Women had issue of transportation during rainy season as no car enter their village due to the poor road network making it very difficult to even get food, pregnant women suffer more, and farm products can't be sold as it cannot be transported with even donkey carts. • The community members mentioned they do not know how far the road is going so they prefer construction during dry season for they fear in rainy season there is high chance for the farm products to be destroys when there are told to shift or move from there. • He mentioned the project's benefit is crosscutting and will help increase the production rate of their area and increase network system. • He recommended community engagement to be one of the top priorities for the project as the perspective of the indigenous knowledge should highly be considered. • Also recommended the project staff to consider employing community youths during construction phase by contracting them on works they can do.

6. Potential Impacts and Mitigation Measures

6.1. Introduction

The poor rural feeder roads have adversely impacted the development of the rural communities, resulting in increased poverty, high post-harvest loss, expensive commodities, increased transportation time and cost. Furthermore, access to healthcare services and education is challenging due to the poor road conditions. Therefore, proposed GIRAV rural feeder roads construction will yield numerous positive impacts and will equally address the above-mentioned challenges associated to the poor existing road conditions.

Notwithstanding, the potential positive impacts of the construction of rural feeder roads is coupled with numerous negative impacts both before and during the construction phase of the roads. The subsequent sections highlight the positive impacts of the project, followed by the potential negative impacts of the project activities. The approach employed to determine the impacts of planned project activities on the existing environment is presented in Annex 3 of this report.

6.2. Positive Impacts

The construction of rural feeder roads by the GIRAV Project can have several positive impacts on various aspects of society, economy, and environment. Here is a detailed explanation of some of these positive impacts:

6.2.1. Improved Access to Markets

Rural feeder roads provide better connectivity between remote rural areas and urban centers, markets, and transportation hubs. This improved accessibility enables farmers and rural entrepreneurs to easily transport their goods to marketplaces, thereby increasing their opportunities for economic activities and income generation.

6.2.2. Enhanced Transportation

Feeder roads improve transportation networks in rural areas, making it easier for people to travel to schools, healthcare facilities, and other essential services. This can improve access to education and healthcare, leading to better outcomes for rural communities.

6.2.3. Enhanced Socio-Economic Development

With improved road infrastructure, rural communities have better access to essential services such as healthcare, education, and social amenities. This leads to an overall improvement in the quality of life for residents, as they can access services that were previously out of reach due to poor transportation networks.

6.2.4. Increased Agricultural Productivity

Rural feeder roads facilitate the transportation of agricultural inputs such as fertilizers, seeds, and machinery to rural farms. Additionally, they enable farmers to transport their produce to markets in a timely manner, reducing post-harvest losses and increasing overall agricultural productivity. Farmers

can also diversify their crops and engage in value-added activities, as they have better access to resources and markets.

6.2.5. Job Creation

The construction of rural feeder roads will generate employment opportunities for both skilled and unskilled workers. Construction projects require labor for road building, maintenance, and related infrastructure development and majority of the unskilled workers will be sourced from the residents and their satellite villages thus creating jobs for most people within and around the project area of influences. Moreover, improved access to markets can stimulate economic activities such as trade, transportation, and services, thereby creating additional employment opportunities for residents.

6.2.6. Enhanced Access to Education

Better road infrastructure makes it easier for children living in rural areas to access schools. Improved transportation reduces travel time and ensures safer commutes for students, encouraging higher school enrollment rates and better educational outcomes.

6.2.7. Increased Tourism and Cultural Exchange

Rural feeder roads provide access to previously isolated areas with unique cultural and natural attractions. Improved connectivity can attract tourists, leading to the development of tourism-related infrastructure and services in rural communities. This not only generates revenue but also promotes cultural exchange and understanding between tourists and residents.

6.2.8. Healthcare Accessibility

Rural feeder roads facilitate the transportation of medical supplies, equipment, and personnel to remote healthcare facilities. Additionally, they enable patients to access healthcare services more easily, reducing barriers to healthcare access and improving health outcomes in rural communities.

6.2.9. Stimulated Local Businesses

Improved access to rural areas can attract investment from businesses looking to serve these communities. This could include retail stores, processing facilities, and other businesses that can benefit from increased connectivity to rural markets.

6.2.10. Social Integration and Cohesion

Better road connections can enhance social integration by reducing isolation in rural communities. Improved access to transportation facilitates interaction between different communities, leading to greater social cohesion and a stronger sense of community.

6.2.11. Infrastructure Development

Feeder road construction often involves the development of ancillary infrastructure such as bridges, culverts, and drainage systems. This infrastructure can help mitigate the impact of natural disasters such as floods and improve overall resilience in rural communities.

6.2.12. Empowerment of Women and Vulnerable Groups

Rural feeder roads can particularly benefit women and vulnerable groups by improving their access to education, healthcare, and economic opportunities. For example, better road access can make it easier for women to access maternal healthcare services and participate in income-generating activities.

In summary, the construction of rural feeder roads in the project intervention area can have multifaceted positive impacts, ranging from improved socio-economic development and agricultural productivity to enhanced access and essential services. These benefits contribute to the overall well-being and prosperity of rural communities, fostering inclusive growth and development.

6.2.13. Boost to local industrial activities.

During construction, locally made products such as cement and gravel will be utilized. The consumption of these will give a boost to industrial production of construction materials. Similarly, during construction, supply of construction materials, direct sale of household goods, consumables and foodstuffs to the workers will improve trade at local and regional levels in Gambia . In addition, the transport sector will benefit from transport of materials from manufacturing site to construction site. This will provide direct and indirect employment.

6.2.14. Improve Drainage and its Environmental Benefits

Construction of the proposed rural feeder roads is anticipated to significantly improve drainage system by creating culverts, bridges and Irish crossing at suitable locations. Improved drainage system will mitigate flooding and its associated negative impacts on the environment and livelihoods.

6.2.15. Improved Road Safety

Rehabilitation and upgrading of the feeder roads will result in improved road safety. With proper road furniture and pavement markings, both the vehicle drivers and pedestrians feel safer.

6.3. Potential Negative Impacts during Pre-construction Phase

6.3.1. Negative impacts of site or vegetation clearing during rural feeder road pre-construction

Clearing vegetation or sites during rural feeder road pre-construction can have several negative impacts:

1. **Loss of Biodiversity:** Clearing vegetation can lead to habitat destruction, resulting in the loss of diverse plant and animal species. This loss can disrupt ecosystems and decrease overall biodiversity in the area.
2. **Noise and Air Pollution:** Pre-construction activities associated with site clearing can generate noise and air pollution, impacting both humans and wildlife in the surrounding area.
3. **Soil Erosion:** Vegetation acts as a natural barrier against soil erosion by stabilizing soil with its roots and preventing water runoff. Clearing vegetation exposes soil to erosion, which can lead to sedimentation in water bodies, reduced soil fertility, and increased risk of landslides.

4. **Disruption of Carbon Sequestration:** Trees and plants play a crucial role in sequestering carbon dioxide from the atmosphere. Clearing vegetation releases stored carbon back into the atmosphere, contributing to climate change and global warming.
5. **Impact on Local Climate:** Vegetation helps regulate local climate by providing shade, absorbing sunlight, and releasing moisture through transpiration. Clearing vegetation can lead to increased temperatures, decreased humidity, and altered precipitation patterns in the area.
6. **Loss of Cultural and Medicinal Resources:** Many rural communities rely on local vegetation for cultural practices, traditional medicines, and food sources. Clearing vegetation can disrupt these cultural practices and lead to the loss of valuable medicinal resources.
7. **Habitat Fragmentation:** Clearing vegetation can fragment habitats, isolating populations of plants and animals and reducing genetic diversity. This fragmentation can hinder migration patterns and disrupt ecological processes such as pollination and seed dispersal.
8. **Visual and Aesthetic Impact:** Clearing vegetation can have a negative visual impact on the landscape, altering the natural beauty of the area. This can be particularly significant in rural areas where scenic landscapes are valued for tourism and recreation.
9. **Increased Runoff and Flooding:** Removal of vegetation can increase surface runoff during rainfall events, leading to localized flooding and erosion of nearby water bodies. This can pose risks to infrastructure and communities located downstream.
10. **Loss of Ecosystem Services:** Vegetation provides a wide range of ecosystem services, including water filtration, air purification, and pollination. Clearing vegetation can diminish these services, impacting the overall health and resilience of ecosystems in the area.
11. **Social Impacts on Communities:** Clearing vegetation for road construction can disrupt communities that rely on the land for their livelihoods, leading to displacement, loss of access to resources, and conflicts over land rights.

The impact significance of vegetation and site clearing during the pre-construction phase of the project is rated **MEDIUM** due to the numerous trees, shrubs and grasses that may be removed. Such an activity has direct impact on air quality, biodiversity, ecosystem services, livelihoods but indirect impacts on soil stability, flooding, and local climate. However, the activity is short-term and limited to the identified road corridors.

To mitigate these negative impacts, it is essential to consider alternative route options with less vegetation, implement sustainable land management practices, and involve local communities in the decision-making process.

6.3.2. Negative impacts of mobilization of construction material during road pre-construction

The mobilization of construction materials for road construction during the pre-construction phase of the GIRAV rural feeder roads project can indeed have several negative impacts, both on the environment and on communities:

1. **Air pollution:** Transporting construction materials often involves the use of heavy machinery and vehicles that emit pollutants such as carbon dioxide, nitrogen oxides, and particulate matter. These emissions contribute to air pollution and can harm local ecosystems and wildlife habitats.
2. **Increased Traffic:** Transporting large quantities of construction materials to road construction sites can lead to an increase in traffic along those rural roads. This can inconvenience commuters, increase travel times, and lead to frustration among drivers.
3. **Noise Pollution:** The movement of heavy machinery and vehicles involved in transporting construction materials can generate significant noise pollution, especially in residential areas. Prolonged exposure to high levels of noise can have negative effects on human health and well-being, including stress, hearing loss, and sleep disturbances.
4. **Road Damage:** The transportation of construction materials to road construction sites can contribute to further deterioration of existing poor roads and infrastructure. Heavy vehicles carrying large loads can cause wear and tear on roads, leading to potholes, cracks, and other forms of damage that require costly repairs.
5. **Public Health:** The public health of communities along the road corridor can be negatively affected due to increased dust pollution and gaseous emission, as well as noise pollution from vehicles during mobilization of construction materials and equipment.

The impact significance of the mobilization of construction materials and equipment during the pre-construction phase of the project is **LOW** since the activity is intensity of the impact is low, duration is short-term, and the extent is local.

To mitigate these negative impacts, it is essential for the project to implement measures such as proper planning, site selection, use of eco-friendly construction materials, efficient transportation practices, and adherence to environmental regulations and best practices. Additionally, community engagement and consultation can help address concerns and mitigate the social impacts of road construction projects.

6.3.3. Negative impacts of gravel mining for rural feeder road construction – Pre-construction Phase

Gravel mining from approved quarries for rural feeder road construction can have several negative impacts on the environment, communities, and ecosystems:

1. **Habitat Destruction:** Gravel mining often involves clearing vegetation and excavating land, leading to the destruction of natural habitats for various plant and animal species. This can disrupt ecosystems and threaten biodiversity.
2. **Soil Erosion:** Removal of gravel can destabilize soil, leading to increased erosion. Erosion can result in sedimentation of water bodies, reducing water quality and affecting aquatic life.

3. **Water Pollution:** Gravel mining can introduce pollutants such as sediment, heavy metals, and chemicals into nearby water sources. These pollutants can harm aquatic life and contaminate drinking water supplies.
4. **Air Pollution:** Dust and particulate matter generated during gravel mining operations can degrade air quality in the surrounding area. This can pose respiratory health risks to nearby communities and wildlife.
5. **Noise Pollution:** Heavy machinery used in gravel mining operations can produce high levels of noise, which can disturb wildlife and negatively impact the quality of life for nearby residents.
6. **Visual Impact:** Gravel mining sites can alter the landscape, leading to visual blight in rural areas. This can detract from the scenic beauty of the countryside and affect tourism and property values.
7. **Impacts on Local Communities:** Gravel mining can disrupt the lives and livelihoods of nearby communities. It may lead to increased traffic, damage to roads, and changes in land use patterns, affecting agricultural activities and traditional ways of life.
8. **Groundwater Depletion:** Gravel mining operations may require large amounts of water for processing and dust suppression. This can lead to groundwater depletion, especially in areas where water resources are already limited.
9. **Long-term Land Degradation:** Gravel mining can leave behind scars on the landscape that may take years or even decades to recover. Reclamation efforts may be costly and ineffective, leaving behind degraded land unfit for productive use.
10. **Regulatory Challenges:** Inadequate regulation and enforcement of environmental laws can exacerbate the negative impacts of gravel mining. Weak oversight may result in unchecked pollution, habitat destruction, and social conflicts.

The impact significance of the mining of gravel from approved quarries for the purpose of the GIRAV rural feeder roads construction is **HIGH** because the intensity of the impacts on the environment and affected communities is high, duration can be permanent, and the extent of the impact can be regional.

To mitigate these negative impacts, it is essential to implement comprehensive environmental assessments, engage local communities in decision-making processes, enforce strict regulations, promote sustainable mining practices, and invest in alternative materials and technologies for road construction.

6.3.4. Negative impacts of creating diversion roads during rural feeder roads pre-construction

Creating diversion roads for the GIRAV rural feeder road construction can have several negative impacts:

1. **Loss of biodiversity:** Building diversion roads may require clearing land, cutting down trees, and disrupting natural habitats. This can lead to deforestation, loss of biodiversity, and soil erosion, contributing to environmental degradation.
2. **Displacement of Communities:** Construction of diversion roads may require the relocation of communities residing in the affected areas. This can lead to social disruption, loss of livelihoods, and cultural disintegration among affected communities.
3. **Fragmentation of Land:** Diversion roads may fragment agricultural land and disrupt traditional land use patterns. This can hinder agricultural activities, reduce crop yields, and negatively impact local economies dependent on agriculture.
4. **Increased Traffic and Pollution:** Construction of diversion roads may lead to increased traffic in rural areas, which can result in noise pollution, air pollution, and road accidents. Additionally, increased vehicle emissions can contribute to environmental pollution and health issues among local residents.
5. **Impact on Soil and Water Resources:** Construction activities associated with building diversion roads can lead to soil erosion and sedimentation of water bodies, affecting water quality and aquatic ecosystems. Improper drainage systems may also exacerbate flooding in the area.

The proposed roads may potentially cause demolition of some structures in Sarre Jama Mballow (URR), Sarre Jama (LRR) and Minna (LRR). There are numerous farmlands in WCR (*Jakoi Sibirik, Tampoto, Bambara, Kankurang, Wassadou, Kangiramba, Busary, Bullengbat, Adully, Nyafee, Bulunto, Gifanga, Kampasa, Kan-Sambou, Kan-Mamadou, Nyofele, Jorren Bunda Kunda*), LRR (*Nema to Sibito*) and CRR-South (*Chargel, Bansang, Dobong Kunda, Cha Kunda, Sarre soffié*) that will be affected by the road construction.

The impact significance of creating diversion roads during the pre-construction phase of the project is ranked **MEDIUM**, on the basis that the intensity of impact of the activity on the environment is medium, duration is medium-term and extent is local.

To mitigate these negative impacts, resettlement and displacement should be avoided as much as possible. In the event resettlement or displacement is inevitable, a resettlement plan should be developed. Additionally, stakeholders should be involved in the decision-making process, and measures should be implemented to minimize environmental degradation, mitigate social disruptions, and promote sustainable development.

6.3.5. Potential Negative Impacts during Construction Phase

Negative impacts of road construction on air quality

The GIRAV rural feeder road construction can indeed have several negative impacts on air quality, during the construction phase. Here are some of the key negative impacts:

1. **Dust and Particulate Matter (PM) Emissions:** Road construction activities such as excavation, grading, and paving can generate significant amounts of dust and particulate matter. These particles, especially fine particles like PM_{2.5} and PM₁₀, can remain suspended in the air for long periods and can be easily inhaled, leading to respiratory issues and exacerbating existing health problems such as asthma and bronchitis.
2. **Emissions from Construction Equipment:** Heavy machinery used in road construction, such as bulldozers, graders, excavators, and trucks, often run on diesel engines which emit pollutants such as nitrogen oxides (NO_x), volatile organic compounds (VOCs), carbon monoxide (CO), and particulate matter. These emissions contribute to air pollution both locally and in surrounding areas.
3. **Traffic Congestion and Idling Vehicles:** During road construction, traffic congestion is common due to lane closures and detours, leading to increased idling of vehicles. Idling vehicles emit pollutants such as nitrogen dioxide (NO₂) and carbon monoxide (CO), contributing to localized air pollution and exposure of nearby residents and workers to harmful pollutants.
4. **Release of Volatile Organic Compounds (VOCs):** The use of asphalt and other construction materials can release volatile organic compounds (VOCs) into the air. VOCs contribute to the formation of ground-level ozone and smog, which can have adverse effects on respiratory health and the environment.
5. **Disruption of Vegetation and Soil:** Road construction activities often involve clearing vegetation and disturbing soil, which can release stored carbon and other pollutants into the air. Additionally, the loss of vegetation reduces the natural filtration of pollutants from the air, further exacerbating air quality issues.
6. **Increased Energy Consumption:** The construction, maintenance, and operation of roads require significant amounts of energy, much of which comes from fossil fuel sources. Increased energy consumption contributes to greenhouse gas emissions and climate change, which can indirectly affect air quality and public health.
7. **Long-term Traffic Impacts:** While not directly related to the construction phase, the expansion or improvement of roads can lead to increased traffic volumes and vehicle emissions over the long term, further deteriorating air quality in the surrounding areas.

The impact significance of project activities on the air quality during the construction phase of the project is **HIGH** due to the long duration of the impact and the intensity of the impact on public health.

Addressing these negative impacts requires careful planning, implementation of mitigation measures, and adherence to environmental regulations to minimize the effects of road construction on air quality and public health. This can include using cleaner construction equipment, implementing dust control measures, promoting alternative transportation modes, and considering the environmental impact during the planning and design phases of road projects.

6.3.6. Negative impacts of road construction on water quality

Road construction can have significant negative impacts on water quality, primarily due to various forms of pollution and alterations to natural water systems. Some of the key negative impacts include:

1. **Sedimentation:** During road construction, soil erosion often occurs due to land disturbance, excavation, and removal of vegetation. This sedimentation can be washed into nearby water bodies during rain events, leading to increased turbidity. Sedimentation can smother aquatic habitats, degrade water quality, and harm aquatic life by reducing light penetration and clogging fish gills.
2. **Chemical Pollution:** Road construction activities can introduce various chemicals into water bodies, including petroleum products, construction materials, and road salt. These pollutants can contaminate water sources, posing risks to aquatic organisms and human health. Petroleum products can contain toxic substances such as polycyclic aromatic hydrocarbons (PAHs) that are harmful to aquatic life. Construction materials like concrete, asphalt, and sealants can leach chemicals such as heavy metals and volatile organic compounds (VOCs) into waterways.
3. **Stormwater Runoff:** Impervious surfaces created during road construction, such as pavement and compacted soil, can increase the rate and volume of stormwater runoff. This runoff can carry pollutants like oils, heavy metals, and debris into nearby water bodies, contributing to pollution and altering natural hydrological processes. Increased runoff can also lead to flash flooding and erosion, further degrading water quality and aquatic habitats.
4. **Chemical Spills:** Accidental spills of hazardous materials, such as fuels, lubricants, and chemicals used in road construction, can occur during transportation, storage, or handling activities. These spills can contaminate soil and water, posing immediate threats to aquatic ecosystems and long-term risks to human health. Spill response and cleanup efforts may also involve the use of additional chemicals, further exacerbating water quality issues.

The impact significance of project activities on water quality during the construction phase of the project is **MEDIUM** because the extent of impact on water quality can be regional, duration and intensity of impact can be short-term and medium, respectively.

Addressing these negative impacts requires comprehensive planning, implementation of best management practices (BMPs), and adherence to environmental regulations to minimize the ecological footprint of road construction activities and protect water resources. This includes erosion and sediment control measures, stormwater management strategies, habitat restoration efforts, and sustainable infrastructure design practices aimed at mitigating pollution and preserving aquatic ecosystems.

6.3.7. Negative impacts of road construction on soil quality

Road construction can have several negative impacts on soil quality, including:

1. **Soil Compaction:** Heavy machinery used in road construction can lead to soil compaction, which reduces pore space and restricts the movement of air, water, and nutrients within the soil. Compacted soil is less able to support plant growth and can lead to erosion.
2. **Loss of Topsoil:** During road construction, topsoil, which is rich in organic matter and nutrients, is often removed or disturbed. This loss of topsoil reduces soil fertility and can hinder vegetation regrowth after construction is complete.
3. **Erosion:** The disruption of natural vegetation and soil cover during road construction can increase the risk of erosion. Without vegetation to stabilize the soil, rainwater runoff can wash away exposed soil, leading to sedimentation in nearby water bodies and loss of soil nutrients.
4. **Soil Contamination:** Construction activities may introduce contaminants such as oil, grease, chemicals, and construction materials into the soil, which can degrade soil quality and harm soil organisms. Contaminants can persist in the soil for long periods and may leach into groundwater, posing risks to human health and the environment.
5. **Alteration of Soil Structure:** Excavation and grading activities during road construction can alter the natural soil structure, disrupting soil horizons and profiles. This alteration can affect soil drainage, aeration, and nutrient cycling processes, leading to long-term degradation of soil quality.

The impact significance of project activities on soil quality during the construction phase is **MODERATE - HIGH** because the duration and intensity of the impact may be long-term and moderate, respectively.

Overall, road construction activities can have significant and often long-lasting negative impacts on soil quality, which can affect ecosystems, agriculture, and human well-being. Mitigation measures such as erosion control, soil stabilization, and revegetation efforts are essential to minimize these impacts and restore soil health.

6.3.8. Negative impacts of noise during rural feeder road construction

The negative impacts of noise during rural feeder road construction can be significant and multifaceted:

1. **Disturbance to Wildlife:** Rural areas often have diverse wildlife populations. Construction noise can disrupt their habitats, affecting their behavior, breeding patterns, and even leading to displacement or injury.
2. **Health Effects on Humans:** Excessive noise can have various health impacts on nearby residents, including stress, sleep disturbances, hearing loss, and even cardiovascular issues. In rural areas where people often value tranquility, the sudden introduction of loud construction noises can be particularly disruptive.
3. **Impact on Livelihoods:** Rural communities often rely on agriculture or tourism, both of which can be negatively impacted by construction noise. For example, noisy construction can

scare away livestock or disrupt farming activities. In tourist areas, it can detract from the natural beauty and tranquility that attracts visitors.

4. **Cultural and Social Disruption:** Rural areas often have close-knit communities with strong cultural ties. Construction noise can disrupt community activities, gatherings, and traditions, leading to social tension and a sense of disconnection.
5. **Environmental Pollution:** Noise pollution is a form of environmental pollution with its own set of detrimental effects. It can disrupt ecosystems, interfere with natural sounds important for communication and navigation among species, and contribute to overall environmental degradation.

The impact significance of noise during road construction can be ranked **MODERATE** since the intensity of the impact may be high and across the length of the road corridor but for a short period of time.

To mitigate these negative impacts, it is essential for construction projects to employ noise control measures such as sound barriers, scheduling noisy activities during less sensitive times, using quieter equipment, and actively engaging with local communities to address concerns and find mutually beneficial solutions.

6.3.9. Negative impact of vibration during rural feeder road construction

Vibration during rural feeder road construction can have several negative impacts:

1. **Damage to nearby structures:** Vibrations from heavy machinery can cause structural damage to nearby buildings, particularly older or poorly constructed structures. This can lead to cracks in walls, foundations, and other structural elements.
2. **Environmental disturbance:** Vibrations can disturb the natural environment, including nearby wildlife habitats and sensitive ecosystems. This disturbance can lead to habitat fragmentation, displacement of wildlife, and disruption of ecological processes.
3. **Health hazards:** Prolonged exposure to vibration can have adverse health effects on workers and nearby residents. This includes conditions such as hand-arm vibration syndrome (HAVS) and whole-body vibration syndrome, which can cause circulation problems, nerve damage, and musculoskeletal disorders.
4. **Noise pollution:** Construction activities that generate vibrations often also produce significant noise pollution. This can disturb residents, livestock, and wildlife in the surrounding area, leading to stress, sleep disturbances, and reduced quality of life.
5. **Impact on agricultural activities:** Rural areas often rely on agriculture as a primary source of livelihood. Vibrations from road construction can disrupt farming activities, such as irrigation systems, livestock operations, and crop production. This disruption can lead to financial losses for farmers and affect food security in the area.

6. **Dust and air pollution:** Construction activities associated with vibration can generate dust and air pollution, particularly in dry and arid regions. This can have respiratory health implications for both workers and nearby residents, especially those with pre-existing respiratory conditions.
7. **Disruption of transportation:** In some cases, excessive vibration during road construction can disrupt transportation routes, including access to markets, schools, and healthcare facilities. This can have economic and social repercussions for rural communities, hindering their development and access to essential services.

The impact significance of vibration during road construction can be **MODERATE** because the intensity of the impact may be high and affects humans and animals but for a short period of time.

To mitigate these negative impacts, construction companies and local authorities can implement measures such as using vibration-dampening equipment, scheduling construction activities during times of lower sensitivity (e.g., avoiding peak agricultural seasons) and providing adequate noise barriers. Additionally, community engagement and consultation can help address concerns and develop solutions that minimize the adverse effects of vibration during rural feeder road construction.

6.3.10. Negative impacts of road construction on flora and fauna

Road construction can have numerous negative impacts on flora and fauna, both directly and indirectly. Here are some of the key impacts:

1. **Habitat Fragmentation:** Roads divide habitats, breaking up continuous stretches of land into smaller patches. This fragmentation can isolate populations of plants and animals, reducing genetic diversity and increasing the risk of local extinctions.
2. **Loss of Habitat:** The construction of roads often requires clearing vegetation and altering the landscape, leading to the direct loss of habitat for many species. This loss can be particularly significant in ecologically sensitive areas such as wetlands, forests, and grasslands.
3. **Disruption of Wildlife Corridors:** Many species rely on connected habitats to migrate, disperse, and find mates. Roads can act as barriers to this movement, disrupting vital wildlife corridors and impeding the natural flow of species.
4. **Roadkill:** Increased vehicular traffic results in higher rates of wildlife mortality due to collisions with vehicles. This not only leads to the direct loss of individual animals but can also have cascading effects on populations, especially for species with low reproductive rates or small population sizes.
5. **Pollution:** Road construction and subsequent vehicle emissions can introduce pollutants such as heavy metals, oil, and chemicals into the environment, contaminating soil, water bodies, and the air. Pollution can have adverse effects on both plants and animals, leading to reduced reproductive success, compromised health, and even death.

6. **Altered Hydrology:** Roads can disrupt natural drainage patterns, leading to changes in water flow and accumulation. This alteration can result in habitat loss for aquatic species, increased erosion, sedimentation, and changes in water quality.
7. **Noise and Light Pollution:** Roads generate noise and artificial light, which can disturb wildlife behavior, disrupt communication, and alter natural rhythms such as migration patterns, feeding behaviors, and reproduction.
8. **Introduction of Invasive Species:** Road construction can create pathways for the introduction and spread of invasive plant species, which can outcompete native vegetation and disrupt local ecosystems.
9. **Edge Effects:** The edges of roads often experience microclimatic changes, such as increased temperature, wind exposure, and sunlight intensity. These edge effects can alter habitat suitability, favoring certain species while disadvantaging others.
10. **Human Disturbance:** Roads facilitate human access to previously remote areas, increasing the likelihood of illegal hunting, poaching, logging, and other forms of exploitation that can further degrade habitats and threaten wildlife populations.

The impact significance of the proposed road construction on loss of flora and fauna is **HIGH** due to the intensity of various flora and fauna species within the project intervention areas and these loss might also be permanent.

Addressing these negative impacts requires careful planning, mitigation measures, and sustainable practices in road construction and management to minimize ecological harm and conserve biodiversity.

6.3.11. Negative impacts of waste during rural feeder road construction

Construction of rural feeder roads, while essential for improving connectivity and accessibility in rural areas, can indeed have negative impacts when not managed properly. Here are some negative impacts of waste during rural feeder road construction:

1. **Environmental Pollution:** Improper disposal of construction waste such as debris, concrete, and asphalt can lead to environmental pollution. These materials can leach harmful chemicals into the soil and nearby water bodies, polluting them and harming local flora and fauna.
2. **Habitat Destruction:** Clearing land for road construction can result in the destruction of natural habitats and ecosystems. This can lead to loss of biodiversity and displacement of wildlife, disrupting the balance of local ecosystems.
3. **Health Risks:** Open dumping of construction waste can pose health risks to nearby communities. Broken glass, sharp metal objects, and other hazardous materials in the waste can cause injuries to people, especially children and livestock who may come into contact with them.

4. **Visual Pollution:** Improperly managed waste piles along rural roads can create visual blight in the landscape, detracting from the natural beauty of the area. This can have negative impacts on tourism and local aesthetics.
5. **Infrastructure Damage:** Poor waste management during construction can lead to debris obstructing drainage systems and culverts. This can result in flooding and damage to the newly constructed road infrastructure, necessitating costly repairs and maintenance.
6. **Long-term Degradation:** Failure to properly address waste management during road construction can lead to long-term degradation of the surrounding environment. The accumulation of waste materials can persist for years, continuing to pose threats to the ecosystem and human health.

The impact significance of improper waste management during the construction phase is **MODERATE** because the duration and intensity of the impact may be short-term and high, respectively.

Addressing these negative impacts requires proper planning, implementation, and monitoring of construction projects. Effective waste management strategies, such as recycling and proper disposal, along with erosion control measures and habitat restoration efforts, can help mitigate the adverse effects of waste during rural feeder road construction. Additionally, involving local communities in the planning process and promoting awareness about the importance of environmental conservation can foster more sustainable development practices.

6.3.12. Negative impacts of road construction on occupational health and safety

Road construction can have several negative impacts on occupational health and safety. Some of these impacts include:

1. **Exposure to Hazardous Materials:** Road construction sites often involve the use of hazardous materials such as asphalt, chemicals, and heavy metals. Workers may be exposed to these substances through inhalation, skin contact, or ingestion, leading to respiratory problems, skin irritations, and other health issues.
2. **Physical Hazards:** Construction sites are inherently dangerous environments with various physical hazards such as moving vehicles, heavy machinery, falling objects, and uneven terrain. Workers are at risk of accidents such as slips, trips, falls, and being struck by moving equipment, leading to injuries ranging from minor cuts and bruises to severe fractures or even fatalities.
3. **Noise Pollution:** Road construction sites are typically noisy environments due to the operation of heavy machinery, equipment, and vehicles. Prolonged exposure to high levels of noise can lead to hearing loss and other auditory problems among workers.
4. **Vibration Exposure:** Workers operating heavy machinery or tools that generate vibrations, such as jackhammers and compactors, are at risk of developing hand-arm vibration syndrome.

(HAVS) or whole-body vibration-related health issues. Prolonged exposure to vibrations can lead to numbness, tingling, and musculoskeletal disorders.

5. **Exposure to Respiratory Hazards:** Dust, fumes, and exhaust emissions generated during road construction activities can pose respiratory hazards to workers. Inhalation of these pollutants can lead to respiratory irritation, asthma, bronchitis, and other respiratory diseases.
6. **Heat Stress:** Road construction often takes place outdoors, exposing workers to extreme temperatures, especially in hot climates. Prolonged exposure to high temperatures can result in heat-related illnesses such as heat exhaustion, heatstroke, and dehydration if appropriate measures are not taken to ensure adequate hydration and rest breaks.
7. **Fatigue and Stress:** The demanding nature of road construction work, including long hours, physically demanding tasks, and tight deadlines, can lead to fatigue and stress among workers. Fatigued workers are more prone to making errors and accidents, while stress can contribute to decreased concentration and decision-making abilities, further increasing the risk of incidents.
8. **Musculoskeletal Injuries:** Heavy lifting, repetitive motions, and awkward postures common in road construction work can lead to musculoskeletal injuries such as strains, sprains, and overuse injuries among workers.

The impact significance of project activities on occupational health and safety during the construction phase is MODERATE - HIGH because the duration and intensity of the impact may be long-term and moderate, respectively.

Addressing these negative impacts requires proactive measures such as implementing proper safety protocols, providing adequate training and personal protective equipment (PPE), conducting regular safety inspections, and promoting a safety-conscious work culture among all stakeholders involved in road construction projects.

6.3.13. Negative impacts of road construction on community health and safety

Road construction projects can indeed have several negative impacts on community health and safety. Here are some of the key ones:

1. **Air Pollution:** Construction activities generate significant amounts of dust and emissions from machinery, vehicles, and materials. This can lead to increased levels of particulate matter (PM10 and PM2.5) and other pollutants in the air, contributing to respiratory problems such as asthma and other respiratory diseases. Prolonged exposure to air pollution can also increase the risk of cardiovascular diseases.
2. **Noise Pollution:** Road construction involves heavy machinery, excavation, and other activities that produce high levels of noise. Prolonged exposure to construction-related noise can lead to stress, sleep disturbances, hearing loss, and other adverse effects on mental health and well-being.

3. **Traffic Congestion and Accidents:** During construction, roads may be partially or fully closed, rerouted, or narrowed, leading to traffic congestion and delays. Increased congestion can result in higher accident rates, as frustrated drivers may engage in risky behaviors such as speeding, aggressive driving, and lane weaving.
4. **Water Pollution:** Runoff from construction sites can carry sediment, chemicals, and other pollutants into nearby water bodies, contaminating water sources and harming aquatic ecosystems. This pollution can affect drinking water quality and aquatic biodiversity, posing health risks to both humans and wildlife.
5. **Disruption of Community Services:** Road construction projects may disrupt access to essential services such as hospitals, schools, and businesses, affecting the community's ability to access healthcare, education, and employment opportunities. This can have particularly severe consequences for vulnerable populations, including the elderly, children, and people with disabilities.
6. **Physical Hazards:** Construction sites can pose physical hazards such as uneven terrain, open excavations, falling debris, and hazardous materials. Accidents and injuries resulting from these hazards can occur not only among construction workers but also among residents and pedestrians in the vicinity of the construction site.
7. **Psychosocial Stress:** The prolonged duration of road construction projects, along with the associated noise, dust, and disruption, can cause psychosocial stress and anxiety among community members. Uncertainty about project timelines, impacts on property values, and changes to the neighborhood's character can also contribute to stress and mental health issues.

The impact if the proposed road construction on community health and safety expected to be significant and the risk is HIGH due to the high severity of the above negative impacts on the host communities and high likelihood of occurrence.

Addressing these negative impacts requires careful planning, mitigation measures, and community engagement to minimize harm and ensure that road construction projects prioritize the health and safety of affected communities. This may include implementing dust control measures, noise barriers, traffic management strategies, erosion and sediment control practices, and public outreach and communication efforts to keep residents informed and involved throughout the construction process.

6.3.14. Negative impacts of road construction on involuntary resettlement and displacement

Road construction projects can have significant negative impacts on involuntary resettlement and displacement, affecting communities and individuals in various ways:

1. **Loss of Land and Homes:** Road construction often requires large swathes of land, leading to the loss of homes, farmland, and other essential resources for affected communities. Involuntary resettlement may force people to leave behind their residences, ancestral lands, and livelihoods.

2. **Disruption of Livelihoods:** Displacement caused by road construction can disrupt established livelihoods, especially for communities dependent on agriculture or other land-based activities. Farmers may lose access to fertile land, while businesses reliant on local trade may suffer from decreased foot traffic or relocation.
3. **Social Disruption and Fragmentation:** Communities subjected to involuntary resettlement may experience social disruption and fragmentation. Relocated individuals often face challenges in rebuilding social networks and maintaining community cohesion, leading to increased social tensions and conflicts.
4. **Loss of Cultural Heritage:** Road construction projects can lead to the destruction of cultural sites, sacred landmarks, and traditional practices, undermining the cultural identity and heritage of affected communities. Displacement may sever ties to ancestral lands and disrupt intergenerational transmission of cultural knowledge.
5. **Psychological and Emotional Stress:** Involuntary resettlement can induce significant psychological and emotional stress among affected individuals and communities. Displacement often entails loss of familiarity, security, and social support structures, contributing to feelings of anxiety, depression, and trauma.
6. **Economic Disadvantages:** Displaced individuals may face economic disadvantages, including reduced access to employment opportunities, inadequate compensation for lost assets, and increased vulnerability to poverty. Resettlement programs may lack sufficient support for income generation and economic recovery, exacerbating socio-economic disparities.
7. **Health Risks and Infrastructure Challenges:** Displacement can exacerbate health risks, including exposure to environmental hazards, inadequate sanitation facilities, and limited access to healthcare services. Inadequate infrastructure in resettlement areas may further compound health and safety concerns, increasing vulnerability to diseases and accidents.
8. **Limited Participation in Decision-Making:** Displaced communities often have limited participation in decision-making processes related to road construction projects, leading to marginalization and disenfranchisement. Lack of consultation and transparency can undermine trust in authorities and exacerbate grievances among affected populations.

The impact significance of involuntary resettlement is rated HIGH due to the severe consequences of involuntary resettlement on lives and livelihoods, and the impacts are long-term.

Addressing these negative impacts requires comprehensive planning, stakeholder engagement, and adherence to international standards such as the World Bank's Operational Policy on Involuntary Resettlement. Mitigation measures should prioritize the protection of human rights, livelihood restoration, cultural preservation, and socio-economic inclusion of displaced populations. (It is my believe that people assets and should some of the alignments be maintained especially where road passes through settlement displacement is a high possibility) . In view of this, it will be important to indicated as to whether people assests will be affected.

6.3.15. Negative impacts of influx of workers during road construction

The influx of workers during road construction can lead to several negative consequences:

1. **Social Disruption:** Communities may experience social disruption due to the influx of temporary workers, including increased demand for local services, strains on infrastructure, and changes in community dynamics.
2. **GBV, SEA/SH:** The influx of non-native workers can increase the risk of GBV, SEA/SH, STDs etc. Communities have express serious concerns regarding potential illicit relation between their female and non-native workers which may lead to social disorder.
3. **Change in lifestyle:** The influx of workers from different cultures, norms and lifestyles may negative influence the local culture, norms and lifestyle of the host communities, especially the youth.

The impact significance of influx of workers during the construction phase is MODERATE because the duration and intensity of the impacts are short-term and moderate, respectively.

Overall, while road construction is necessary for infrastructure maintenance and improvement, the negative impacts associated with the influx of workers highlight the importance of careful planning and management to mitigate these effects.

6.3.16. Negative impacts of traffic disruption during road construction

Traffic disruption during road construction can have various negative impacts on both the immediate vicinity and the wider community. Here are some of the common negative impacts:

1. **Traffic Congestion:** One of the most apparent impacts is increased traffic congestion. Lane closures, detours, and reduced speeds due to construction activities can lead to long delays, especially during peak travel times. This congestion can spill over onto alternative routes, compounding the problem.
2. **Increased Travel Time and Costs:** Longer travel times and increased fuel consumption due to traffic congestion can impose additional costs on commuters and businesses. This can be particularly burdensome for individuals who rely on timely transportation for work or other commitments.
3. **Safety Hazards:** Construction zones can pose safety hazards for both motorists and pedestrians. Factors such as uneven road surfaces, debris, and changes in traffic patterns increase the risk of accidents and injuries.
4. **Social Disruption:** Communities located near construction sites may experience social disruption due to increased noise, traffic congestion, and reduced access to amenities. This can lead to frustration and decreased satisfaction with the local area.

The impact significance of the proposed road construction on the traffic is expected to be **LOW** since these roads are not busy highways but rural road and the work is short-term as well as diversions will be created for easy flow of traffic.

Overall, while road construction is necessary for infrastructure maintenance and improvement, minimizing the negative impacts on traffic disruption requires careful planning, effective communication with stakeholders, and proactive mitigation measures.

6.3.17. Negative impacts of road construction on public utilities

Road construction projects can indeed have several negative impacts on public utilities, affecting various aspects of infrastructure and services. Some of these impacts include:

1. **Disruption of Water Supply:** Road construction often requires excavation, which can damage underground water pipes. This can lead to water leaks, contamination, or even complete disruptions in water supply to nearby communities. Repairing such damages can be time-consuming and costly.
2. **Telecommunication Disruptions:** Underground telecommunication cables and fiber optic lines can be damaged during road construction, affecting internet connectivity, phone services, and other communication networks. This disruption can impact businesses, emergency services, and everyday communication for residents in the area.

The impact significance of the road construction activities on public utilities is **LOW** because most of the affected rural communities do not have underground electricity and telecommunication cable and most of them also have boreholes as water resource.

Overall, while road construction is necessary for infrastructure development and maintenance, mitigating the negative impacts on public utilities requires careful planning, coordination, and implementation of appropriate measures to minimize disruptions and ensure the well-being of communities affected by these projects.

6.3.18. Negative impacts of road construction on gender- based violence.

Road construction projects can indeed have negative impacts on gender-based violence (GBV) due to various social, economic, and environmental factors. Here are some of the ways in which road construction can exacerbate or contribute to gender-based violence:

1. **Disruption of Social Fabric:** Road construction often brings in a large influx of male workers into areas that may have had predominantly female populations. This demographic shift can disrupt existing social structures and increase tensions, leading to instances of harassment and violence against women.
2. **Increased Vulnerability:** With the influx of construction workers, women and girls may feel more vulnerable to sexual harassment, assault, and other forms of violence, especially if proper safety measures and policing are lacking in construction areas.
3. **Limited Access to Resources:** Road construction projects can disrupt access to essential services such as healthcare, education, and markets, particularly for women and girls who may bear the primary responsibility for fetching water, collecting firewood, or accessing health

facilities. This increased distance and limited access to resources can expose them to greater risks of violence, including sexual assault or harassment during travel.

4. **Inadequate Grievance Mechanisms:** In many cases, the implementation of road construction projects lacks adequate grievance mechanisms for addressing complaints related to gender-based violence. This lack of accountability can perpetuate impunity and allow perpetrators to act with impunity.

The risk of GBV during the proposed road construction is rated **HIGH** due to the high influx of workers, likelihood of occurrence and severity of consequences. Hence, the impact significance is HIGH.

Addressing these negative impacts requires a holistic approach that involves incorporating gender perspectives into all stages of road construction projects, including planning, implementation, and monitoring. This includes ensuring the participation of women in decision-making processes, providing gender-sensitive training to construction workers, implementing safety measures to protect women and girls from violence, and establishing mechanisms for reporting and addressing incidents of gender-based violence. Additionally, investing in community-based interventions that address underlying social and economic inequalities can help mitigate the negative impacts of road construction on gender-based violence.

6.4. Mitigation measures

This section highlights the recommended mitigation measures for the main potential impacts of the project activities during the pre-construction, constructions and operational phase of the proposed GIRAV feeder roads.

Table 6.1: Mitigation measures for the identified potential E&S impacts

Potential Impact	Mitigation Measures
Loss of Flora/vegetation	<ul style="list-style-type: none"> • Consult and take advice from biodiversity authorities/wildlife specialists before vegetation removal from proposed project site. • Limit vegetation clearing to approved widths and, as practicable, to minimum required. • If possible, initiate actions to enhance regrowth or revegetation of the site with appropriate species consistent with operation requirement. • Careful planning of phasing and timing of activities. • Demarcation and avoidance of areas of conservation interest (high value species, feeding or breeding sites, migration routes, etc.) where possible, and wildlife rescue and translocation where appropriate, under expert supervision. • Prohibit the use of fire in work areas. • Provide and train workers on fire extinguishers at the work areas and the life base. • Educate workers on the protection of natural resources and wildlife (i.e., they should be informed of the guidelines for hunting wildlife).
Loss of fauna	<ul style="list-style-type: none"> • Vegetation clearance should be minimum and within the designated areas.

	<ul style="list-style-type: none"> • Noise mitigation measures should be followed, and machinery with lesser noise production should be used. • Nighttime work should be limited, and the use of lights at night should not disrupt the movement of nocturnal wildlife. • Workers should not do any harm or death to wildlife. • Rescue, rehabilitation, and relocation should be done for terrestrial fauna in cooperation with the Department of Parks and Wildlife Management when required. Disturbance and/or injury or death due to accidental events to wildlife should be monitored regularly
Dust pollution	<ul style="list-style-type: none"> • Minimize cleared vegetation areas to those that are needed to be used. • Area should be dampened within suitable intervals to prevent a dust nuisance and this frequency should be increased during hotter days. • Cover or wet construction materials such as sand, gravel to prevent dust pollution. • Where unavoidable, construction workers working in dusty areas should be provided and fitted with dust mask (N95 respirators) • Vehicles carrying earth materials should be covered. • In the case of any demolitions, employ control demolition technique. • Reduce vehicle speed along the access earth/untarred road.
Gaseous emissions	<ul style="list-style-type: none"> • Ensure that all vehicles involved in the transport of construction material and staff, and machinery used in construction is properly maintained and services. • Reduce the idling of vehicles that may occur and thus reduce the gaseous emission from vehicles in the area. • Low-sulfur diesel should be used in diesel-powered equipment. • Promote the use of fuel-efficient construction machinery or equipment with the proper emission standards and more eco-friendly fuel type. • Vehicle/equipment exhausts observed emitting significant black smoke in their exhausts will be serviced/replaced. • Solid waste burning at the project site is prohibited.
Water pollution	<ul style="list-style-type: none"> • Environmentally sound management of land development activities especially near wetlands and ecologically sensitive areas. • In flood-prone areas of the road corridors, work must be subject to ongoing supervision and environmental and social monitoring, and the contractor must ensure that construction and mitigation measures comply with the ESMP-Contractor • Limit equipment access into flood-prone areas of the road corridors, where possible. • Collection of waste oil for recycling • Avoid placing spoil on drainage paths. • In the event of a spill on water bodies, the contractor in charge of the work shall immediately notify the person responsible for the environmental monitoring of the work and take measures to stop the leak, contain the product and recover it. • The contractor will be required to have emergency equipment on site in the event of an accidental spill.

	<ul style="list-style-type: none"> • Appropriate solid and liquid waste storage to limit the risk of pollution.
Runoff and flooding	<ul style="list-style-type: none"> • Develop engineering solutions for areas that have inadequate drainage and are vulnerable to flooding. • Culverts should be located strategically to avoid discharge into property. • Locals should be consulted during the field investigation to support in identifying the natural drain areas and the drainage history of the area for due consideration. • Diversions will be constructed during the dry season, with adequate drainage facility, and will be completely removed before the onset of the rainy season. • Debris generated due to the excavation of foundation or due to the dismantling of existing structures will be removed from the water course. • Temporary silt fencing to be provided on the mouth of discharge into natural streams where available. • Construction work close to water bodies will be avoided during the rainy season. • Camps will be located away from water bodies. • Car washing / workshops near water bodies will be avoided.
Soil contamination & Geology	<ul style="list-style-type: none"> • For operating new quarries, the materials shall be obtained from quarries only after the consent of relevant authorities such as the Geology Department and NEA. Extraction sites will need to be assessed before commencement, and approval (including mining and reclamation plans) be sought from these institutions. • Copy of licenses should be displaced on site, or produced on request by the relevant national authorities. • Quarries must be officially closed after the works, and communities given the responsibility of reporting to the authorities (NEA, GD) of any illegal mining activities. • Gravel and sand borrow pits must be reclaimed to return the sites to as close as possible to the natural state. • Only established transportation routes and diversions must be used to limit destruction and ensure reclamation is done at the end of the works. • Contractor must be cautioned through relevant clauses in the works agreements to use only certified sand and gravel suppliers that have been approved by the NEA and Geology Department. • Vegetation removal must be carefully carried out to avoid major soil disturbance and only existing transportation routes used to avoid destruction of virgin land.
Solid waste disposal	<ul style="list-style-type: none"> • Preparation of waste management plan following the waste hierarchy and ensure proper implementation, supported by staff training. • Adequate skips and bins should be strategically placed within the campsite and construction site. • The skips and bins at the construction and operation phase should be adequately designed and covered to prevent access by vermin and minimize odor.

	<ul style="list-style-type: none"> • Waste segregation in different bins should be practiced and ensure that workers adhere to the practice. • The skips and bins at both the construction and operation phase should be emptied regularly to prevent overfilling. • Disposal of the contents of the skips and bins should be done at an approved disposal site. • Reuse waste plastic materials (deform bottle containers) as feedstock for plastic product production. • Debris generated due to the dismantling of the existing culverts and other concrete structures and cutting materials shall be suitably reused in the proposed construction as fill materials for embankments. • A well-organized internal supervision and monitoring system will ensure waste reduction and proper management. • All hazardous waste is to be disposed of with the help of approved vendors.
Wastewater discharge	<ul style="list-style-type: none"> • Adequate sanitary facilities, i.e., toilets and showers, shall be provided for the construction workforce. • Septic tanks and soak pits shall be provided at the labor camp for the treatment of domestic wastewater. • Storage of chemicals, oil, fuel, and lubricant in a paved storage area.
Noise and vibration pollution	<ul style="list-style-type: none"> • Use Diesel Generator set with an acoustic enclosure. Adopt the vehicle speed limit on the access road. • Minimal use of vehicle horns and heavy engine breaking in the area needs to be encouraged. • Temporary noise barriers shall be provided surrounding the high noise-generating construction equipment. • Mobile noise sources such as cranes, earth moving equipment shall be routed in such a way that there is minimum disturbance to receptors. • The personnel involved in high noise-generating activities shall be provided with personal protective devices to minimize their exposure to high noise levels. • The contractor should ensure that all construction equipment and vehicles are fitted with silencers, where possible. • Only well-maintained equipment should be operated on the construction site. Only limited construction activities shall be carried out during nighttime. Restrict the nighttime vehicle movement through the access road. • The contractor should undertake additional post-development noise monitoring in accordance with international noise standards. • It is also to be ensured that no village road will be utilized for the movement of equipment except the designated access road. • The number of equipment operating simultaneously should be reduced as far as practicable. • Rubber padding/noise isolators shall be used for construction equipment.
Occupational health and safety	<ul style="list-style-type: none"> • Adequate provision of healthy living conditions should be ensured in the labor camp.

	<ul style="list-style-type: none"> • The contractor should prepare Emergency Preparedness and Response Procedure (EPRP) and Occupational Health and Safety Management Plan. • Training on Health and Safety policy for the workers (both regular and contractual) should be provided. • Establish a grievance redressal mechanism in place, to allow the employees and workers to report any concern or grievance related to project activities. • Child labor and forced labor during project construction should be prohibited. Adequate training should be provided to staff about raising awareness about the use of PPE and EPRP. • Job responsibility and shifting chart should be prepared so that no person shall be over-exhausted, which will ultimately lead to an accident or injuries. • Safety signs should also be marked at appropriate places on the construction site and access road. • It shall also be ensured that good housekeeping at the construction site is maintained to avoid slips and falls. • Excessive waste debris and liquid spills should be cleaned up regularly. • Electrical cords and ropes should be placed along identified corridors marked for the attention of everyone at the site. • Dropping/lowering of construction materials or tools will be restricted and undertaken only under strict supervision if required. PPEs such as safety glasses with side shields, face shields, hard hats, and safety shoes shall be mandatory at a construction site. • Earplugs shall be provided if required for workers placed in high-noise areas. • Provision of first aid kits and training on their use is important. This is important for workers to meet minor accidents during construction.
Community health and safety	<ul style="list-style-type: none"> • Dust control measures should be taken by the contractor along the site approach road and dust generation site. • The speed of heavy vehicles should be limited (<20 km /hr.) near the site access road. • A traffic management plan should be followed by the contractor for the project. • Training on community health and safety issues should be provided to the drivers. • Only drivers having valid licenses should be employed in the project. • Adequate sanitation facilities at labor camps should be ensured by the contractor to maintain hygiene and minimize the spread of diseases. • Wage discrimination between male and female workers should be minimized through a proper monitoring system. • An active grievance mechanism should be developed. • GBV/SEAH should be confidential, and more options will be created to submit the grievance against GBV/SEAH. • Creating awareness about local traditions and culture among outside migrants and encouraging respect for the same. • Providing awareness training regarding sexually transmitted diseases among the workers.

	<ul style="list-style-type: none"> • Contractors will prepare and conduct induction and training on the project's Code of Conduct for all site personnel regarding do's and don'ts in relation to interaction with locals.
Traffic disruption	<ul style="list-style-type: none"> • A traffic management plan should be prepared by the Contractor before field mobilization. • The contractor should avoid heavy vehicle traffic movement during school and market hours. • The speed of heavy vehicles should be limited (<20 km /hr.) near the site access road and sensitive locations. • Only trained drivers with valid licenses shall be recruited by the contractor. • Training programs shall be conducted at regular intervals for all the drivers for raising awareness about road safety and adopting the best transport and traffic safety procedures once every month. • Regular maintenance of vehicles and the use of manufacturer-approved parts should be adopted to minimize potentially serious accidents caused by equipment malfunction or premature failure. • The villagers should be made aware of the schedule before the movement of trucks and heavy equipment in the project area. • Collaboration with local communities and responsible authorities to improve signage, visibility, and awareness of traffic and pedestrian safety. • Notify the local area responsible person before starting the construction work and put signage near the educational and religious institutes and instruct the driver to carefully drive close to the sensitive area.
Involuntary resettlement and economic displacement	<ul style="list-style-type: none"> • Resettlement Action Plan including Livelihood Restoration Plan should be followed during the project implementation. • The project will also provide additional livelihood restoration measures to mitigate the impacts due to the reduction in landholdings through the Livelihood Restoration Plan for the project. • Identify and provide additional social and livelihood support to especially vulnerable families. • The SEP and GM for the project will be applicable to the landowners and users impacted. • Prioritize the severely affected land users in the livelihood restoration program and monitor the livelihood condition of the affected people to ensure their quality of life is the same or better than previously. • The project management shall undertake a formal consultation with all Farmers. • from whom land shall be obtained and gain informed consent.
Influx of workers	<ul style="list-style-type: none"> • Recruit local labor for unskilled jobs as a priority to ensure local ownership of the project. • Organize the work of unskilled employees in a task-oriented manner. • Post the internal rules of the work site. • Include provisions in the site code of conduct to deter employees from abusing the trust of food vendors/stallholders (those provisions will explain what

	<p>behavior is not acceptable- including SEA/SH and what sanctions will be applicable in case of misconduct)</p> <ul style="list-style-type: none"> • Training for all staff in acceptable behaviour with respect to community interactions. • Take gender into account (give a quota to women employed) and extensively sensitize and raise awareness of all workers on issues related to SEA/SH • Sensitize the personnel of project sites on the respect of the habits and customs of the populations. • Establish a conflict prevention and management mechanism. • Respect the labor code regarding the recruitment of labor. • Ensure all workers on site sign the protocols, as well as get sensitized and their awareness raised on challenging issues such as HIV-AIDS, STIs, etc. • Ensure continuity of consultation and participation of the beneficiary communities throughout the project (with women consulted in small, separate groups facilitated by a woman). • Establish and publicize grievance procedure
<p>GBV, SEA/SH & VAC</p>	<ul style="list-style-type: none"> • Ensure that code of conducts (CoC) are developed and signed by all personnel and workers and that they attend regular training on SEA/SH, content of CoC and sanctions. • Action Plan for Implementing ESHS and OHS Standards, and Preventing Gender Based Violence (GBV) and Violence Against Children (VAC) must be rigorously applied and monitored for compliance. These Codes will also be included in the Contractors ESMP. • Ensure that SEA/SH Action Plan is developed and implemented prior to the physical start of civil works. • Develop and implement a complaint/grievance mechanism (GM) sensitive to GBV, SEA/SH, VAC, and other forms of discrimination with accessible entry points to submit complaints, referral to GBV service providers and confidential, survivor-centered procedures for verification and managing of complaints. • Conduct regular awareness raising campaigns about the project and the risks of GBV, SEA/SH, VAC with workers and community members (and with women in separate groups with a woman facilitator) • Include provisions in the site's internal regulations to discourage employees from abusing the trust of food vendors/stallholders, and the use of GBV, SEA/SH, VAC • Report and sanction all forms of GBV related to the project activities. • Formally prohibit child labor • Monitor changes in the status of women and the potential impacts of the project on them by conducting regular focus groups consultations with women in a sample of villages (in small groups facilitated by a woman).

7.Environmental and Social Management Plan

7.1. E&S Management Plan

An Environmental and Social Management Plan (ESMP) is essentially a management tool and standalone component of an ESIA that provides the assurance that the mitigation measures developed for the significant impacts of a proposed project are implemented and maintained throughout the project life cycle. It outlines management strategies for safety, health, and environmental stewardship in the proposed project implementation. It states in specific terms how the project proponent's commitments will be implemented to ensure sound environmental practice. Table 7.1 provides the ESMP guidelines for the implementation of the mitigation measures.

This has been developed to manage negative impacts/effects, enhance benefits, and ensure good standards of practice are used throughout the project. These objectives shall be achieved by:

- ensuring compliance with all stipulated legislation on protection of the biophysical and socio-economic environment and Project proponent's HSE policy.
- integrating environmental and socio-economic issues fully into the project development and operational philosophies.
- promoting awareness on the management of the biophysical and socioeconomic environment among workers.
- rationalizing and streamlining existing environmental activities to add value to efficiency and effectiveness.
- ensuring that only environmentally and socially sound procedures are employed during the project implementation; and
- continuous consultations with the relevant regulatory bodies, community leaders (local heads/Alkalo), youth leaders, women leaders at the project intervention sites, village development committees (VDCs), and other stakeholders throughout the project lifecycle.

This ESMP section rationally completes the process that begins with prediction, assessment, and evaluation of identified potential environmental and social Impacts from the project activities, then Implementation of Mitigation Measures and Monitoring the success of those measure.

To minimize adverse impacts during different phases of project lifecycles, mitigation measures and responsibilities for its implementation and supervision of the GIRAV project intervention are given in Table 7.1.

Table 7.1: ESMP for GIRAV Project Intervention Sites

Potential Impact	Mitigation Measures	Responsibility	
		Implementation	Supervision
Loss of Flora/vegetation	<ul style="list-style-type: none"> • Consult and take advice from biodiversity authorities/wildlife specialists before vegetation removal from proposed project site. • Limit vegetation clearing to approved widths and, as practicable, to minimum required. • If possible, initiate actions to enhance regrowth or revegetation of the site with appropriate species consistent with operation requirement. • Careful planning of phasing and timing of activities. • Demarcation and avoidance of areas of conservation interest (high value species, feeding or breeding sites, migration routes, etc.) where possible, and wildlife rescue and translocation where appropriate, under expert supervision. • Prohibit the use of fire in work areas. • Provide and train workers on fire extinguishers at the work areas and the life base. • Educate workers on the protection of natural resources and wildlife (i.e., they should be informed of the guidelines for hunting wildlife). 	Contractor	PIU/ESIA Group/DoF Working
Loss of fauna	<ul style="list-style-type: none"> • Vegetation clearance should be minimum and within the designated areas. • Noise mitigation measures should be followed, and machinery with lesser noise production should be used. 	Contractor	PIU/ESIA Group/DPW Working

	<ul style="list-style-type: none"> • Nighttime work should be limited, and the use of lights at night should not disrupt the movement of nocturnal wildlife. • Workers should not do any harm or death to wildlife. • Rescue, rehabilitation, and relocation should be done for terrestrial fauna in cooperation with the Department of Parks and Wildlife Management when required. Disturbance and/or injury or death due to accidental events to wildlife should be monitored regularly 		
Dust pollution	<ul style="list-style-type: none"> • Minimize cleared vegetation areas to those that are needed to be used. • Area should be dampened within suitable intervals to prevent a dust nuisance and this frequency should be increased during hotter days. • Cover or wet construction materials such as sand, gravel to prevent dust pollution. • Where unavoidable, construction workers working in dusty areas should be provided and fitted with dust mask (N95 respirators) • Vehicles carrying earth materials should be covered. • In the case of any demolitions, employ control demolition technique. • Reduce vehicle speed along the access earth/untarred road. 	Contractor	PIU/ESIA Working Group
Gaseous emissions	<ul style="list-style-type: none"> • Ensure that all vehicles involved in the transport of construction material and staff, and machinery used in construction is properly maintained and services. 	Contractor	PIU/ESIA Working Group

	<ul style="list-style-type: none"> • Reduce the idling of vehicles that may occur and thus reduce the gaseous emission from vehicles in the area. • Low-sulfur diesel should be used in diesel-powered equipment. • Promote the use of fuel-efficient construction machinery or equipment with the proper emission standards and more eco-friendly fuel type. • Vehicle/equipment exhausts observed emitting significant black smoke in their exhausts will be serviced/replaced. • Solid waste burning at the project site is prohibited. 		
Water pollution	<ul style="list-style-type: none"> • Environmentally sound management of land development activities especially near wetlands and ecologically sensitive areas. • In flood-prone areas of the road corridors, work must be subject to ongoing supervision and environmental and social monitoring, and the contractor must ensure that construction and mitigation measures comply with the ESMP-Contractor • Limit equipment access into flood-prone areas of the road corridors, where possible. • Collection of waste oil for recycling • Avoid placing spoil on drainage paths. • In the event of a spill on water bodies, the contractor in charge of the work shall immediately notify the person responsible for the environmental monitoring of the work and take measures to stop the leak, contain the product and recover it. 	Contractor	PIU/ESIA Working Group/ DWR

	<ul style="list-style-type: none"> • The contractor will be required to have emergency equipment on site in the event of an accidental spill. • Appropriate solid and liquid waste storage to limit the risk of pollution. 		
Runoff and flooding	<ul style="list-style-type: none"> • Develop engineering solutions for areas that have inadequate drainage and are vulnerable to flooding. • Culverts should be located strategically to avoid discharge into property. • Locals should be consulted during the field investigation to support in identifying the natural drain areas and the drainage history of the area for due consideration. • Diversions will be constructed during the dry season, with adequate drainage facility, and will be completely removed before the onset of the rainy season. • Debris generated due to the excavation of foundation or due to the dismantling of existing structures will be removed from the water course. • Temporary silt fencing to be provided on the mouth of discharge into natural streams where available. • Construction work close to water bodies will be avoided during the rainy season. • Camps will be located away from water bodies. • Car washing / workshops near water bodies will be avoided. 	Contractor	PIU/ESIA Working Group
Soil contamination & Geology	<ul style="list-style-type: none"> • For operating new quarries, the materials shall be obtained from quarries only after the consent of relevant authorities such as the Geology 	Contractor	PIU/ESIA Working Group/ Geology Department

	<p>Department and NEA. Extraction sites will need to be assessed before commencement, and approval (including mining and reclamation plans) be sought from these institutions.</p> <ul style="list-style-type: none"> • Copy of licenses should be displayed on site or produced on request by the relevant national authorities. • Quarries must be officially closed after the works, and communities given the responsibility of reporting to the authorities (NEA, GD) of any illegal mining activities. • Gravel and sand borrow pits must be reclaimed to return the sites to as close as possible to the natural state. • Only established transportation routes and diversions must be used to limit destruction and ensure reclamation is done at the end of the works. • Contractors must be cautioned through relevant clauses in the works agreements to use only certified sand and gravel suppliers that have been approved by the NEA and Geology Department. • Vegetation removal must be carefully carried out to avoid major soil disturbance and only existing transportation routes used to avoid destruction of virgin land. 		
Solid waste disposal	<ul style="list-style-type: none"> • Preparation of waste management plan following the waste hierarchy and ensure proper implementation, supported by staff training. • Adequate skips and bins should be strategically placed within the campsite and construction site. 	Contractor	PIU/ESIA Working Group/ Area Councils

	<ul style="list-style-type: none"> • The skips and bins at the construction and operation phase should be adequately designed and covered to prevent access by vermin and minimize odor. • Waste segregation in different bins should be practiced and ensure that workers adhere to the practice. • The skips and bins at both the construction and operation phase should be emptied regularly to prevent overfilling. • Disposal of the contents of the skips and bins should be done at an approved disposal site. • Reuse waste plastic materials (deform bottle containers) as feedstock for plastic product production. • Debris generated due to the dismantling of the existing culverts and other concrete structures and cutting materials shall be suitably reused in the proposed construction as fill materials for embankments. • A well-organized internal supervision and monitoring system will ensure waste reduction and proper management. • All hazardous waste is to be disposed of with the help of approved vendors. 		
Wastewater discharge	<ul style="list-style-type: none"> • Adequate sanitary facilities, i.e., toilets and showers, shall be provided for the construction workforce. • Septic tanks and soak pits shall be provided at the labor camp for the treatment of domestic wastewater. • Storage of chemicals, oil, fuel, and lubricant in a paved storage area. 	Contractor	PIU/ESIA Working Group

<p>Noise and vibration pollution</p>	<ul style="list-style-type: none"> • Use Diesel Generator set with an acoustic enclosure. Adopt the vehicle speed limit on the access road. • Minimal use of vehicle horns and heavy engine braking in the area needs to be encouraged. • Temporary noise barriers shall be provided surrounding the high noise-generating construction equipment. • Mobile noise sources such as cranes, earth moving equipment shall be routed in such a way that there is minimum disturbance to receptors. • The personnel involved in high noise-generating activities shall be provided with personal protective devices to minimize their exposure to high noise levels. • The contractor should ensure that all construction equipment and vehicles are fitted with silencers, where possible. • Only well-maintained equipment should be operated on the construction site. Only limited construction activities shall be carried out during nighttime. Restrict the nighttime vehicle movement through the access road. • The contractor should undertake additional post-development noise monitoring in accordance with international noise standards. • It is also to be ensured that no village road will be utilized for the movement of equipment except the designated access road. • The number of equipment operating simultaneously should be reduced as far as practicable. 	<p>Contractor</p>	<p>PIU/ESIA Working Group</p>
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	<ul style="list-style-type: none"> • Rubber padding/noise isolators shall be used for construction equipment. 		
Occupational health and safety	<ul style="list-style-type: none"> • Adequate provision of healthy living conditions should be ensured in the labor camp. • The contractor should prepare Emergency Preparedness and Response Procedure (EPRP) and Occupational Health and Safety Management Plan. • Training on Health and Safety policy for the workers (both regular and contractual) should be provided. • Establish a grievance redressal mechanism in place, to allow the employees and workers to report any concern or grievance related to project activities. • Child labor and forced labor during project construction should be prohibited. Adequate training should be provided to staff about raising awareness about the use of PPE and EPRP. • Job responsibility and shifting chart should be prepared so that no person shall be over-exhausted, which will ultimately lead to an accident or injuries. • Safety signs should also be marked at appropriate places on the construction site and access road. • It shall also be ensured that good housekeeping at the construction site is maintained to avoid slips and falls. • Excessive waste debris and liquid spills should be cleaned up regularly. • Electrical cords and ropes should be placed along identified corridors marked for the attention of everyone at the site. 	Contractor	PIU/ESIA Working Group

	<ul style="list-style-type: none"> • Dropping/lowering of construction materials or tools will be restricted and undertaken only under strict supervision if required. PPEs such as safety glasses with side shields, face shields, hard hats, and safety shoes shall be mandatory at a construction site. • Earplugs shall be provided if required for workers placed in high-noise areas. • Provision of first aid kits and training on their use is important. This is important for workers to meet minor accidents during construction. 		
Community health and safety	<ul style="list-style-type: none"> • Dust control measures should be taken by the contractor along the site approach road and dust generation site. • The speed of heavy vehicles should be limited (<20 km /hr.) near the site access road. • A traffic management plan should be followed by the contractor for the project. • Training on community health and safety issues should be provided to the drivers. • Only drivers having valid licenses should be employed in the project. • Adequate sanitation facilities at labor camps should be ensured by the contractor to maintain hygiene and minimize the spread of diseases. • Wage discrimination between male and female workers should be minimized through a proper monitoring system. • An active grievance mechanism should be developed. 	Contractor	PIU/ESIA Working Group

	<ul style="list-style-type: none"> • GBV/SEAH should be confidential, and more options will be created to submit the grievance against GBV/SEAH. • Creating awareness about local traditions and culture among outside migrants and encouraging respect for the same. • Providing awareness training regarding sexually transmitted diseases among the workers. • Contractors will prepare and conduct induction and training on the project's Code of Conduct for all site personnel regarding do's and don'ts in relation to interaction with locals. 		
Traffic disruption	<ul style="list-style-type: none"> • A traffic management plan should be prepared by the Contractor before field mobilization. • The contractor should avoid heavy vehicle traffic movement during school and market hours. • The speed of heavy vehicles should be limited (<20 km /hr.) near the site access road and sensitive locations. • Only trained drivers with valid licenses shall be recruited by the contractor. • Training programs shall be conducted at regular intervals for all the drivers for raising awareness about road safety and adopting the best transport and traffic safety procedures once every month. • Regular maintenance of vehicles and the use of manufacturer-approved parts should be adopted to minimize potentially serious accidents caused by equipment malfunction or premature failure. • The villagers should be made aware of the schedule before the movement of trucks and heavy equipment in the project area. 	Contractor	PIU/ESIA Working Group

	<ul style="list-style-type: none"> • Collaboration with local communities and responsible authorities to improve signage, visibility, and awareness of traffic and pedestrian safety. • Notify the local area responsible person before starting the construction work and put signage near the educational and religious institutes and instruct the driver to carefully drive close to the sensitive area. 		
Involuntary resettlement and economic displacement	<ul style="list-style-type: none"> • Resettlement Action Plan including Livelihood Restoration Plan should be followed during the project implementation. • The project will also provide additional livelihood restoration measures to mitigate the impacts due to the reduction in landholdings through the Livelihood Restoration Plan for the project. • Identify and provide additional social and livelihood support to especially vulnerable families. • The SEP and GM for the project will be applicable to the landowners and users impacted. • Prioritize the severely affected land users in the livelihood restoration program and monitor the livelihood condition of the affected people to ensure their quality of life is the same or better than previously. • The project management shall undertake a formal consultation with all Farmers. • from whom land shall be obtained and gain informed consent. 	Contractor	PIU/ESIA Working Group
Influx of workers	<ul style="list-style-type: none"> • Recruit local labor for unskilled jobs as a priority to ensure local ownership of the project. 	Contractor	PIU/ESIA Working Group

	<ul style="list-style-type: none"> • Organize the work of unskilled employees in a task-oriented manner. • Post the internal rules of the work site. • Include provisions in the site code of conduct to deter employees from abusing the trust of food vendors/stallholders (those provisions will explain what behavior is not acceptable- including SEA/SH and what sanctions will be applicable in case of misconduct) • Training for all staff in acceptable behaviour with respect to community interactions. • Take gender into account (give a quota to women employed) and extensively sensitize and raise awareness of all workers on issues related to SEA/SH • Sensitize the personnel of project sites on the respect of the habits and customs of the populations. • Establish a conflict prevention and management mechanism. • Respect the labor code regarding the recruitment of labor. • Ensure all workers on site sign the protocols, as well as get sensitized and their awareness raised on challenging issues such as HIV-AIDS, STIs, etc. • Ensure continuity of consultation and participation of the beneficiary communities throughout the project (with women consulted in small, separate groups facilitated by a woman). • Establish and publicize grievance procedure 		
GBV, SEA/SH & VAC	<ul style="list-style-type: none"> • Ensure that code of conducts (CoC) are developed and signed by all personnel and 	Contractor	PIU/ESIA Working Group

	<p>workers and that they attend regular training on SEA/SH, content of CoC and sanctions.</p> <ul style="list-style-type: none"> • Action Plan for Implementing ESHS and OHS Standards, and Preventing Gender Based Violence (GBV) and Violence Against Children (VAC) must be rigorously applied and monitored for compliance. These Codes will also be included in the Contractors ESMP. • Ensure that SEA/SH Action Plan is developed and implemented prior to the physical start of civil works. • Develop and implement a complaint/grievance mechanism (GM) sensitive to GBV, SEA/SH, VAC, and other forms of discrimination with accessible entry points to submit complaints, referral to GBV service providers and confidential, survivor-centered procedures for verification and managing of complaints. • Conduct regular awareness raising campaigns about the project and the risks of GBV, SEA/SH, VAC with workers and community members (and with women in separate groups with a woman facilitator) • Include provisions in the site's internal regulations to discourage employees from abusing the trust of food vendors/stallholders, and the use of GBV, SEA/SH, VAC • Report and sanction all forms of GBV related to the project activities. • Formally prohibit child labor • Monitor changes in the status of women and the potential impacts of the project on them by conducting regular focus groups consultations 		
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	with women in a sample of villages (in small groups facilitated by a woman).		
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7.2. Environmental and Social Management System

The GIRAV Project needs to design a workable environmental and social management system that will ensure the predicted impacts are handled in the best possible management. Some relevant site-specific management plans that are required for the project intervention activities at the GIRAV intervention sites are provided beneath:

- Emergency Management Plan
- Workers Accommodation Plan
- Site Safety Management Plan
- Community Engagement Plan
- Influx Management Plan
- Workers Code of Conduct
- Traffic Management Plan
- Waste Management Plan
- Construction Dust Management Plan
- Water Management Plan
- Occupational Health and Safety Plan
- Community Health and Safety Plan
- Revegetation Management Plan
- Chance Finds Procedure
- Gender Action Plan
- Biodiversity Management Plan
- Invasive Species Management Plan

7.2.1. Emergency Management Plan

An emergency can have the potential to cause serious injuries or loss of life. It may cause extensive damage to property, serious disruption to the construction site, and may adversely affect the surrounding environment. Hence, it is imperative for the proposed project to develop an emergency management plan that will provide an organizational structure to effectively prepare for both external and internal events that can potentially affect the project negatively. The emergency management plan will establish a basic emergency preparedness program to provide timely, integrated, and coordinated response to the wide range of natural and man-made disasters that may disrupt construction activities or normal operations and require a preplanned response.

The emergency management plan will be prepared following national legislation and best industrial practices. The following factors may cause a major emergency at the construction site:

- Electricity (electrocution)
- Fire (flammable material)
- Snapping of cables, ropes. Chain, slings
- Road accidents
- Cranes, winches, hoisting, and hauling
- Natural disaster/hazards like flooding, storms, forest fires, heat waves etc.

Responsibility for developing the emergency management plan for the construction phase lies with the Contractor. The Contractor will prepare immediately a plan for their preparedness and effective response in an emergency before the start of the construction activity. Ultimately, in the preparation of the emergency management plan, the following matters will need to be considered.

- Establish an emergency control center at the project construction site for managing any kind of emergency.
- Ensure internal and external communication system, computer and other essential records, daily attendance of workers employed in the construction site, records of the storage of hazardous material, pollution records, walky-talky, notebook, pad, pencil, list of key personnel with addresses, telephone number, etc. at the emergency control center.
- Provide a list of important/emergency telephone numbers and addresses including the nearest hospitals and ambulance service, fire station, police station, government officials, etc. at the construction site and workers' camp. Hotline numbers (police, ambulance, fire, electricity emergency, and water emergency) also can be provided.
- Ensure a safe place as an assembly point where in case of emergency personnel evacuated from the affected areas are to be assembled.
- The construction workers, contract workers, and visitors should assemble at the assembly point in case of an emergency.
- Document the perceived level of risk and the appropriate mitigation measures which are required to reduce risks to acceptable levels.
- Inform potentially affected communities of significant hazards giving explanations to aid understanding.
- Summarize and disclose the emergency management plan in a culturally appropriate manner.

7.2.2. Workers Accommodation Plan

Generally, workers are housed by their employers in cases where either the number or the type of workers required cannot be sourced from or accommodated within local communities. Thus, provision of workers' accommodation is often associated with the importation of an external workforce into an area. This can occur because the local labor supply or skills base is inadequate, because the workers are simply not available due to the remote location of the worksite, or the skills required or because labor requirements can only be satisfied by migrant workers due to the nature of the work or the working conditions (IFC, 2009).

Provision of worker housing may relate to a temporary phase of a project (for example an exploration or construction camp) or may be more permanent (for example a factory dormitory or plantation camp). Depending on the type of accommodation, there are a range of considerations relating to both the living conditions of the workers themselves, and to the impact that workers' housing facilities may have on surrounding communities. Therefore, it is important to conduct a workers' accommodation assessment to determine the type of accommodation to arrange for workers if there is a need for it. There are numerous stages of the worker's accommodation assessment and management process recommended by IFC, as illustrated in Figure 7.1.

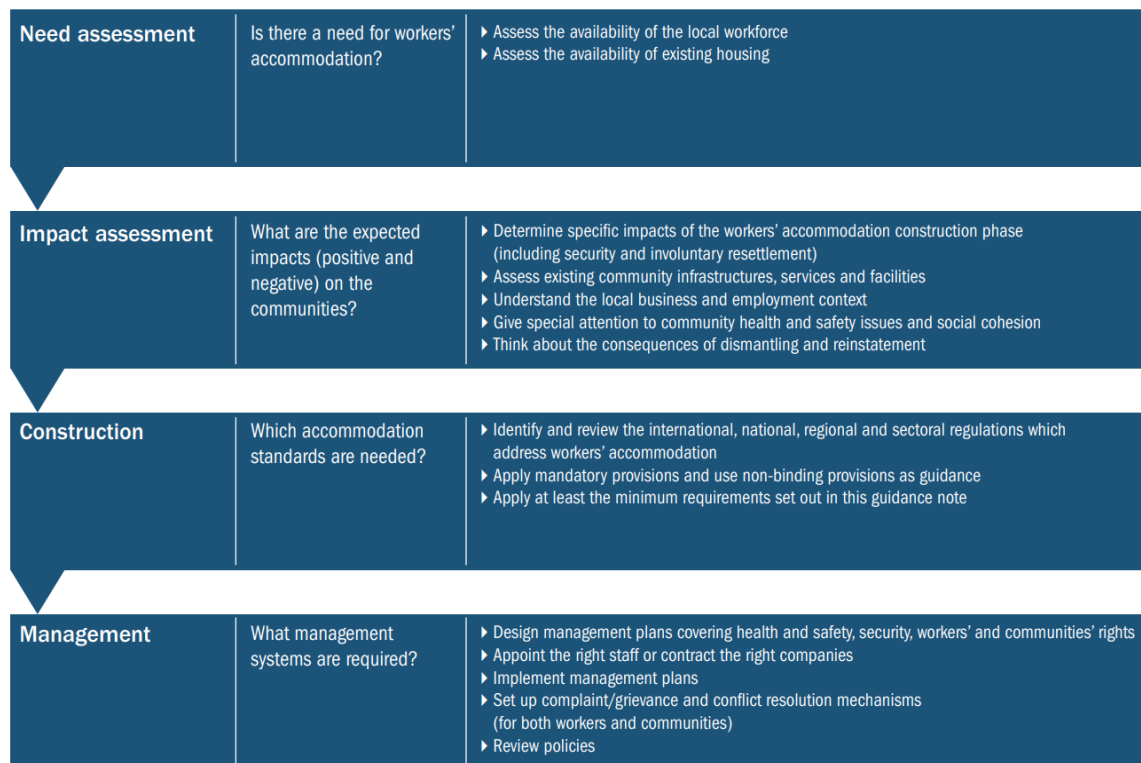


Figure 7.1: Workers' accommodation assessment and management process (Source: IFC 2009²)

To ensure that all project accommodation areas are healthy, clean, and pleasant locations for

² [Workers' accommodation: processes and standards \(ifc.org\)](http://www.ifc.org)

workers to live in, the project contractor is to develop a workers' accommodation plan (WAP). The WAP should describe the minimum national legislative requirements plus the applicable international and project requirements relevant to the facility standards and management of workers' accommodation. It is recommended that the workers accommodation plan should follow the lenders guidelines and standards. Prior to the construction works, the contractor and any other appointed subcontractors responsible for providing worker's accommodation will commit to measures at a minimum including the following:

- ✚ The provision of accommodation will meet international good practice in relation, but not restricted, to the following:
 - Practice for charging for accommodation.
 - Provision of minimum amounts of space for each worker.
 - Provision of sanitary, laundry, cooking facilities, potable water, and entertainment.
 - Location of accommodation in relation to the workplace.
 - Any health, fire, safety, or other hazards or disturbances and local facilities.
 - Provision of first aid and medical facilities.
 - Heating and ventilation.

- ✚ Workers freedom of movement to and from the employer-provided accommodation will not be unduly restricted.
- ✚ Contractor will provide security services to protect the camp and its contents.
- ✚ Contractor will provide timely payments to the workers.
- ✚ Avoid illegal labor practices e.g., child labor, forced labor, etc.
- ✚ Working conditions and terms of employment will be fully compliant with national standards.
- ✚ Provision of clean drinking water in accordance with national standards.
- ✚ Screening, surveillance, and treatment of workers, through the provision of medical facilities and, where required, immunization programs.
- ✚ Prevention of vector larval and adult propagation through sanitary improvements and elimination of breeding habitats close to human settlements.
- ✚ Educating project personnel and area residents on risks, prevention, and available treatment for vector-borne diseases.
- ✚ Promoting the use of repellents, clothing, netting, and other barriers to prevent insect bites.
- ✚ Sanitary facilities including toilets will be provided for the use of the construction workforce both on-site and at the workers' accommodation, separate toilets for men and women.
- ✚ Sharing and implementing the workers' code of conduct.

The WAP should ensure there is a management team responsible for the hygiene, safety, and security of accommodation. The plans need to consider ways of safeguarding workers' valuables,

perhaps through the provision of individual safe boxes that can be stored safely and accessed as required. House rules and regulations that are reasonable and non-discriminatory will need to be included in the WAPs once workers' representatives are consulted about them.

7.2.3. Community Engagement Plan

A Community Engagement Plan (CEP) is a critical element of the overall social management plans. Regular transparent communication between both the project authority and communities and vice versa is vital in building positive relationships between the two parties. This relationship should be important for managing unanticipated situations which might arise during the project implementation. The plan mainly focuses on the communication issues during the construction phase however it also includes some community liaison measures for the operation phase as well.

The environmental and social standards mandate continuous communication between the project authority and different stakeholders such as the local community, workers, etc. The project proponent should ensure that disclosure of relevant project information would help the concerned communities understand the impacts, risks, and opportunities of the project. A community engagement plan is developed to ensure a clear communication channel between the project authority and the local community. The community engagement plan would concentrate on the following aspects:

A project information booklet and poster would be prepared and distributed in the project-affected villages/town. This booklet should preferably be presented in the English language. The poster should be prepared by providing necessary instruction for a better understanding of the people who are not familiar with the English language. The booklet in addition to containing the salient features of the project should have a map depicting the project intervention areas. The important landmarks should also be demarcated so that it becomes easy for the people in the community to relate to the ground conditions. In addition to the project information, the booklet should also highlight the impacts on the community as presented in the ESIA document and the commitments for the safeguards including the entitlement matrix. To ensure wide circulation of the project information booklet the booklet would be made available at all the Alkalos, VDC, schools, and other public facilities in the project area. To ensure the continuity of the flow of information to the community it is suggested that a quarterly community information booklet should be published. During the construction phase, the booklet would contain information about the progress of the project and information which are pertinent to the community. It is proposed that the community information booklet be continued even during the operation stage where this also acts as a transfer of information from the project to the community. In addition, it can also be used to share information between the communities e.g., the achievement of a particular member of the community or any worker can be published in this booklet.

7.2.4. Influx Management Plan

An influx management plan should be developed by the Contractor to avoid and mitigate the effects of project-induced migration, particularly the non-local workforce that will be present on the construction site. High number of direct employment opportunities will be generated, mostly during the construction phase. During the operation and maintenance period, a very minimum number of workers will be required. This will include consideration of the following measures to be undertaken in consultation and partnership with regional government and civil society:

- ✚ Organizing project recruitment and employment to minimize potential workers going to the project site.
- ✚ Community investment funds for spatial planning and to support local initiatives to address greater demand for social and community services and infrastructure.
- ✚ Contractor will prepare and conduct induction and training on the project's Code of Conduct for all site personnel regarding do's and don'ts in relation to interaction with locals.
- ✚ All site personnel will be provided orientation and training on the Code of Conduct.
- ✚ All site personnel will be provided awareness and training to prevent communicable diseases, sexually transmitted infections, and HIV/AIDS.
- ✚ Compulsory medical examinations for Project workers, including subcontractors to ensure they are fit for work and to monitor the prevalence of communicable diseases detected through annual medical check-ups.
- ✚ Zero tolerance towards inappropriate behavior from and amongst the workforce. A written warning will be issued to the relevant personnel upon inappropriate behavior, if it is not improved, dismissal will follow. This will be applicable to all workers onsite.
- ✚ The privacy of women will be respected, and routes and places used by them will be avoided as far as possible.
- ✚ Establish a committee to prevent gender-based violence or abuse in the project area and site.
- ✚ Where applicable, Construction camps will be located at least 500 m away from the communities. Entry of the site personnel into the local communities will be minimized to the extent possible/appropriate.
- ✚ No child and forced labor will be engaged by the project or its contractors and subcontractors.
- ✚ Liaison with the community will be maintained.
- ✚ Grievance Management will address community grievances related to social conflict.

7.2.5. Workers' Code of Conduct

The code of conduct will be designed to govern the behavior of workers employed by the

contractor, and subcontractors during the construction of the proposed project. It should include a signed declaration form. The code of conduct includes general onsite requirements and requirements for driving to and from the site:

General responsibilities (including but not limited to):

- ✚ All workers must work towards maintaining good relations with each other in the construction site, construction camp, and communities near the project.
- ✚ Workers will respect the cultural norms of the local community of the project's surrounding area.
- ✚ All workers are forbidden to consume alcohol during working hours.
- ✚ Use of drugs or medicines must be authorized by the physician on site.
- ✚ Workers must use the designated access routes between the site and the accommodation.
- ✚ All workers are forbidden to smoke except in designated smoking areas.
- ✚ All workers must always comply with the occupational health and safety plan.
- ✚ All workers must wear appropriate personal protective equipment to the task they are undertaking.

Driving to, from, and on and the construction site (including):

- ✚ Vehicles must always be driven following the Traffic Management Plan.
- ✚ Vehicles must not use routes other than those designated in the Traffic Management Plan.
- ✚ Project drivers must not be authorized to carry passengers other than project workers.
- ✚ The project's designated speed limits must not be exceeded.
- ✚ Drivers will adhere to dust suppression measures outlined in the project's environmental and social management plan.

The code of conduct will be reviewed annually, taking into consideration any relevant complaints by communities or by workers against other workers.

7.2.6. Traffic Management Plan

Traffic Management Plan (TMP) encompasses the address of community safety-related impacts that may arise from the increased vehicular traffic due to the movement of heavy equipment/machinery and vehicles along the site access and approach roads, particularly during the construction phase. The TMP will advise and inform the Contractor and external suppliers of equipment and materials of access and entry points along with other key information such as tipping areas and wash-out areas. The plan will be implemented throughout the entire construction period and is intended to be the primary tool to inform the project's management of construction traffic effects. TMP will be classed as "live" and therefore be subjected to updates as required.

Due to the significant quantities of materials to be transported to and from the project site, a construction TMP will be required for this project. The measures outlined below are required

to ensure that all relevant policies and standards are met by the project. These measures should be developed further by the Project Contractor when developing the TMP:

- ✚ Project vehicular movement will be restricted to defined access routes.
- ✚ Proper signage will be displayed at important traffic junctions along the vehicular access routes to be used by construction phase traffic.
- ✚ Usage of horns by project vehicles will be restricted near sensitive receptors viz. schools, settlements, mosques, markets, hospitals, etc.
- ✚ Temporary parking facilities shall be provided within the work areas and the construction sites to avoid road congestion.
- ✚ Vehicular movement is to be controlled near sensitive locations viz. schools, markets, and hospitals identified along designated vehicular transportation routes.
- ✚ Adequate training on traffic and road safety operations will be imparted to the drivers of project vehicles. Road safety awareness programs will be organized in coordination with local authorities to sensitize target groups viz. school children, and commuters on traffic safety rules and signage.
- ✚ Driving licenses for heavy vehicles must be ensured.
- ✚ No passengers should be taken by construction vehicles specifically open pickup vans.
- ✚ The contractor(s) shall frame and implement a “No Drug No Alcohol” Policy to prevent road accidents/incidents.
- ✚ Vehicular movements along the access road and highways shall be restricted during the nighttime.
- ✚ The speed limit on the internal roads shall be restricted to 25 km/hr. Proper warning signs and road safety awareness posters shall be displayed to create road safety awareness among the personnel accessing the site.
- ✚ Periodic road safety and traffic management campaigns and awareness sessions shall be carried out among the villagers and workers to develop road safety awareness among the people likely to be impacted by the project.
- ✚ Road maintenance fund to cover damage caused by project-related activities during the construction phase.

The traffic management measures will need to include: an awareness-raising campaign for local populations, adequate signage, speed restrictions, and circulation restriction of vehicles, particularly at night.

The plan will cross reference with other relevant management plans such as occupational health and safety. Local health care and emergency services will be consulted in the development of the plan.

7.2.7. Waste Management Plan

The purpose of the Waste Management Plan (WMP) is to identify measures for the

minimization of waste and safe disposal of construction and operational wastes. A WMP for the construction phase will be developed by the Project Contractor to ensure that the developer will follow national legislation as well as good international industry practices identified by the FAO and GCF ESSs for waste management and minimization for segregation, handling, and storage of hazardous wastes. In addition, the Project Safeguard Officer will lead the development of a WMP for managing the waste that will be generated during the operation of the project intervention activities (i.e. fish smoking and drying facilities etc).

Various waste streams are anticipated during the construction phase, such as debris, packing material, paint containers, filters, concrete, timber, and domestic waste. All wastes will be temporarily stored in designated waste storage areas. All wastes that cannot be reused or recycled will be collected by approved waste contractors and transferred to an appropriately licensed waste management facility for treatment and disposal. During the construction phase, the Contractor will adopt the following measures as part of the WMP:

- ✚ Construction waste will be stored at the construction site in suitable containers and periodically disposed of by a licensed waste contractor.
- ✚ Incineration for the disposal of waste at the construction site will not be practiced.
- ✚ Fuel will be stored on-site in temporary aboveground storage tanks and will be stored in a locked container within a fenced and secure temporary staging area.
- ✚ Used oil from construction machinery and used chemicals barrels/drums will be stored in HDPE containers /drums placed in secondary containment with impervious liners.
- ✚ The available volume of secondary containment should be at least 110% of the largest storage container, or 25% of the total storage capacity (whichever is greater), in that specific location.
- ✚ Rain, heat, and fire protection measures will be adopted in the storage spaces and also during the transportation of such wastes.
- ✚ Trucks and construction vehicles will be serviced off-site.
- ✚ All concrete mixing be undertaken on the impermeable plastic lining to prevent contamination of the soils and surrounding areas.
- ✚ Separate bins with proper marking in terms of recyclable and non-recyclable waste will be provided at the construction site.
- ✚ Food waste will be collected separately in a covered container and disposed of in dug pits covered with soil on daily basis.
- ✚ The use, storage, transport, and disposal of hazardous materials used for the project will be carried out in accordance with all applicable regulations.
- ✚ Efforts will be made to keep the non-hazardous waste and hazardous waste segregated in well-defined spaces. All hazardous waste is to be disposed of with the help of approved vendors.
- ✚ Material safety data sheets for all applicable materials present on-site will be readily available to on-site personnel.

- ✚ Empty fuel containers will also be stored in a secured area designated for scrap and sold to authorized vendors. All packaging material will also be collected at the storage area and sold to scrap dealers.
- ✚ Training on solid waste management procedures will be part of the induction training for workers.
- ✚ Sewage from the labor camp will be treated in the Sewage Treatment Plant (STP).

7.2.8. Construction Dust Management Plan

The purpose of the Construction Dust Management Plan (CDMP) is to assess the potential air quality impacts associated with dust generation during the construction phase of the project and provide management measures to ensure that the impacts are controlled to an acceptable level. The plan will ensure that dust generated from construction activities has minimal adverse impacts on the sensitive receptors around the proposed project site.

The following measures will be adopted as part of the construction dust management plan:

- ✚ Exposed sections/dust generation sites of the construction site will be sprinkled with water, at least 3-4 times/day. The frequency of dust suppression will be increased as appropriate, such as during dry and windy conditions to ensure no visible dust emissions.
- ✚ Excavated material will be kept to the minimum practicable to control dust generation associated with the fall of materials.
- ✚ Trucks engaged for the transportation of construction materials will be covered by a fixed cover or sheeting appropriately fixed and suitable for the purposes of preventing materials and dust emission.
- ✚ Vehicles being used at the construction site will be operated at speeds of 20 km/h to ensure minimum dust generation.
- ✚ A route plan shall be prepared by the contractor for the vehicles transporting construction materials to the site. The movement will be restricted to specified routes only.
- ✚ Vehicle exhausts should be directed away from the ground and other surfaces and preferably upwards to avoid road dust being re-suspended to the air.
- ✚ Material stockpiles, especially cement, sand, and soil, will be located away from sensitive receptors, preferably in the downwind direction.
- ✚ Material stockpiles (fine, dry materials with particles less than 3 mm in size) will be stored in enclosed areas or provided with wind barriers, as appropriate to prevent them from becoming airborne.
- ✚ Mixing of large quantities of concrete or cement-based materials will be undertaken in enclosed or shielded areas.

- ✚ Dust concentrations (SPM, PM_{2.5}, and PM₁₀) in the ambient air will be monitored on a regular basis during the construction period through NEA or third-party firms.
- ✚ All construction workers engaged in high dust-generating activities shall be provided with appropriate dust masks.

7.2.9. Water Management Plan

The purpose of the Water Management Plan (WMP) is to ensure the prevention and control of any adverse impact on groundwater resources and the local community caused by withdrawal and consumption for construction and operation phase activities of the project.

The following measures will be taken as part of the water management plan during the construction phase:

- ✚ Optimum use of water during sprinkling on construction area and earth roads for dust settlement, washing of vehicles, concrete mixing for foundation, etc.
- ✚ Regular inspection for identification of water leakages and preventing wastage of water from water supply tankers, and camp areas.
- ✚ Construction labor deputed onsite to be sensitized about water conservation and encouraged for optimal use of water.
- ✚ Minimum use of water in cleaning/washing equipment and vehicles.
- ✚ Rainwater harvesting tanks/pits can be installed at the site to collect the rainwater and used it to recharge the groundwater.

During the operation, the proposed project will adopt the following measures as part of the water management plan:

- ✚ Use of seawater for rinsing during fish processing.
- ✚ Use of water-efficient technologies for water storage and distribution in aquaculture.
- ✚ The wastewater from the aquaculture ponds or tanks will be recycled as organic liquid fertilizers in the rice fields and gardens.
- ✚ Maintain a logbook for water consumption in the aquaculture integrated gardens.
- ✚ Use of water from multiple sources to avoid dependency on one particular source.

7.2.10. Occupational Health and Safety Plan

The Occupational Health and Safety (OHS) of the employee and contractual laborers will be maintained at the work sites during both the construction and operation phases. The occupational health and safety management measures shall comply with the national regulatory

requirements.

The following occupation health and safety measures will be adopted during the construction phase:

- ✚ Personnel protective equipment like safety vests, safety shoes, goggles, helmets, gloves, ear plugs, etc. should be provided among the workers as per their nature of work during construction-related activities to ensure the health and safety of workers at the workplace. It should also be ensured that all workers wear their PPEs at the site.
- ✚ Periodic cleaning of work areas will be undertaken and supervised by the Contractor to ensure hygienic conditions on-site.
- ✚ Workers will stop working in extreme natural climatic conditions i.e., heat waves, heavy rain, pluvial and fluvial flooding, forest fire, etc.
- ✚ Adequate fire alarms, fire hydrants, and firefighting equipment should be ensured at all workplaces to handle any occurrence of fire in the construction site and workers camp as well as fish smoking houses.
- ✚ Adequate drinking water will be supplied at the workplace for workers on site and water quality meets national drinking water quality standards.
- ✚ Sufficient light and ventilation will be provided for workers working in confined spaces.
- ✚ Periodic health check-up camps for workers on site will be organized to ensure the prevention of occupational health hazards.
- ✚ First Aid kits at all work areas will be ensured to manage injuries occurring in the area.
- ✚ The switchyard building will be provided with fire extinguishers and sand buckets at all strategic locations to deal with any incident of fire.

Although no significant occupational health and safety risks are identified during the operation of the proposed project, the following mitigation measures need to be adopted:

- ✚ Operators are provided with adequate PPEs depending upon the nature of the operation and occupation health and safety risks associated with it viz. electrical maintenance activities etc.
- ✚ Special emphasis on fire safety will be laid and all workers will be trained in fire safety and First Aid.
- ✚ Standard Operation Procedures will be developed by the Project proponent for operational activities likely to have potential occupational health and safety risks.
- ✚ Periodic medical examinations will be undertaken for workers including fish smoking processors.
- ✚ Periodic inspections will be carried out to ensure all the above are implemented and any non-conformances will be recorded along with grievances related to OHS issues.
- ✚ An EHS team will effectively implement and monitor the occupational health and safety management system and environmental and social management plan.

7.2.11. Community Health and Safety Plan

The various potential impacts during the road construction phase needs to be mitigated in order not to cause any risks or impacts on local communities. Therefore, a community health and safety plan will be developed by the Contractor to safeguard the local community. The community health and safety plan will take account of the Contractor health safety and environmental policy and will include but not be limited to measures to address:

- ✚ Appropriate signage and fencing at the project site.
- ✚ A site registry system to prevent unauthorized access to the local community people to the construction site.
- ✚ Establish safety exclusion zones on the project site.
- ✚ Road traffic management measures.
- ✚ A safety awareness campaign in the project site and community.
- ✚ Ensure proper waste collection, storage, and disposal in the construction camp site.
- ✚ Ensure adequate facilities for the workers in the construction camp.

7.2.12. Chance Find Procedure

A 'Chance Finds Procedure' will be developed and implemented by the Contractor for all groundworks during the construction of the seawater rinsing pipeline for fish processing. The Contractor will consult with the relevant authorities to ensure that the procedure is acceptable to them and that it complies with national regulations (National Council for Arts and Culture Act 1989 and its amendment in 2003).

If any unexpected finds are encountered during earthworks or excavation works, the following procedure should be employed:

- ✚ Immediately informed the Project Proponent and work will be stopped in the area of the chance find.
- ✚ The find(s) will be demarked and protected via fencing/blocking off.
- ✚ The Project Manager will inform the local/national archeological department.
- ✚ The authority will be informed to seek guidance and specialist advice for the management of the find(s) and how best to proceed, given its nature and extent.
- ✚ Secure the site to prevent any damage or loss of removable objects. In case of removable antiquities or sensitive remains, a night guard should be present until the responsible authority takes over.
- ✚ All finds will be recorded.

The Contractor's environmental and social team will submit a chance find report to the Project Proponent team within one day of the find. This will record as a minimum the following

information:

- ✚ Date and time of the discovery.
- ✚ Location of the discovery (GPS coordinates and maps, as appropriate).
- ✚ Description/photo of the physical cultural resource.
- ✚ Estimated weight and dimensions of the find.
- ✚ Temporary protection that has been implemented (if any).

The chance finds report will be submitted to any other concerned parties in accordance with national legislation. In case of delay incurred in direct relation to archaeological findings not stipulated in the contract (and affecting the overall schedule of works), the sub-contractor may apply for an extension of time. However, the contractor will not be entitled to any kind of compensation or claim other than what is directly related to the execution of the archaeological findings works and protections.

7.2.13. Gender Action Plan

The objective of the Gender Action Plan (GAP) is to ensure the mainstreaming of gender issues and concerns into all aspects of the proposed project throughout the project lifecycle through detailed planning, implementation, monitoring, and evaluation activities. This will be specifically prioritized through the implementation of the ESMP for the project.

GAP will safeguard the interest of the community women adjacent to the proposed project site, promote their participation in project planning and activities (if applicable) and ensure safer and healthier living conditions for them. It will also contain actions that will be adhered to by all the agencies (Contractor and sub-contractors) involved in the implementation of the project during the project lifecycle along with the project proponent.

In general, the GAP will emphasize the necessity of free, prior, and informed participation of women in the project area across various engagement activities.

The following measures should be followed to address gender issues:

- ✚ Encourage Contractor to prioritize the use of local materials and the employment of local workers and to maximize the use of women (at least 30%) in labor-based work (wherever feasible).
- ✚ Preference may be given to women from project-affected families to work as unskilled workers (wherever feasible) during the construction phase and they receive an equal wage for the work.
- ✚ Ensure equal pay for equal work for women & men for all construction and maintenance work. At least the market price should be paid to males and females.
- ✚ Announce employment opportunities and recruitment notices widely, targeted at women as well as men.
- ✚ Technical training can be provided to the local workforce, especially women for

inclusion in the operation and maintenance phase.

- ✚ Ensure basic facilities (separate toilets, clean water, drinking water facilities, resting place) are provided for female as well as male workers at the construction site.
- ✚ Compensation related to economic displacement may be given to the women workers due to their vulnerability.

7.2.14. Invasive Species Management Plan

This Management Plan provides an outline of the overall approach that should be adopted at the site to minimize the probability of invasive alien plants becoming established and ensuring that any outbreaks are managed quickly to ensure that they do not become a long-term problem on site. The establishment of any dense infestations will be expensive to eradicate and will require more complex control measures than would be necessary for low density invasions.

A prevention strategy could be developed which includes monitoring for invasive alien plants, effective rehabilitation of disturbed areas and prevention of unnecessary disturbance of natural areas. Prevention could also include measures such as washing the working parts and wheels of earth-moving equipment prior to it being brought onto site, visual walk-through surveys every three months and other measures.

Keeping up to date on which weeds are an immediate threat to the site is important, and efforts should be made to update this information as may be required. When new Invasive Alien Plant Species are spotted an immediate response of locating the site for future monitoring and either hand-pulling the weeds or an application of a suitable herbicide should be planned. It is, however, better to monitor regularly and act swiftly than to allow invasive alien plants to become established on site.

If any alien invasive plants are found to become established on site, action plans for their control should be developed, depending on the size of the infestations, budgets, manpower considerations and time. Separate plans of control actions should be developed for each location and/or each species. Appropriate registered chemicals and other possible control agents should be considered in the action plans for each site/species. The key is to ensure that no invasions get out of control. Effective containment and control will ensure that the least energy and resources are required to maintain this status over the long-term. This will also be an indicator that natural systems are impacted to the smallest degree possible.

7.3. Environmental and Social Monitoring Plan

Monitoring is a tool to ensure adherence to agreed actions, to assess compliance to environmental and social standards, to provide enhanced data for risk management purposes and facilitate any needed project design or operational changes. It provides feedback to the management on what is working and what is not working.

The monitoring will be undertaken to ensure that the proposed mitigation measures for negative impacts are implemented. For this reason, it is important that environmental and social monitoring be included in the project planning.

The essential objectives are:

- ✓ To measure the level of completion (success or failure) of implementation of mitigation measures.
- ✓ Identifying unpredicted impacts; and
- ✓ Facilitate integration of environmental and social management in the project implementation interventions.

Monitoring the implementation of mitigation measures and proponent commitments are essential in sustainable implementation of proposed undertaking. The quality of the environment depends on the quality of environmental components (air, water, soil); thus, a study of the parameters of the environmental components will give a good indicator of the condition of the environmental resources. For example, water quality monitoring looks at the parameter-indicators of the water resources component of the environment; thus, the need to identify the parameters that define the quality of the environment (air, water, soil, vegetation, etc.), as presented in the table below. The monitoring plan for the ecological and socio-economic components of the proposed project is presented in Table 8.2.

Table 8.2: Monitoring plan

Potential Impact	Indicator Parameter	Monitoring method	Monitoring location	Timeline/ Frequency	Responsibility	Cost for Annual Monitoring (US\$)
Loss of Flora and Fauna	Extinct of native vegetation and wildlife	Vegetation (sample) collection by use of 10m-by-10m quadrants around the entire project area; and Wildlife Sampling through interview of reputed hunters, and walk through the area to ascertain the presence of animals by sighting and correlation of cries and footprints	Project intervention sites	Annual Audit	ESIA – Working Group (WG); Biodiversity experts, Project Safeguard Officer; Consultant	10,000
Air Pollution	Dust and particulate matters (PM _{2.5} & PM ₁₀)	Visual inspection – to observe the effectiveness of dust suppression measures in place on site. Use of air quality monitoring device	Site preparation locations Quarry Communities along the road corridor	Daily during construction	Project Safeguard Officer	-
	Gaseous emissions (CO, SO ₂ , Nox)	Outdoor air quality monitoring	Communities along the road corridor	Daily during construction	Project Safeguard Officer and	8,000

		measurements and analysis	Wherever the construction machinery and equipment operating		ESIA Working Group	
Noise and vibration	Noise level in dB(A) (Leq, Leq day, Leq night, and hourly Leq)	Onsite measurement of noise level and frequency of vibration	Different points of the project intervention sites including nearby receptors	Daily during construction Quarterly during operation	ESIA – Working Group (WG); Project Environmental Officer; Consultant	6,000
Soil Contamination	Soil properties	Collection of soil sample from sites and analysis	Project intervention sites	Quarterly	ESIA – Working Group (WG); Project Environmental Officer; Consultant	6,000
Water Quality	Temp., Turbidity, pH, EC, TDS, Salinity, Color, Odor, Taste, TSS, PO ₄ ³⁻ , NO ₃ ⁻ , NO ₂ ⁻ , Fe, Cl ⁻ , Alkalinity, Hardness, Ca, Mn, DO, As, F ⁻ , SO ₂ -4, NH ₄ , TC and FC	Collect water samples and analyse	Water sources close to the construction activities	Quarterly	ESIA – Working Group (WG); DWR; Project Safeguard Officer; Consultant	9,000

Waste	Types, quality, quantity, collection system, and disposal locations	Visual checks to assess the situation and record-keeping including photographs if applicable.	Project intervention sites & disposal sites	Daily/Weekly/Monthly	Project Safeguard Officer	16,000
				Quarterly	NEA and ESIA Working Group	9,000
Social life impact/Socio-cultural conflict	Cultural conflicts, norms, social vices, project-perception of community leaders, hospitality of indigenous	Continuous effort of Consultations (at all levels); review of implementation of Community Engagement Plan in the host community	Project beneficiary communities	Quarterly	NEA and ESIA Working Group including the Regional Community Development Officer	15,000
Influx of people	Number of workers from outsider the host community	Monitor and record the number of workers employed	Project beneficiary communities	Quarterly	NEA and ESIA Working Group, Project Safeguard Officer	7,000
Occupational health and safety	Frequent illness of workforce, workplace accident, medical fitness	Observation, interviews, and the use of Job-Hazard-Analysis report, and reports from nearby healthcare facilities	Project intervention sites	Biannually	NEA and ESIA Working Group, Project Safeguard Officer	10,000
Community Health Impact	Common/prevalent diseases in the host communities	Use of questionnaires within the host communities as well as collection of health statistics from clinic and hospitals within the area	Project beneficiary communities	Annual Environmental and Social Performance Audit	NEA and ESIA Working Group, Project Safeguard Officer	5,000

Involuntary resettlement and economic displacement	Number project affected persons (PAPs) – how many persons properties and livelihood has been affected including farmlands etc	Review of the RAP implementation report. Consultation with PAPs	Project beneficiary communities	Annually	NEA and ESIA Working Group, Project Environmental Officer	8,000
Gender Impacts (GBV, SEA/SH)	Report of GBV, SEA/SH cases	Investigation of reported cases, interview with affected and non-affected victims	Project beneficiary communities	Quarterly	NEA and ESIA Working Group, Project Environmental Officer	15,000
TOTAL						124,000

7.4. Roles and Responsibilities of Stakeholders

Various Government Ministries, Departments and Agencies have different mandates and thus, their roles and responsibilities towards the implementation and monitoring of the environmental and social impacts of this project differ based on their mandates. Table 7.3 presents relevant stakeholders together with the description of their unique role and responsibilities in terms of the implementation of mitigation measures and monitoring plan.

Table 7.3: Roles and Responsibilities of various Stakeholders

INSTITUTION	MANDATE	INTEREST IN PROJECT	POSSIBLE ROLE IN PROJECT	
			Implementation of mitigation measures	monitoring
Ministry of Agriculture	To formulate policies for the development of the agricultural, fishing and rural development sectors; and to manage formulation of plans, programs and projects required to develop these sectors.	Project in line with policy goals, especially in the area of poverty reduction and food self-sufficiency	The ministry also supports all initiatives regarding improvement of agricultural productivity and food security. Ensures that the project is implemented as per the agreed project design	The Ministry also ensure that the project activities and funds are used efficiently and effectively for the intended purposes through project monitoring during implementation
Department of Agriculture (DOA)	It is responsible for the assessment of periodic variation of the country's Agricultural sector.	The project in line with Gambia's agricultural policies in ensuring the periodic assessment of food resources in the country	Direct monitoring of the implementation of project activities in horticulture gardens and rice fields	The soil and water management services unit can help in analyzing the soil and water quality. Help in monitoring the performance of project activities.
National Environment Agency	The NEA through the EIA working group is mandated government Agency for ensuring compliance of projects with national environmental management laws	Project has the potential of generating negative environmental and social effects if proposed surveillance activities are not properly implemented.	Direct monitoring of the implementation of the enhancement and mitigation measures and submission of quarterly monitoring reports to Project Proponent. To advise the Project Proponent on required adjustments to the enhancement and mitigation programs.	Quarterly environmental monitoring with key stakeholders

Ministry of Environment, Climate Change and Natural Resources	This Ministry oversees implementation of the environment policies adopted by the National Environment Management Council (NEMC). MECCNAR has a Climate Change Secretariat responsible for all Climate Change initiatives in the country	The Project in line with policy goals in the sound management of the environment, climate change and conservation of natural resources	The Ministry co-opted in the monitoring to ensure adopted policies are in line with our national environmental laws	Support in the monitoring of the identified potential impacts during the project lifecycle.
Ministry of Transport, Works and Infrastructure	This Ministry oversees implementation of transport, works and infrastructure related projects and policies	The Project is in line the National Transport Policy.	Ministry co-opted in the monitoring to ensure works are progressing as designed and planned	Support in the monitoring of the quality of works
National Roads Authority	It is responsible for the planning, construction and maintenance of the national road network as defined in the National Transport Plan	Support in reviewing road feasibility study and designs as well the entire implementation of the GIRAV road project.	Ensure that the road construction is done in compliance with the approved mitigation measures	Provide an oversight monitoring role during the project execution.
Department of Water Resources	Responsible for dealing with water resources and hydrological issues	Support in the effective use of water resources during the rehabilitation and upgrading phase and operation of water distribution system at the gardens and rice fields. Ensure there is proper design tidal irrigation systems and smart water management systems in place.	Ensure water resources are used wisely	Support in preventing water contamination and monitoring water bodies.
Department of Parks and wildlife	Responsible for the welfare of protected areas and wildlife (biodiversity)	Provide expert advice on biodiversity related concerns	Ensure the protection of flora and fauna	Support in monitoring the impact of project activities on flora and fauna
Local Government Authorities	Regional authorities within project administrative area where the project falls are to support the Project	Project compliments responsibilities to the beneficiaries	Potential contributor towards cost of sustainability of the project after implementation and life cycle in terms of technical and human	The LGA in the Region can be support in surveillance and also be part of the ESIA Working Group

	implementation in accordance with their respective mandates		resources as this would not be project's responsibility	
Beneficiaries' communities	communities to receive Project support in the form of improved facilities and alternative sources of income	Project enhances livelihood of beneficiaries	<ul style="list-style-type: none"> • in-kind contributions, especially free labour towards plan implementation • record keeping aiding monitoring program. • Comply with mitigation and enhancement measures in this ESMP 	Provide relevant information during project monitoring
Non-governmental Organizations:	those organizations working with beneficiary communities in the area of horticulture, rice cultivation, women and youth empowerment and poverty alleviation.	Project complements efforts in supporting villagers in area of sustainable horticulture and rice production sector.	<ul style="list-style-type: none"> • share and provide expertise in the implementation of the mitigation and monitoring programs. • share expertise and resources in building capacity of the beneficiaries. 	

7.5. Capacity Development and Training

During the development, rehabilitation or upgrading phase of the project, induction training will be conducted for every worker to be engaged in the project. The training will be provided by the Project Contractor(s). The training will include but is not limited to:

- Planned tasks for new workers
- Safe work procedures at the work site
- Use, of personal protective equipment on the site
- Emergency responses and warning notices
- Personal hygiene and site sanitation
- First Aid training
- Environmental protection
- Occupational and incident reporting
- Occupational Health and Safety
- Community Health and Safety issues
- GBV, SEAH, VAC
- Grievance mechanism, etc.

The Project Contractor's Environmental and Social Development Specialist will train employees in environmental, social, health, and safety issues management programs, plans, and procedures. The training will educate employees on the occupational and environmental hazards associated with the work. Training will include induction training for the appointment, specialist training, and refresher training as required. All the staff will be trained in the following issues but not limited:

- National legislation, policies, and guidelines relevant to the proposed project operation
- Relevant Environmental and Social Framework guidelines
- Screening and preparation of Environmental and Social Impact Assessment
- Specific roles and procedures
- Implementation of Environmental and Social Management Plans
- Efficient use of resources and prevention of pollution
- Environmental compliance monitoring and audit
- Stakeholder mapping and engagement including Grievance Mechanism
- Emergency Procedure and Response Plan
- Labor Management Plans
- Community and Occupational Health and Safety
- GBV and SEA/SH risk in the project and its implementation, need to understand and sign the Code of Conduct
- Construction waste management.

In addition, special training regarding the environment, social, health, and safety will be given to the HSE personnel. The following training is proposed for them but is not limited to:

- Day-to-day monitoring activities
- Use of monitoring equipment, operation, and maintenance
- Collection and analysis of environmental attributes (air, noise, water, etc.) samples
- Monitoring of water effluents
- Industrial hygiene
- Occupational health and safety
- Emergency procedures
- Grievance Mechanism
- Monitoring report preparation

Furthermore, a tailor-made training will be conducted for project beneficiaries based on the area of project intervention. The following training is proposed for them but not limited to:

- Road safety
- Implementation of Environmental and Social Management Plans
- Monitoring environmental and social impacts
- Understand the emergency management plan
- Waste management
- GBV, SEA/SH & VAC

Table 7.4: Information/Sensitization Measures & Capacity Building

No	Identified activities	Themes	Beneficiary	Budget (USD)
Institutional Capacity - Technical Skills Development and Awareness Raising				
1	Workshops and meetings to strengthen the human resource capacity of relevant stakeholders to manage ESIA and ESMPs.	<ul style="list-style-type: none"> Workforce management and incidents and accidents risk prevention and procedure for reporting Implementation and monitoring environmental and social issues of project intervention sites. 	ESIA Technical working group. PIU Other vital stakeholders	50,000 USD
2	Capacity building of relevant staff PIU and IPs	<ul style="list-style-type: none"> Understanding of environmental and social safeguard issues Understanding of the roles and responsibilities of PIU and NEA staff in the implementation of the ESMP Workforce management and incidents and accidents risk prevention and procedure for reporting Role and functioning of the GM. 	Project Safeguard Team Project Coordinator M & E Officer	20,000 USD
3	Information/Awareness of the contractor's personnel	<ul style="list-style-type: none"> Implementation and monitoring of an HSE plan Prevention of construction site accidents and implementation of an emergency evacuation plan Prevention and management of GBV/SEA/SH/VAC, GM Raising awareness about diseases (HIV-AIDS, STI). 	Construction Manager Works managers HSE expert Workers	15,000 USD
Public Awareness - Education, Communication and Information Provision				
4	Beneficiary Communities Awareness Raising Campaign	<ul style="list-style-type: none"> Raising public awareness on project issues (environmental and social issues, GBV, SEA/SH, VAC and GM, Emergency preparedness, etc.) Assessment and prevention of accidents related to civil works and the movements of machines. Prevention and management of GBV/SEA/SH/VAC, GM Public awareness on diseases (HIV-AIDS/STI). 	Local communities, CSOs/NGOs The public, especially the communities where the project will be implemented	15,000 USD
TOTAL:				100,000 USD

7.6. Grievance and Redress Mechanism

It should be expected that grievances or disputes/complaints could arise in the implementation of the measures. The ESIA studies recognized three types of disputes and grievances during the implementation of feeder road activities and as such proposed the mechanism to redress any grievance or complaint that may arise.

The first type refers to the dispute between the project and/or the contractor and the local community, the second one refers to the dispute between the contractor and its workforce and the third to the dispute between the contractor and the client.

The project has already established GRM committees at Community level, Regional and Project Level. The said committees received trainings on GRM matters related to project including reporting, registering, and investigating grievance or disputes/complaints among others.

The study recommends for the feeder roads construction, rehabilitation and upgrading to use the same structures to avoid duplicating efforts. The composition of the said structures could be assessed to observe the adequacy of members where necessary add those relevance personnels to the team and provide more trainings/sensitizations specifics to feeder roads.

1. The following process should be followed in receiving and responding to grievances.
 - i. the grievance is received by Chairperson of the Committee and recorded in a grievance register by the Secretary.
 - ii. the Chairperson summons a meeting within seven calendar days of receiving the grievance, inviting the representative of the Project in the Region
 - iii. if the Committee agrees to an immediate action to satisfy the complainant, the latter shall be briefed by the Chairperson of the remedial action and how it will be implemented.
 - iv. for a corrective action that requires a longer period, again the Chairperson will inform the complainant of the action and proposed timeline for correction.
 - v. in either 'iii' or 'iv' above, the Chairperson get written satisfaction from the Complainant on the action taken and formally close the case in the Register.

In managing grievances, a Grievance Redress Mechanism will be employed, and it will include:

- Setting up of a site-level GRM/Grievance Redress Mechanism Committee (GRMC) for the adaptation and implementation by the contractor with regular reporting to the PIU.
- The PIU will constantly engage project-affected persons through its Stakeholder and Public Disclosure Plan. This will keep the communities informed of developments on the project, including planned activities, project impacts and mitigation measures, grievance mechanism, the right to submit complaints and the compensation process.
- Building capacity of the project team and site level GRMC to ensure they can engage the communities, records and ensure grievances are resolved.
- Alternative Dispute Resolution Mechanisms will also be used as a key element of the GRM.

Grievances are expected to be communicated either verbally (in a language of choice) or in writing to the GRMC through a Short Code called (Toll free Number) which will shared with all the committees for ease of communication . Upon receipt of complaints, timely responses are expected to be given. If grievances cannot be resolved locally, they are expected to be referred quickly to the region for resolution.

Actions to be taken to address the grievance will be agreed upon by the GRMC, and progress of implementation of agreed measures reported to the Local community, and PIU and on monthly basis. Table 8.5 presents the operating budget of the GRM. This budget is estimated at USD 51,000.

Table 7.5: GRM Implementation Budget Summary

Headings	Unit	Quantity	Unit cost (USD)	Total cost (USD)
Reproduction and distribution of forms	Lump sum	1	2,000	2,000
Organization of GRM awareness and public campaigns in project areas	Session	6	4,000	24,000
Training of GRMC on the GRM specific to feeders construction, rehabilitation and upgrading	Session	1	5,000	5,000
Support for the operating of complaints management committees	Lump sum	1	20,000	20,000
Total cost of the implementation of GRM				51,000

7.7. Implementation Schedule and Cost Estimates

The environmental and social management plan will be implemented in line with the finalized project schedule, as well as activities integrated into the project design. There would be a need for the contractor to update the safeguards instruments based on the final design of the road construction, rehabilitation or upgrading works. The estimated cost for implementation of the mitigation measures and monitoring plan proposed in the ESMP for the GIRAV project is approximately US\$ 275,000 as shown in Table 8.6.

Table 7.6: Implementation Cost of the ESMP for Proposed Project

#	Activity	Estimated Cost (USD)
	ESMP Implementation	Contractor's budget
1.	Capacity building of PIU, Contractors, Workers, and other stakeholders involved in ESMP implementation	100,000
2.	E&S Monitoring Implementation	124,000
3.	GRC establishment and operations	51,000
	TOTAL	275,000

7.8. Reporting Responsibilities of ESMP during Implementation

Reporting of the ESMP implementation and monitoring should be harmonized with the main Project monitoring and evaluation reporting system, to ensure holistic and effective communication amongst the stakeholders. Monthly and Quarterly reporting of ESMP implementation and monitoring is recommended from the Project Contractor and NEA, respectively; NEA shall evaluate the reports and coordinate immediate improvement, where necessary. An annual monitoring report shall be submitted to the GIRAV Project for consideration.

7.9. Environmental Audit

This is a systemic review of the Project activities against the ESMP to ensure that it is implemented in an environmentally sustainable manner. The audit may also identify possible new risks that have not been anticipated due to changes in the design of Project activities or changes at the sites. Thus, new or alternative means of mitigation may be suggested. Therefore, an independent environmental audit is recommended midway of the Project implementation.

8. Conclusion

This ESIA study report has been conducted to equip the GIRAV Project and its stakeholders such as the Ministry of Agriculture and the National Environment Agency with relevant and sufficient information about the intended activities of the Project and their potential environmental and social impacts. It is hoped that the project uses the findings in this assessment to address the environmental and social impacts during the proposed road site preparation, construction/rehabilitation, and operation phases.

The potential negative environmental impacts that have been identified and are associated with the implementation of this project can be addressed by implementing the mitigation measures proposed to ensure that they pose no threat to the environment and to the communities. Some of these measures are part of the responsibilities of the PIU and will bring no added cost in the implementation process. The benefits of implementing the project are enormous and will address persistent problems of the agricultural sector in Gambia and subsequently address the perennial problem of food insecurity and income generation by improving rural feeder roads infrastructure.

In general, the overall potential negative environmental and social impacts that were anticipated because of project activities would develop as result of site clearing, mobilization of construction materials, civil works and drainages, pavement works, surfacing, movement and operation of heavy machinery/equipment etc. that may cause dust pollution,, soil pollution, water contamination, loss of flora and fauna, noise and vibration, and socio-cultural conflict due to the influx of worker, gender-based violence, sexual exploitation and abuse and violence against children.

Based on the above, the envisaged potential negative impacts with respect to project activities could be addressed through the application of mitigation measures recommended as clearly detailed out in this ESIA document. When implemented according to strict adherence to this ESIA, there shall be controlled negative impacts that shall not compromise the project benefits or resources for future generations. Thus, it is concluded that implementation of activities could be very successful if considered in a holistic manner and potential impacts managed.

Reference

Recovery Focused National Development Plan (NDP) 2023

The Gambia Environmental Action Plan, 2021

National Transport Policy, 2018

Road Safety Strategy, 2021

The National Health Policy, 2012

Agriculture and Natural Resources Policy, 2017

The Wildlife Sector Policy and Strategy, 2013

Strategic Environment Assessment Policy, 2016

The National Biodiversity Strategy and Action plan, 2015

National Forest Policy, 2023

The Gambia National Water Policy, 2006

National Adaptation Plan of Action (NAPA) on Climate Change, 2007

Decentralization and Local Development policy, 2015

National Climate Change Policy, 2016

Gambia National Gender and Women Empowerment Policy, 2010

National Youth Policy, 2009

National Environmental Management Act 1994

Biodiversity and Wildlife Act, 2003

The Children's Act, 2005

Land Acquisition and Compensation Act, 1991

Local Government Act, 2002

Labour Act, 2023

Forestry Act, 2018

Women's Act, 2010

Hazardous Chemicals and Pesticides Control and Management Act 1994

Environmental Impact Assessment, 2014

Anti-Littering Regulation, 2007

Annex 1

Table A1. Water quality test results

No	Parameters	Dobong Kunda	Minna Village	Gunjur Nyofelleh	Sibanor	Kerr Omar Saine	<u>WHO Guideline Values</u>
1.	Temperature (°C)	27.4	28.0	27.7	27.5	28.1	Acceptable
2.	Turbidity (NTU)	<5	<5	<5	<5	<5	<5
3.	pH	6.16	5.91	5.84	5.78	5.63	6.5 - 8.5
4.	pH after aeration (A.pH)	6.34	5.98	5.90	5.93	5.72	6.5 – 8.5
5.	Electrical Conductivity (µs/cm)	58.00	22.00	40.00	39.00	32.00	1300
6.	Total dissolved solids (mg/l)	38.00	14.00	26.00	25.00	20.00	1000
7.	Salinity (promile)	0.03	0.01	0.02	0.03	0.01	NS
8.	Colour	Absent	Absent	Absent	Absent	Absent	Absent
9.	Odour	Smelling	Normal	Normal	Normal	Normal	Normal
10.	Taste	Normal	Normal	Normal	Normal	Normal	Normal
11.	Residual Chlorine (mg R.C12/l)	0	0	0	0	0	0.3

12.	Suspended Solids (mg S.S./l)	2.00	1.00	1.00	1.00	1.00	NS
13.	Phosphate (mg PO ₄ ³⁻ /l)	0.04	0.07	0.05	0.12	0.06	NS
14.	Nitrate (mg NO ₃ ⁻ -N/l)	2.4	1.8	3.1	3.8	2.7	10
15.	Nitrate (mg NO ₂ ⁻ -N/l)	0.001	0.001	0.001	0.001	0.001	0.03
16.	Total Iron (mg Fe ^{+2/3} /l)	0.12	0.01	0.18	0.11	0.05	0.3
17.	Sodium (mg Na ⁺ /l)	0.0	0.0	0.0	0.0	0.01	150
18.	Chloride (mg Cl ⁻ /l)	5.4	3.1	3.6	3.7	3.4	250
19.	Alkalinity (mg CaCO ₃ /l)	25.7	0.0	25.8	27.1	25.5	>20
20.	Free Carbondioxide (mg CO ₂ /l)	10	25.2	10	10	9	NS
21.	Hardnes (CaCO ₃ /l)	11.2	8	17.4	15.0	13.5	200
22.	Calcium (mg Ca ⁺² /l)	3.5	9.1	5.8	5.0	4.9	200
23.	Magnesium (mg Mg ⁺² /l)	0.5	3.0	0.7	0.6	0.3	150
24.	Manganese (mg Mn ⁺² /l)	0.05	0.4	0.02	0.03	0.05	0.5
25.	Fluoride (mg F ⁻ /l)	0.07	0.01	0.12	0.08	0.15	1.5
26.	Sulphate (mg SO ₄ ⁻² /l)	2	0.11	1	2	0	250
27.	Ammonia (mg NH ₄ ⁺ /l)	0.13	0	0.10	0.03	0.01	0.5

28.	Total Coliform (No./100ml)	4	0.12	0	0	0	Nil
29.	Faecal Coliform (No./100ml)	2	0	0	0	0	Nil

Annex 2

(Community Consultation/Engagement)

Access the full community consultation report using the link below:

[Community Engagement Report FULL - Copy.docx](#)

Annex 3

Impact Matrix

Impact Identification

The description of the planned project activities helped in identifying the environmental aspects of the proposed project. These identified environmental aspects were then matched with the existing baseline description of the project environment which was employed to generate a checklist of potential and related impacts of the proposed project. Project impacts were identified through the understanding of the interaction between the planned project activities and the prevailing environment at the project site. Expert knowledge and stakeholder consultation plays a significant role in the process of impact identification.

Environmental-Aspect

The proposed project will be executed in three different stages and the procedure utilized in the identification and assessment of the potential impacts took into account the various phases of the project, as shown in the subsequent sub-sections.

Pre-construction /Site preparation

This phase of the project entails deploying heavy construction machineries and equipment, clearing of undesired vegetation from the sites/road corridor, mobilization of construction materials and recruitment of workforce, creating diversion roads. In addition, the barricading of the site was categorized under the pre-construction phase. Table 6.1 shows the matrix interaction checklist that helps to unveil the impacts associated with each project aspect at the pre-construction phase.

Table A2.1: Environmental Indicators interaction matrix of the project pre-construction activities

Project Stage	Pre-construction				
Project activities	Vegetation clearing	Mobilization of construction	Recruitment of workforce/	Barricading of the site	Creating diversion roads

		on elements	Camp for workers		
Air Quality					
Dust and particulates	✓	✓			✓
Gaseous emissions (NO _x , SO _x , CO _x , GHGs etc)		✓			
Water Quality					
Surface water contamination/pollution					✓
Underground water contamination/pollution					
Depletion of groundwater					✓
Soil Quality					
Soil contamination		✓		✓	✓
Soil erosion and siltation	✓				✓
Change in topography/natural drainage					✓
Sensory Perceptions					
Noise Disturbance		✓			✓
Vibration Disturbance					✓
Visual Intrusions	✓				
Terrestrial Ecology-Flora					
Forested areas (removal)	✓				✓
Habitat fragmentation	✓			✓	✓
Terrestrial Ecology - Fauna					

Avifauna (degradation and removal of habitat)	✓				✓
Rodents and mammals (degradation and removal of habitat)	✓				✓
Socio-economic/Cultural/Human Health					
Traffic congestion		✓			
Waste generation (solid and liquid)	✓		✓		✓
Public health (air and water quality)	✓	✓			✓
Occupational Health and Safety (increased accident potential)		✓			✓
Employment opportunities	✓	✓	✓		✓
Impact on livelihood			✓		
In-migration			✓		
Social stability/cohesion			✓		
Sexual and communicable diseases			✓		
Change in lifestyle/culture			✓		
Child labor			✓		
GBV, SEAH/SH			✓		

Construction

The construction stage of the project comprises of the recruitment of skilled and unskilled workforce for the construction/rehabilitation of the roads; earthworks; civil works and drainages; pavement works; surfacing; Road furnishing & pavement marking; handling of fuel or hazardous materials; movement of heavy vehicles; and many other related activities during construction. The detailed project construction activities were provided in the Interaction matrix checklist on Table 6.2.

Table A2.2. Environmental Indicators interaction matrix of the project construction activities

Project Stage								
Project activities								
	Workforce recruitment/Camping on site	Earthworks	Civil works & drainages	Pavement works	Surfacing	Road furniture and pavement marking	Fuel/hazardous materials handling	Movement and operation of heavy construction trucks & equipment
Air Quality								
Dust and particulates		✓	✓	✓	✓			✓
Gaseous emissions (NO _x , SO _x , CO _x , GHGs etc)				✓	✓	✓	✓	✓
Water Quality								
Surface water contamination/pollution	✓	✓	✓	✓	✓	✓	✓	
Underground water contamination/pollution	✓						✓	✓
Depletion of groundwater								
Soil Quality								
Soil contamination		✓	✓	✓	✓	✓	✓	
Soil erosion and siltation								
Soil compaction								✓
Change in topography/natural drainage		✓	✓	✓	✓			
Sensory Perceptions								
Noise Disturbance		✓	✓	✓	✓			
Vibration Disturbance		✓	✓	✓	✓			
Visual Intrusions		✓						✓
Terrestrial Ecology-Flora								
Forested areas/Vegetation (removal)								
Habitat fragmentation		✓	✓	✓	✓			
Terrestrial Ecology - Fauna								
Avifauna (degradation and removal of habitat)		✓						

Rodents and mammals (degradation and removal of habitat)		✓	✓	✓	✓			
Socio-economic/Cultural/Human Health								
Traffic congestion		✓	✓	✓	✓	✓		✓
Waste generation (solid and liquid)	✓	✓	✓	✓	✓	✓	✓	
Public health (air and water quality)		✓		✓			✓	✓
Occupational Health and Safety (increased accident potential)		✓	✓	✓	✓	✓		✓
Employment opportunities	✓	✓	✓	✓	✓	✓		
Impact on livelihood	✓							
In-migration	✓							
Social stability/cohesion	✓							
Sexual and communicable diseases	✓							
Change in lifestyle/culture	✓							
GBV, SEA/SH	✓							

Operation and maintenance

This phase of the project commences right after the completion of the construction phase and it includes commissioning, use and maintenance of the road.

The potential impacts of the above sub-activities on the environment and socio-economic condition of the host communities and beyond are demonstrated on Table 6.3.

Table A2.3: Environmental Indicators interaction matrix of the project operation activities

Project Stage	Operation and Maintenance	
Project activities		

	Fully operational	Maintenance
Air Quality		
Dust and particulates		-
Gaseous emissions (NO _x , SO _x , CO _x , GHGs etc)	✓	✓
Water Quality		
Run-off and flooding	✓	
Soil Quality		
Soil erosion and siltation	✓	
Noise Disturbance	✓	
Vibration Disturbance	✓	
Loss of livestock/animals	✓	
Waste generation (solid and liquid)	✓	✓
Improved accessibility	✓	✓
Reduce travel time	✓	✓
Increase connectivity	✓	✓
Occupational Health and Safety (increased accident potential)	✓	✓
Increase business opportunities	✓	
Impact on livelihood	✓	
Social stability/cohesion	✓	
Sexual and communicable diseases	✓	
Change in lifestyle/culture	✓	

Impact Characterization

The potential impacts identified from the proposed activities of the project were further characterized to have an in-depth understanding of the nature of the identified potential project impacts. The characterization was based on the nature, characteristics and duration of the

different project activities on the physiochemical and biological component of the environment as well as the socio-economic, cultural, human health and safety.

Project impact on the environment occurs when the existing environment interacts with the various project activities which may lead to changes in the environment as shown in Equation 1.

$$\text{[Environment]} + \text{[Project]} = \{\text{Changed Environment}\} \quad \text{Equation 1}$$

The changed environment anticipated from the above interaction may be direct or indirect, adverse or beneficial, cumulative or residual, long-term or short-term as presented below.

Positive/Beneficial Impacts: Impacts that would produce an overall positive effect on the wellbeing of the people as well as the environment.

Adverse Impacts: Impacts that may result in;

- Irreversible and undesirable change(s) in the biophysical environment,
- Decrease in the quality of the biophysical environment,
- Limitation, restriction or denial of access to or use of any component of the environment to others, including future generations,
- Disturbance to the social cohesion and stability as well as the wellbeing of the people,
- Sacrifice of long-term environment viability or integrity for short-term economic goals.

Direct Impacts: Impacts resulting directly (direct cause-effect consequence) from a project activity.

Indirect Impacts: Impacts that are at least one step removed from a project activity. They do not follow directly from a project activity.

Normal Impacts: Impacts that will normally be expected to follow a particular project activity.

Abnormal Impacts: An impact is considered to be abnormal when it follows a project activity as against sound predictions based on experience.

Short-term Impacts: Impacts that will last only within the period of a specific project activity.

Long-term Impacts: Impacts whose effects remain even after a specific project activity.

Reversible Impacts: Impacts whose effects can be addressed on application of adequate mitigation measures.

Irreversible Impacts: Impacts whose effects are such that the project (impacted component) cannot be returned to its original state even after adequate mitigation measures are applied.

Cumulative Impacts: Impacts resulting from interaction between ongoing project activities with other activities, taking place simultaneously.

Incremental Impacts: Impacts that progress with time or as the project activity proceeds.

Residual Impacts: Impacts that would still remain after mitigation measures have been applied.

Impact Evaluation

The already identified and characterized potential impacts in the previous stages of the assessment process were evaluated based on explicitly defined criteria to ascertain the significance of the impacts. The criteria and weighing scale adopted for the evaluation are provided below.

Legal/Regulatory Requirement (L)

The proposed project activities that trigger the identified impacts were weighted against existing legal/regulatory provisions to determine the requirement or otherwise for permits prior to the execution of such activities. The weighting scale used was as presented in Table 6.4.

Table A2.4: Conditions and corresponding rating scale of legal/regulatory requirement

Condition	Rating
No legal/regulatory requirement for carrying out project activity	Low = 1
Legal/regulatory requirement exist for carrying out activity	Medium = 3
A permit is required prior to carrying out project activity which may result in impact on the environment	High = 5

Risk Posed by Impact (R)

The health, safety and environmental risks associated with each impact were assessed and ranked as “Low”, “medium” or “high”, using the Risk Assessment Matrix (RAM) as shown in Table 6.5.

Table 6.5: Risk Assessment Matrix

			Likelihood				
			A	B	C	D	E
			Remote	Unlikely	Possible	Likely	Certain
Negative Consequences	5	Severe	M	H	H	H	H
	4	Major	M	M	H	H	H
	3	Moderate	L	M	M	M	H
	2	Minor	L	L	M	M	M
	1	Negligible	L	L	L	L	L

Positive impact (P)	P	P	P	P	P
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The level of impact will be largely determined by a qualitative appraisal of the likely change in the receiving environment, human health/safety and socio-economic situation, based on the matrix in Table 6.5 and the weighting used was as follows:

- **Low Risk =1**: Where the level of risk is broadly acceptable and generic mitigation measures are already assumed in a design process but require continuous improvement.
- **Medium Risk =3**: Where the level of risk is tolerable, but mitigation measures are required to minimise the risk to reduce the risk as much as practicable (i.e. tolerable if ALARP).
- **High Risk =5**: Where the level of risk is not acceptable and mitigation measures are required to move the risk figure to the lower risk categories.
- Positive impacts (to be enhanced if at all practicable).

Frequency (F)

The frequency of the occurrence of the identified impacts was also evaluated. Frequency of impact occurrence was rated as “low”, “medium” or “high” based on the historical records of accidents/incidents, consultation with experts or key informants and professional judgement. The frequency criterion is summarized below (see Table 6.6).

Table 6.6: Summary of the conditions and rating scales for the Frequency of Impacts

Low = 1	<ul style="list-style-type: none"> ○ Minor degradation in quality in terms of scale (<0.1% of study area, habitat, very localized), appearance, duration (a few days to a month) ○ Effect within range of naturally occurring impacts, changes, dynamics ○ Rapid reversibility (change lasting only a few weeks before recovery), no lasting residual impact of significance
Medium =3	<ul style="list-style-type: none"> ○ Degradation in quality in terms of scale (>0.1% of study area, habitat, appearance, duration (a few months) ○ Effect beyond naturally occurring impacts variability ○ Slow reversibility (change lasting a few months before recovery), lasting residual impact ○ Potential for cumulative impact ○ Intermittent frequency of impact (occur in only a few occasions during the project execution period) ○ Limited geographic extent of impact (large area within study area)

High =5	<ul style="list-style-type: none"> ○ Major degradation in quality in terms of scale (>1% of study area or habitat within the study area), appearance, duration (beyond duration of project) ○ Irreversible or only slowly recoverable (change lasting more than 1 year) degradation of environmental ecosystem level (population, abundance, diversity, productivity) ○ High frequency of impact (occur continuously and almost throughout the project execution period (<4 months)) ○ Geographic extent of impact (e.g. encompassing areas beyond study area)
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Importance of Impact (I)

The importance of target environmental component in respect of identified potential impacts was also determined and rated as “low”, “medium” or “high”. The rating were based on consensus of opinions among consulted experts. The importance criterion is summarized below (see Table 6.7).

Table 6.7: Summary of conditions and corresponding rating scale for importance of impact

Importance	Attribute – Environmental, Human Health and Safety
Low =1	<ul style="list-style-type: none"> ○ Imperceptible outcome ○ Insignificant alteration in value, function or service of impacted resource ○ Within compliance, no controls required
Medium =3	<ul style="list-style-type: none"> ○ Negative outcome ○ Measurable reduction or disruption in value, function or service of impacted resource ○ Potential for non-compliance with international best practices
High =5	<ul style="list-style-type: none"> ○ Highly undesirable outcome (e.g., impairment of endangered, protected habitat, species) ○ Detrimental, extended flora and fauna behavioral change (breeding, spawning, molting) ○ Major reduction or disruption in value, function or service of impacted resource ○ Impact during environmentally sensitive period ○ Continuous non-compliance with international best practices

Public Perception (P)

Consultation with the project affected communities and stakeholders were carried out to determine the perception of the public on the proposed project and the identified potential impacts. The rating of “low”, “medium” or “high” were assigned based on consensus of opinion among consulted parties. Table 6.8 summarizes the public perception criterion.

Table 6.8: Summary of the conditions and corresponding rating scale of public perception

Public Perception	
Low =1	<ul style="list-style-type: none"> ○ No known risk to human health, acute and/or chronic ○ No known risk of life endangered for community inhabitants and site personnel ○ Minor reduction in social, cultural, economic value ○ Unlikely adverse perception among population
Medium =3	<ul style="list-style-type: none"> ○ Limited incremental risk to human health, acute and/or chronic ○ Unlikely life endangerment for community inhabitants and site personnel ○ Some reduction in social, cultural, economic value ○ Possibility of adverse perception among population
High =5	<ul style="list-style-type: none"> ○ Elevated incremental risk to human health, acute and/or chronic ○ Possibility of life endangerment for community inhabitants and site personnel ○ Major reduction in social, cultural, economic value ○ Continuous non-compliance with international best practices ○ Any major public concern among population in the project region

Impact Significance

The impact significance of the proposed project activities is the result of the impact assessment based on the evaluation of the various criteria such as legal/regulatory requirements (**L**), risk posed by impact (**R**), frequency of occurrence (**F**), importance of affected environmental component (**I**) and public perception (**P**). The overall rating of impact significance of each identified impacts was given as “low”, “medium” or “high”. To determine the overall impact significance, the following considerations were adopted:

Low = (L+R+F+I+P) <8

Medium = (L+R+F+I+P) ≥8 but <15

High = (L+R+F+I+P) ≥15 or (F+I) ≥6 or P = 5

The rating for each identified potential impacts against the selected criteria and the overall impact significance results based on the formula above are presented in Table 6.4 – Table 6.8 for the pre-construction, construction and operation phase, respectively.

