



MINISTRY OF FOOD AND AGRICULTURE

**ENVIRONMENTAL AND SOCIAL IMPACT
ASSESSMENT (ESIA)**

FOR

NANDOM - KPEE AND KO RICE VALLEYS

**RESILIENT RICE REGIONAL VALUE
CHAINS IN WEST AFRICA (REWARD)
PROJECT**

FINAL ESIA REPORT

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ACRONYMS AND ABBREVIATIONS

AEZ	Agro-Ecological Zones
AfDB	African Development Bank
CBD	Central Business District
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CSIR	Council for Scientific and Industrial Research
DCP	Decommissioning and Site Closure Plan
DEMC	District Environmental Management Committees
EA	Environmental Assessment
EHU	Environmental Health Unit
EIS	Environmental Impact Statements
EPA	Environmental Protection Authority
ERO	ECOWAS Rice Observatory
ESIA	Environmental Impact Assessment
ESMP	Environmental and Social Management Plan
FASDEP	Food and Agriculture Sector Development Policy
FAW	Fall Army Worm
FBGs	Farmer Based Groups
FBOs	Farmer Based Organizations
FID	Factories Inspectorate Division
FROGGIE	Forest Reserves of Ghana Information Exhibitor
GAP	Gender Action Plan
GIDA	Ghana Irrigation Development Authority
GMMB	Ghana Museum and Monument Board
GNFS	Ghana National Fire Service
GRC	Grievance Redress Committee
ISS	Integrated Safeguards System
LEAP	Livelihood Empowerment Against Poverty
MED	Metro Education Directorate
METASIP	Medium Term Agriculture Sector Investment Plan
MoFA	Ministry of Food and Agriculture
MSME	Micro Small and Medium Scale Enterprises
NADMO	National Disaster Management Organization
NRDS	National Rice Development Strategy
OSs	Operational Safeguards
PAFs	Project Affected Framers
PAPs	Project Affected Persons
PCR	Project Completion/Technical Review
PIU	Project Implementation Unit
PSC	Project Steering Committee
RAP	Resettlement Action Plan
RCC	Regional Coordinating Council
REWARD	Resilient Rice Regional Value Chains In West Africa
SDHMT	Sub-district Health Management Team
SIP	Savannah Investment Programme
UNFCCC	United Nations Framework Convention on Climate Change
VLD	Voluntary Land Donation
VSLA	Village Savings and Loans Associations
WRC	Water Resources Commission

EXECUTIVE SUMMARY

The Resilient Rice Regional Value Chains in West Africa (REWARD) Project is being implemented by the Government of Ghana through the Ministry of Food and Agriculture with the support of the African Development Bank (AfDB) aimed at addressing disruptions in food systems in Ghana.

Specific activities to be undertaken in selected Inland Valleys include but not limited to: development of water control and conveyance systems; construction of drainage systems to collect water out of command areas; construction of access roads into the valleys; and land development for crop cultivation. The programme will also seek to address issues with women and youth drawn from the Gender Action Plan (GAP).

0.1 Objectives

The overall goal of the project is to increase rice production in order to contribute to industrialization, youth employment and food security. The specific objectives of the project are to:

- Increase rice productivity and production thus increased incomes for farmers, particularly women and young people;
- Increase the resilience and adaptive capacities of rice farms and production systems; and
- Increase the marketing and intra-regional trade of rice.

0.2 Components and main activities

The project components and activities comprise:

No	Component Name	Sub-Component and Activities
1	Production and Productivity	<u>Sub-component 1.1: Sustainable climate-resilient infrastructure and management services in rice production systems</u> Key interventions will include: • Development of Agricultural Zones • Sustainable Land and Water Management (SLWM) • Form and build capacity of Water Users Association • Social infrastructure development
		<u>Sub-component 1.2: Improved availability and access to climate-resilient inputs, mechanization services and knowledge</u> Key interventions will include: • Seed Delivery Systems • Fertilizers and Pest Control Management Systems • Agricultural Mechanization Services Delivery • Extension Delivery

No	Component Name	Sub-Component and Activities
2	Processing and Marketing	<u>Sub-component 2.1: Modernized processing infrastructure and strengthening capacities of value chain actors</u> This component will focus on: • The construction and installation of processing and storage infrastructure to minimise post-harvest losses and enhance value addition. • Development of information systems using innovative technologies (incl. digital) and consumer-oriented branding to improve access to market.
3	Policy and Governance	Key activities under this component will include: • Support to policy reforms and harmonization at regional/national levels • Finalize the National Rice Development Strategy II (NRDS). • Organise policy dialogues and workshops to discuss issues relevant to the rice sub-sector. • Coordinate activities to ensure synergies among rice value chain stakeholders and projects to boost production, processing, marketing and consumption of locally-produced rice. • Enhance control and regulations for agricultural inputs at regional/national levels.
4	Programme Coordination and Management	This component will be responsible for: • Day-to-day management of project activities to ensure harmony and coherence. • Establishment or nesting of Project Implementation Unit (PIU) under existing PIU to support the coordination and management of the project. • Development of Regional and National Management and monitoring systems based on digital technologies to ensure tracking of results at Regional and National levels, and in line with ECOWAS Rice Observatory (ERO).

0.3 Project Activities in the Kpee and Ko Valleys

The specific project activities to be implemented in the Kpee and Ko Valleys in the Nandom Municipal area at the preparatory, construction and operation phases of the project implementation are:

0.3.1 Preparatory Phase

The preparatory phase activities include:

- Identification of beneficiary community and farmers for rice production;
- Conduct of relevant studies, including socio-economic surveys and resettlement related studies;
- Development and Implementation of Environmental and Social Management Plan (ESMP);
- Request for applications and screening of applicant farmers; and
- Assessment of soil suitability and GIS mapping of commercial farms using ICT.

0.3.2 Construction Phase

The construction phase activities will include the following:

- Rehabilitation of existing access routes;

- Construction of mini work camp;
- Vegetation clearance and land preparation;
- Winning of construction materials from borrow pits (site yet to be determined);
- Transportation of materials to and from project site;
- Construction of drainage channels and flood protection works;
- Provision and installation of farm infrastructure such as farm houses and storage facilities;
- Waste disposal (cleared vegetation, construction waste etc.); and
- Decommissioning of mini work camp.

The vegetation will be cleared using suitable machinery for land development to ensure that top soils are not unduly disturbed. Some activities to be undertaken will involve land levelling and In-field bunding. Bunds which are earthen embankments will be created to retain rainfall runoff. The plots will be formed to conform to the direction of the contours, in this way reducing the earth movement during bunding and levelling to the minimum. The levels of the plots will be set to balance cut and fill. Bunding and land levelling will form the major activities in plot formation. Pegging out of plots boundaries to the standard size of plots will be required during the levelling. All levelled plots would be portioned and banded by in-field contour bunds into plots.

Roads linking valleys to towns which are mostly in deplorable states will be maintained to reduce post-harvest losses which has been a major problem confronting farmers. Access roads will be maintained to permit the use of agricultural machinery in the cropping zone to do tillage, deliver inputs and send out produce.

0.3.3 Operation Phase

The operation phase activities include:

- Production and promotion of rice;
- Support for out-grower contractual arrangements;
- Conduct surveillance and collect data on pests attacking the Rice in the project zones with specific reference to FAW;
- Community sensitization, Establishment of fire belts and enforcement of community fire by-laws to deal with the impact of bush fires;
- Promotion of quality standards for rice, maize and soybean production, storage and processing;
- Support business development, including improvements in business processes of existing commercial farmers;
- Enhance access to market information (e.g. quantity, quality, timing and pricing);
- Promote the development of allied services (packaging, new distribution networks for rice products, transport services, new agro-input delivery systems, etc.);
- Support to feed millers to improve feed stock and expand processing capacity;
- Promote the sustainable use of agro-chemicals;
- Enhance investment facilitation and promotion to increase the number of commercial producers and processors in the Savannah regions; and
- Capacity building for women and youth in small-scale commercial rice business management and entrepreneurship, including mentorship.

0.4 Analysis of Alternative Project Options

The proposed project considered some feasible options including:

- Site selection;
- Resettlement related options
- Power supply;
- Sources of water;
- Water Management Systems;
- Waste management; and
- Project implementation versus No Project implementation.

These are further discussed in the table below.

Option/ Method of Deployment	Potential Environmental, Social, Technological and Economic Implications		Preferred Option
Site Selection			
1. Nandom Ko and Nandom Kpee Valley	Advantages 1. Size of the valley 2. Potential benefit to farming communities with limited access to developed rice fields 3. Not a flood prone area 4. Sparsely vegetated fields	Disadvantages 1. Underdeveloped rice fields	The Nandom Kpee and Nandom Ko valleys were selected as the preferred valleys because of their potential benefit to many more communities. The large size of the valley also made it the preferred choice.
	2. Other Valleys	Advantages 1. Already developed rice fields serving nearby communities	
Resettlement related options			
Nandom Kpee and Nandom Ko Valleys	Advantages 1. The individual land owners willing to donate land for the project. 2. The chief is willing to provide alternate land for the affected farmers. 3. There will be no temporary or permanent physical	Disadvantage 1. The livelihood of thirty-nine (39) farmers will be disrupted. 2. The affected farmers will have to trek longer distances to access alternate farmlands provided by the chief.	The preferred option is the Nandom Kpee and Nandom Ko valley sites due to more favourable resettlement related conditions.

Option/ Method of Deployment	Potential Environmental, Social, Technological and Economic Implications		Preferred Option
	structures to be removed or destroyed.		
Other Sites	Advantages 1. Vast lands available for the project. 2. Alternative lands to be provided for any affected farmers may be closer to the community.	Disadvantages 1. Land is owned by individuals who may not be easily willing to donate for the project. 2. There may not be alternative land for the affected farmers. 3. There will be more farmers affected.	
Power supply			
1. National grid	Advantages 1. The cost of electricity is low decreasing production cost	Disadvantages 1. Unreliable power supply from frequent power cuts	Solar energy installations (Option 2) such as solar powered pumps are preferred for the pump irrigation.
2. Solar energy installations	Advantages 1. Presents a clean and sustainable source of electricity 2. Low operational costs 3. Meets the objective of Technology transfer and climate friendliness	Disadvantages 1. Expensive capital cost	
Sources of Water			
1. Groundwater	Advantages 1. Relatively reliable source all year round 2. Seasonal variations are minimal 3. Relatively stable water quality	Disadvantages 1. Expensive to access and abstract 2. Challenges of over-exploitation to meet high demands and associated threat of land subsidence 3. May require farms of boreholes to meet demand 4. Threat of high iron and fluoride concentration in aquifers in the northern parts of the country	Option 3, which is the use of rain water appears to be the most preferred option as it will be easier to implement water management plans
2. Surface water	Advantages 1. Easier to abstract and use	Disadvantages 1. Seasonal variations in flow	

Option/ Method of Deployment	Potential Environmental, Social, Technological and Economic Implications		Preferred Option
		2. Vulnerable to pollution	
3. Rain harvesting	Advantages 1. Easy to trap and store	Disadvantages 1. Source is unreliable 2. Evaporation losses are high in the dry months of the year	
Water Management Systems			
1. The head-bund system	Advantages 1. Water stored in the ponds is conserved and can be used for additional irrigation during dry spells because of the small nature of the storage ponds. 2. The technique allows for deep water infiltration into the soil by trapping the water, thereby enhancing the soil's water retention capacity. 3. This system also help to prevent soil erosion and gully formation by reducing the speed and volume of surface runoff.	Disadvantages 1. Developing of bunds can be laborious and may demand more manpower if size of farm is huge. 2. Having head-bund system in areas with adequate rainfall or irrigation may cause waterlogging which may affect crop growth.	The preferred option is the head-bund system as it is ideal for small to medium-sized farms. It also allows for deep water infiltration into the soil by trapping water, thereby enhancing the soil's water retention capacity which is very essential in rice production.
2. The central-drain system	Advantages 1. The water levels in the rice fields, especially those near the central drain, can be controlled to mitigate against excessive flooding of the fields. 2. Help reduce soil salinity. 3. With water levels being controlled, crops receive optimal water amounts leading to better growth and yield.	Disadvantages 1. This system is only suitable for areas with high rainfall and not arid conditions. 2. The central drain can be a conduit for soil erosion if not maintained properly.	
3. The interceptor-canal system	Advantages 1. In periods of high rainfall, the fields are better	Disadvantages 1. Water can be lost from the canals through	

Option/ Method of Deployment	Potential Environmental, Social, Technological and Economic Implications		Preferred Option
	protected from any rapid overflow of water from the stream and from the lateral runoff from the uplands. 2. The interceptor-canal system can be used to irrigate the rice fields during dry spells in the rainy season.	seepage into the ground and evaporation, reducing the overall efficiency of the irrigation system. 2. It can be challenging to distribute water evenly across large areas with this system, as some parts of the irrigated land can receive more water than others. 3. Canals require regular maintenance, such as desilting and repairing leaks, which can be expensive and labor-intensive.	
4. The contour-bund system	Advantages 1. The stream used for irrigation is effectively obliterated and water is allowed to cascade from one levelled area to the next by way of built outlets or spillways to the next field.	Disadvantages 1. Contour bunds are not suitable for uneven or eroded land as overtopping of excess water with subsequent breakage may occur at low spots.	
Waste Management Option			
1. Composting plant	Advantages 1. Improvements in soil quality. 2. Enhances the structure of the soil. 3. Eco-friendly. 4. Fully organic fertilizer. 5. Higher yields.	Disadvantages 1. Requires initial investment. 2. Efficiency depends on the amount of organic waste 3. May attract rats, snakes, and bugs. 4. Requires space 5. Unpleasant smell	Option 1, composting is a better option as it is ecofriendly and could be used to improve soil quality on farms. It will also keep waste away from

Option/ Method of Deployment	Potential Environmental, Social, Technological and Economic Implications		Preferred Option
2. Municipal Waste Dump/ landfill sites	Advantages 1. Straightforward concept to deal with waste. 2. Filled land can be reused for other community purposes. 3. Landfills can prevent environmental dumping. 4. Good for waste that is non-recyclable.	Disadvantages 1. Completed landfill areas can settle and requires maintenance. 2. Requires proper planning, design, and operation. 3. Can contribute to groundwater pollution. 4. Landfills can be a breeding ground for bacteria.	landfill, which already have limited space.
Project Implementation versus No Project Implementation			
1. Project Implementation	Advantages 1. Enhancing rice production, 2. Strengthening market systems, 3. Improving farmer livelihoods. 4. Supporting research to produce breeder seeds, 5. Ensuring widespread access to seed of improved rice varieties. 6. Facilitate the supply of key inputs such as fertilizers and pesticides	Disadvantages 1. Potential displacement issues 2. Depriving other projects from accessing scarce resources	Project implementation is the preferred option as the benefits outweigh that of the no project implementation option
2. No Project Implementation	Advantages 1. Project resources can be channeled into other development programs	Disadvantages 1. Food security challenges 2. High Cost of Land Development: 3. Inadequate Irrigation and Poor Water Management. 4. Limited availability of quality breeder, foundation and certified seeds: 5. Inadequate use of Improved Agro Inputs: 6. Inadequate access to mechanized services 7. Poor knowledge of good agronomic practices	

Option/ Method of Deployment	Potential Environmental, Social, Technological and Economic Implications		Preferred Option
		8. Poor quality of processing and storage facilities	

0.5 Institutional and legal framework for implementation of the project

0.5.1 Institutional roles and responsibilities

The key stakeholder institutions identified include:

- Ministry of Food and Agriculture;
- Water Resources Commission;
- Lands Commission;
- Environmental Protection Authority;
- Local Government Authority; and
- Traditional Authorities.

Their roles and mandates as well as relevance to the project are summarised as follows:

Institution	Institutional Framework and Key Implementation Responsibilities	Applicability to Proposed Project
Ministry of Food and Agriculture (MOFA)	MOFA promotes sustainable agriculture and agribusiness through research and technology development, effective extension and other support services to farmers, processors, and traders for improved human livelihood. The Food and Agriculture Sector Development Policy (FASDEP II) and the Medium-Term Agricultural Sector Investment Plan (METASIP) seeks to guide development and interventions in the agriculture sector. The Resilient Rice Regional Value Chains in West Africa Project (REWARD) of MoFA also seeks to develop agriculture in Ghana in line with the country's efforts at poverty reduction and ensuring food security by promoting inclusive commercial farming along selected commodity value chains.	Regional and District Departments of Agriculture have the mandate of offering extension services and support to ensure sustainability and the successful implementation of the project
Water Resources Commission (WRC)	WRC was established by an Act of Parliament (Act 522 of 1996) with the mandate to regulate and manage Ghana's Water Resources and co-ordinate government policies in relation to them. The Act stipulates that ownership and control of all water resources are vested in the President on behalf of the people, and clearly defines the WRC as the overall body responsible for water resources	The REWARD Project will collaborate with the WRC for the protection of water bodies

Institution	Institutional Framework and Key Implementation Responsibilities	Applicability to Proposed Project
	management in Ghana. The functions of the WRC as established under Act 522 among other things are to: ▪ Formulate and enforce policies in water resources conservation, development and management in the country; ▪ Coordinate the activities of the various agencies (public and private) in the development and conservation of water resources; ▪ Enforce, in collaboration with relevant agencies, measures to control water pollution; and ▪ Be responsible for appraising water resources development project proposals, both public and private, before implementation.	
Local Government Authority	The Regional Coordinating Council (RCC) and the Metropolitan /Municipal/District Assemblies (MMDAs) are responsible for the overall development of the region and metropolis/municipality/district respectively. Acts 462 and 480, which established the current district assembly structure, designate the District/Municipal/Metropolitan Assembly as the planning authority, charged with the overall development of the district. With regard to environmental management at the district level, the District Environmental Management Committees (DEMC) has been set up by law (Act 462) to among other things: ▪ Promote and provide guidelines for the establishment of community-level environmental committees to put into effect the environmental programmes of the Assembly in the community; and ▪ Plan and recommend to the DA, strategies and activities for the improvement and protection of the environment with emphasis on fragile and sensitive areas, river courses etc.	The project is located in the Nandom Municipal and will be influenced by decisions and plans of the Northern Regional Coordinating Council and the identified Assembly. The Assembly will play key roles in the successful implementation and related activities of the project.
Lands Commission	The Lands Commission was established by Article 258 of the 1992 Constitution and the Lands Commission Act, 2008 (Act 767). The functions of the Lands Commission include amongst others; ▪ Advise the Government, local authorities and traditional authorities on the policy framework for the development of particular areas of the country to ensure that the development of individual pieces of land	The REWARD Project will be implemented in line with the objectives of the Commission for sustainable development of land and conform to the

Institution	Institutional Framework and Key Implementation Responsibilities	Applicability to Proposed Project
	is coordinated with the relevant development plan for the area concerned; ▪ Ensure that through sound, sustainable land use planning, socio-economic activities are consistent with sound land use through sustainable land use planning in the long-term national development goals; and ▪ Promote community participation and public awareness at all levels in sustainable land management and development practices to ensure the highest and best use of land.	development goals of the MMDAs.
Environmental Protection Authority	The EPA is the body responsible for regulating the environment and ensuring the implementation of government policies on the environment. The functions of the Authority include: ▪ Ensuring compliance with any laid down environmental impact assessment procedures in the planning and execution of development projects, including compliance in the respect of existing projects; ▪ Promoting effective planning in the management of the environment; ▪ Imposing and collecting environmental protection levies in accordance with the Environmental Protection Act 2025, Act 1124 or regulations made under the Act; and ▪ Acting in liaison and co-operation with government agencies, Municipal Assemblies and other bodies and institutions to control pollution and generally protect the environment.	The REWARD Project will obtain environmental permit from the EPA and will follow all EPA procedures in the implementation of the project.
Traditional Authorities	In Ghana, people of common descent owe allegiance to a symbol of collective authority, such as the 'stool' for the Akans of southern Ghana or the 'skin' for the northern peoples. Traditional authorities play a role in the administration of the area. At the village level, family and land disputes and development issues are also traditionally dealt with by the village chief and elders. In addition to providing an important leadership role, especially in the more rural areas, chiefs act as custodians of stool/skin land, can mobilise their people for developmental efforts and arbitrate in the resolution of local disputes. Although chiefs have no direct political authority, some are appointed by the Government or Municipal Assemblies.	The proposed project site falls under the Nandom Traditional Council that is a key stakeholder in the project.

0.5.2 Policies, Legislative and regulatory requirements for the implementation of the ESMP

The relevant policies and legal frameworks include:

Policies and Plans

- Ghana Shared Growth and Development Agenda, 2010;
- National Environmental Policy, 2012;
- National Land Policy, 1999;
- National Water Policy, 2024;
- National Climate Change Policy, 2013;
- National Gender Policy, 2015;
- Riparian Buffer Zone Policy, 2014;
- Food and Agriculture Sector Development Policy, FASDEPII (MOFA);
- National Environmental Action Plan/Policy, 1994; and
- National Employment Policy, 2012.

National legal framework

- The Constitution of the Republic of Ghana, 1992;
- Ghana Investment Promotion Centre Act 1994, Act 478;
- Environmental Protection Act 2025, Act 1124;
- Environmental Assessment Regulations 2025, LI 2504
- Fees and Charges (Miscellaneous Provisions) Act, 2022 (Act 1080);
- Water Resources Commission Act 1996, Act 522;
- The Water Use Regulations 2001, LI 1692;
- Ghana Meteorological Agency Act 2004, Act 687.

Agriculture sector legislation and related requirements

- Plants and Fertilizer Act 2010 (Act 803).

Local governance, planning and other institutional requirements

- Local Governance Act, 2016 (Act 936);
- National Building Regulations, 1996 (LI 1630);
- The State Lands Act, 1962 (Act 125);
- Lands Commission (LC) Act 2008, Act 767;
- Land Use and Spatial Planning Act, 2016 (Act 925)

Labour, Health, Safety, Security and Social Protection

- Labour Act, 2003 (Act 651);
- Occupational Safety and Health Policy of Ghana (Draft, 2004);
- Workmen's Compensation Law, 1987 (PNDCL 187);
- National Workplace HIV/AIDS Policy.

Environmental regulations

- Ghana Standards for Drinking Water (GS 175:2017 5th);
- Ghana Standard for Environmental Protection - Requirements for Effluent Discharge (GS1212, 2019);

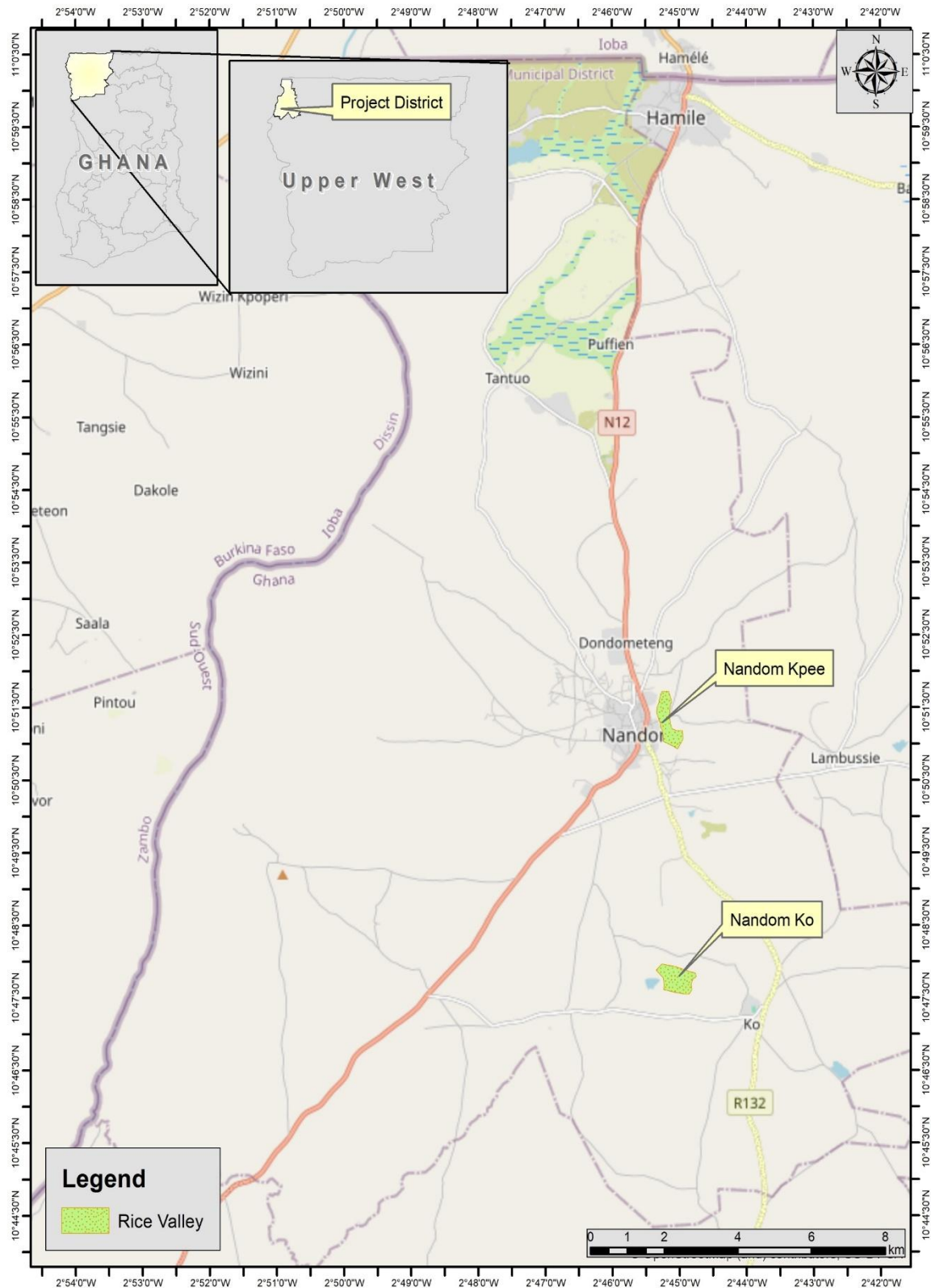
- Ghana Standards for Environment and Health Protection - Requirements for Ambient Air Quality and Point Source/Stack Emissions (GS 1236, 2019);
- Ghana Standards for Health Protection - Requirements for Ambient Noise Control (GS 1222, 2018);
- Ghana Standards for Environment and Health Protection - Requirements for Motor Vehicle Emissions (GS1219, 2018);
- Factories, Offices and Shops Act, 1970 (Act 328);
- Water Resources Commission (WRC) Act 1996, Act 522;
- Ghana National Fire Service Act, 1997 (Act 537);
- Fire Precaution (Premises) Regulations, 2003 (LI1724).

0.6 Brief Description of the Project location in Nandom Municipality

The Nandom Municipality, with Nandom as the administrative capital, is located in the Upper West Region of Ghana between Longitude 2°25 W and 2°45W and Latitude 10°20 N and 11°00 S. With a total land area of 387sq.km., the area shares boundaries to the east and south with the Lambussie and Lawra districts respectively, and to the north and west with the Republic of Burkina Faso.



Map of Ghana showing the beneficiary districts including Nandom Municipal



Location map of the Nandom Municipality showing the Nandom Ko and Nandom Kpee valleys

0.6.1 Environmental and Social Baseline Conditions for the Nandom Municipality

Physical Environment

The municipality's topography is gently undulating with a few isolated hills and an elevation of about 180 m above sea level. The area has just a few natural water bodies, mostly interconnected rivers and streams, such as the Kanbaa River, that flow into the Black Volta. A number of dams and dugouts provide water for irrigation, domestic chores, construction, and grazing animals.

The area's rock formation is primarily Birimian, with scattered outcrops of granite. According to some research, there are minor occurrences of manganese, traces of gold and diamond, iron ore, and clay. The well-developed fracture pattern in the rocks creates a high potential for obtaining ground water.

The main soil types in the area are sandstone, gravel, mudstone, alluvial, granite, and shale, which have weathered into various soil grades. Sand, clay, and laterite ochrosols are soil types that result from seasonal erosion. These soil types are better suited for the cultivation of cereals and root tuber crops such as millet, maize, sorghum, and yam. They respond well to the application of organic manure and commercial fertilizers to produce a high yield.

The climate in the municipality is tropical continental, as seen in Ghana's northern regions. Temperatures are high all year, with a minimum of 23°C at night and a maximum of 42°C during the day and an average monthly temperature range of 21°C and 32°C. The municipality experiences the dry season (November to April) and rainy season (May to September/October). The dry season presents an opportunity for the preservation industry, which could use sunlight as a natural preservative while crop production happens in the rainy season.

Biological Environment

The municipality lies within the Guinea Savannah vegetation belt which is characterized by short grasses interspersed with fire-resistant trees such as Shea, Acacia, and Baobab trees. The vegetation is ideal for livestock production, which contributes significantly to household income. The prolonged dry season has the greatest impact on the vegetation. During this time, the grass dries out, and subsequent bush burning leaves the area patchy and nearly devoid of vegetation.

Socio-economic Environment

The Nandom Municipality's highest political and administrative body is tasked with developing and implementing plans, programs, projects, and strategies for the district's overall sustainable development. The municipality has thirty-eight (38) Assembly members, twenty-seven (27) of them are elected members, while the remaining sixteen (16) are government appointees. The Municipal Chief Executive and the Member of Parliament are ex-officio members, bringing the total to thirty-eight (38). Administratively, the municipality is made up of one (1) Town Council, three (3) Area Councils, and twenty-two (22) Unit Committees.

The municipality according to the 2021 Population and Housing Census has a total population of 51,328 comprising 25,577 (49%) males and 25,751 (51%) females. This is about 6% and <1% of the regional and national population respectively. The population density is 133 persons per sqkm with a total of 9,864 households and a household size of 5 persons per household which is lower than the regional average of 6.

In terms of literacy, 49% of the population 11 years and older are illiterate. Of the literate population, the majority (56%) are literate in English and Ghanaian language.

Majority (78%) of the economically active population is engaged in agriculture, forestry and fishery work, 10% in craft and related trade and 4% in service and sales. About 5% are engaged as managers, professionals, and technicians.

Considering that farming is the people's main occupation, it implies that their main sources of livelihood and income are limited during the dry season, resulting in the migration of the youth to the south in search of greener pastures. As a result, adequate irrigation facilities are required to promote and enhance agricultural activities during the dry season.

The sanitation situation in the municipality is among the best in the region, and it ranks first in the region's Open Defecation Free (ODF) League Table with about 91% of communities certified and declared ODF. Majority of households in these communities have their own latrines and an increase in hand washing awareness is resulting in fewer faecal matter-related diseases in the municipality

In recent years, the area has seen a remarkable improvement in the development of the road sector. The Lawra-Nandom-Hamile Road has seen significant improvement, and work is currently underway. There has been a lot of work done to create access roads to most of the Nandom Township communities and suburbs. This has boosted economic activity in the township, with many commercial stores and buildings being built along these access roads.

The Nandom municipality inhabitants are mostly Dagaabas with patrilineal lineage (Lentz, 2006a). Dagaabas are the land custodians, and according to the customs that have been passed down, women are barred from land ownership and entitlements, which are mostly acquired through inheritance.

0.6.2 Site Specific Conditions within Nandom Kpee Valley

In addition to the above description, the site specific measurements and observations are summarised below:

Physical Characteristics

Particulate Matter and Gases

Active air quality monitoring was carried out between 7th and 10th April 2025 at the proposed project site, that is within the Nandom Ko valley. Sampling was done in compliance with the requirements of GS 1236:2019 as shown in the Table below.

Environment and Health Protection- Requirements for Ambient Air Quality and Point Sources/Stack Emissions (GS 1236:2019).

S/N	Air Quality Parameter	Maximum Limits	Averaging Time
1	Carbon monoxide, mg/m ³	10	8 hours
2	Sulphur dioxide (SO ₂), µg/m ³	50	24hours
3	Nitrogen oxides (measured as NO ₂), µg/m ³	150	24hours
4	PM ₁₀ , µg/m ³	70	24hours
5	PM _{2.5} , µg/m ³	35	24hours

The sampling and analysis of ambient particulate matter concentrations was done according to the ASTM Test Method D4096-17. Particulate matter (PM_{2.5} and PM₁₀) was sampled at the Nandom Kpee valley for 24 hours using ARA N-FRM Air Sampler set to a flow rate of 16.7 L/min drawing air through the inlet onto a 47mm quartz filter for analysis.

The Particulate Matter (PM_{2.5}) concentrations monitored at the proposed Nandom Kpee Rice Valley was 40.7 µg/m³. The value for the project site exceeded the Ghana Standard (GS 1239:2019) permissible value of 35 (µg/m³) and the WHO 2021 limit of 15 µg/m³. These elevated levels, even before any agricultural activity begins, suggest that background air quality in the area may be already compromised. Nearby bush burning, unpaved roads, and domestic cooking emissions from surrounding communities may contribute to the high particulate load.

The Particulate Matter (PM_{2.5}) concentrations monitored at the nearest sensitive receptors (school and household) were 28.2 µg/m³ and 33 µg/m³. The value for the receptors were less than the Ghana Standard (GS 1239:2019) permissible value of 35 (µg/m³) but exceeded the WHO 2021 limit of 15 µg/m³. This could be as a result of the area around the school exposed to moderate air pollution—likely due to local factors such as cooking with biomass, vehicular dust from unpaved access roads, and windblown particles from the surrounding terrain. These findings indicate that additional impacts from the project would require careful management to avoid exacerbating existing conditions.

The Particulate Matter (PM₁₀) concentrations monitored at the proposed Nandom Kpee Rice Valley was 152 µg/m³. The value for the project site exceeded the Ghana Standard (GS 1239:2019) permissible value of 70 (µg/m³) and the WHO 2021 limit of 45 µg/m³. The high background level likely reflects the influence of seasonal dust storms, exposed soils, and nearby open burning practices. This reinforces the need for the project developers to incorporate environmental safeguards such as green buffers, soil cover management, and dust suppression to avoid adding further to the existing levels of coarse particulate pollution.

The Particulate Matter (PM₁₀) concentrations monitored at the nearest sensitive receptors (school and household) were 157 µg/m³ and 163 µg/m³ respectively. These again exceeded the Ghana Standard (GS 1239:2019) permissible value of 70 (µg/m³) and the WHO 2021 limit of 45 µg/m³. Local factors such as unpaved compounds, proximity to bush-burning or waste burning, and domestic dust emissions are likely to play a role in this high figure. If the rice development project proceeds, it would be essential to engage with nearby residents and establish air quality monitoring and community-level mitigation strategies, especially since the baseline is already above safe limits.

The NO₂ and CO values recorded at the Nandom Kpee valley were both below the minimum detection limit of 0.06 mg/m³ at the time of sampling. This suggested that both gases were significantly below both the Ghana Standard and the WHO guidelines and indicate that the area is currently free from major combustion sources such as heavy traffic, industrial activity, or burning of biomass.

The SO₂ concentration value of 400 µg/m³ recorded was much higher than the Ghana standard of 50 µg/m³ and the WHO guideline of 40 µg/m³. This sharp spike is unusual and potentially concerning as it may indicate the use of sulphur-rich agrochemicals or local biomass burning near the proposed valley area as at the time of sampling.

At Nearest sensitive receptor (school), values recorded for Nitrogen dioxide (NO₂) and Carbon monoxide (CO) were 0.100 µg/m³ and 0.250 mg/m³ respectively while that of Sulphur Dioxide (SO₂) was below the minimum detection limit of 0.06 mg/m³ at the time of sampling.

These values recorded were all below their respective Ghana Standards and WHO guidelines. This suggests that the area is currently free from major combustion sources such as heavy traffic, industrial activity, or burning of biomass.

The Nitrogen dioxide (NO₂), Sulphur Dioxide (SO₂) and Carbon monoxide (CO) values for the nearest sensitive receptor (household) were all below the minimum detection limit of 0.06 mg/m³ at the time of sampling. This suggests that combustion-related activities are very limited at the site.

Ambient Noise

The equivalent continuous sound level (L_{Aeq}) recorded at the project site (Nandom Kpee valley) was 56.1 dB(A), with a maximum noise level (L_{max}) of 59.4 dB(A), a minimum noise level (L_{min}) of 52.6 dB(A) and a peak (L_{peak}) of 62.7 dB(A). The L_{peak} value indicates that the current ambient noise levels at the project site are well within acceptable limits.

The L_{Aeq} value of 66.9 dB, with noise peaking at 86.1 dB at the nearest school sensitive receptor were notably higher than the recommended maximum of 55 dB. This could potentially disrupt the learning environment, especially if the project adds more noise during its active phases and there should be the need for early planning of mitigation measures, such as installing noise barriers, maintaining vegetative buffers, or scheduling noisy activities outside of school hours.

The L_{Aeq} value of 55.6 dB at the nearest household sensitive receptor were slightly higher than the recommended maximum of 55 dB, as set by both the Ghana residential standard (Category A) and the IFC EHS guidelines for residential areas. Although the exceedance is minimal (0.6 dB), is close enough to warrant attention, especially if future project activities add to the noise. The peak level of 71.5 dB recorded (while not directly regulated under these guidelines) gives an indication of occasional high noise events.

Soil

The project site has marginal, with shallow soil depth as the major limitation with a soil depth <50 cm. The soil texture may be sandy with clay content <6%. The topsoil tends to be droughty, while the subsoil has a high level of gravel and concretions (hard, compact masses). The soils are therefore prone to erosion and have low moisture and nutrient-holding capacity. The status of exchangeable calcium and magnesium may be low and declining.

Biological Characteristics

Flora

The Nandom Kpee project site is an admixture of farmlands (predominantly rice fields) and grassland with isolated trees. Rice cultivation and cattle grazing as well as wildfires have led to a loss of the typical tree and shrub strata of the Guinea savanna vegetation. Some of the tree species found on the site are *Vitellaria paradoxa*, *Parkia biglobosa*, *Tectona grandis*, *Azadirachta indica* and *Diospyros mespiliformis*.

Fauna

Most of the large mammals which were common in the area have moved away due to human activities such as farming and cattle grazing as well as wildfires.

Notable among these are the elephant, lion, leopard, warthog, several parrots, terns, songbirds (passerines), land tortoises, pythons other snakes, lizards, bats, birds of prey, mongooses, bovids (e.g. the African buffalo and several duikers), egrets, ducks, pigeons. A number of the species known to occur in the area are of both national and global (IUCN, CITES) conservation significance.

Conclusion

The results of the survey indicate that none of the floral and faunal species recorded are of conservation concern due to the project area being an extensively modified habitat. The project will therefore have no significant impact on the existing flora and fauna characteristics as well as their habitat. Very few *Vitellaria paradoxa* (shea tree) were observed on the project site. These are commonly found in many other parts of the district.

Water Resources

There was no water body draining the project area at the time of visit but there is a borehole present in the Nandom Kpee community which is a vital water source to the community who use it for drinking, washing, cooking, and bathing.

Water Quality

Borehole water was sampled and test for pH, Conductivity, TSS, TDS, Turbidity and Chloride was conducted insitu using the Hanna multipara meter. The results of the following parameters were as follows;

Temperature- 31.6, pH- 6.94, Electrical conductivity – 344.0, Total Dissolved solids – 172.0, Turbidity- 0.00, Total suspended solids - <1, Biological oxygen demand (BOD)- 0.660, Iron -0.343 and Manganese -0.029. All parameters recorded were within the acceptable guidelines except that of Temperature, Iron and Manganese.

Socio-economic Characteristics

Farming is the dominant primary source of income in the Nandom Kpee community, with about 81% of the sixteen (16) sampled respondents' households relying on it. All respondents interviewed identified their ethnicity as either Dagaare, Dagaaba, or Dagara. This indicates that they belong to closely related Dagaari-speaking groups. The majority of respondents identified their religion as Christianity with only one respondent identified as Moslem. Almost all respondent in the community interviewed rely on borehole as their main source of drinking water except one household who mentioned GWCL (Ghana Water Company Ltd.). The majority of households (13 out of 16, or 81%) use a Pit Latrine with slab. Two households (12.5%) use a KVIP (Kumasi Ventilated Improved Pit) latrine, and one (6.3%) uses a Bucket Latrine.

0.6.2 Site Specific Conditions within Nandom Ko Valley

In addition to the above description, the site specific measurements and observations are summarised below:

Physical Characteristics

Particulate Matter and Gases

Active air quality monitoring was carried out between 7th and 10th April 2025 at the proposed project site, that is within the Nandom Kpee valley. Sampling was done in compliance with the requirements of GS 1236:2019 as shown in the Table below.

Environment and Health Protection- Requirements for Ambient Air Quality and Point Sources/Stack Emissions (GS 1236:2019).

S/N	Air Quality Parameter	Maximum Limits	Averaging Time
1	Carbon monoxide, mg/m ³	10	8 hours
2	Sulphur dioxide (SO ₂), µg/m ³	50	24hours
3	Nitrogen oxides (measured as NO ₂), µg/m ³	150	24hours
4	PM ₁₀ , µg/m ³	70	24hours
5	PM _{2.5} , µg/m ³	35	24hours

The sampling and analysis of ambient particulate matter concentrations was done according to the ASTM Test Method D4096-17. Particulate matter (PM_{2.5} and PM₁₀) was sampled at the Nandom Ko valley for 24 hours using ARA N-FRM Air Sampler set to a flow rate of 16.7 L/min drawing air through the inlet onto a 47mm quartz filter for analysis.

The Particulate Matter (PM_{2.5}) concentrations monitored at the proposed Nandom Ko Rice Valley and its nearest sensitive receptor (a household) were 13.0 µg/m³ and 143 µg/m³ respectively. The PM_{2.5} value for the rice valley was within the Ghana Standard (GS 1239:2019) and WHO 2021 limit. This indicates that the ambient air quality at the proposed agricultural site is safe for human exposure with minimal health risks.

The PM_{2.5} of the nearest household receptor exceeded both the Ghana Standard (GS 1239:2019) and WHO 2021 limit. This could be as a result of the presence of localized pollution sources, possibly including indoor biomass burning, charcoal stoves, open waste burning, or poorly ventilated cooking areas.

The Particulate Matter (PM₁₀) concentration of 37 µg/m³ recorded at the proposed Rice valley was within both the national and international thresholds. These findings confirm that the rice valley is well-suited for agricultural use, including irrigation farming, without anticipated respiratory or dust-related health impacts. The open nature of the environment and minimal dust-generating activities likely contribute to this satisfactory air quality.

The Particulate Matter (PM₁₀) concentration of 775 µg/m³ recorded at the sensitive receptor also significantly exceeded both the national and international thresholds. This pollution level could be linked to persistent dust, open burning, poor waste disposal practices, and possibly proximity to unpaved roads or bare lands with wind directed towards this location.

The SO₂ and CO values recorded at the Nandom Ko valley were both below the minimum detection limit of 0.06 mg/m³ at the time of sampling. This suggested that both gases were significantly below both the Ghana Standard and the WHO guidelines and indicate that the area is currently free from major combustion sources such as heavy traffic, industrial activity, or burning of biomass.

The NO₂ value of 0.100 µg/m³ recorded was significantly below both the Ghana Standard of 150 µg/m³ and the WHO guideline of 25 µg/m³. This indicates an environment with no significant combustion sources such as vehicles, generators, or industrial activity. The air quality is satisfactory for outdoor work and is fully compatible with agricultural development and human exposure.

The Sulphur Dioxide (SO₂) and Carbon monoxide (CO) values for the nearest sensitive receptor (household) were both below the minimum detection limit of 0.06 mg/m³ at the time of sampling indicating an environment with no significant combustion sources such as vehicles, generators, or industrial activity. The air quality was satisfactory for outdoor work and is fully compatible with agricultural development and human exposure.

The NO₂ value of 0.4 µg/m³ recorded was significantly below both the Ghana Standard of 150 µg/m³ and the WHO guideline of 25 µg/m³. Although slightly higher than the rice valley measurement, it remains insignificant from a health perspective. This suggested that no major combustion-related pollution was present at the household, though minor domestic sources (e.g., charcoal stoves) may contribute minimally. Air quality here is suitable for residential living.

Ambient Noise

The equivalent continuous sound level (L_{Aeq}) recorded at the project site was 54.1 dB(A), with a maximum noise level (L_{max}) of 62.1 dB(A), a minimum noise level (L_{min}) of 43.2 dB(A) and a peak (L_{peak}) of 79.0 dB(A). The recorded L_{max} and L_{peak} were indicative of occasional transient events—possibly the passage of motorcycles, nearby mechanized farming activity, or intermittent local traffic. These spikes are not sustained but may reflect human or mechanical interventions such as the operation of small-scale machinery.

The equivalent continuous sound level (L_{Aeq}) recorded at the nearest sensitive receptor (household) was 50.4 dB(A), with a maximum noise level (L_{max}) of 51.9 dB(A), a minimum noise level (L_{min}) of 45.6 dB(A) and a peak (L_{peak}) of 81.0 dB(A). The L_{peak} of 81.0 dB(A)—notably higher than that recorded at the project site suggests that the household occasionally experiences sharp or sudden noise events. Possible sources include passing motorbikes, loud household items (e.g., radios or metal implements).

Soil

The project site have marginal, with shallow soil depth as the major limitation with a soil depth <50 cm. The soil texture may be sandy with clay content <6%. The topsoil tend to be droughty, while the subsoil have a high level of gravel and concretions (hard, compact masses). The soils are therefore prone to erosion and have low moisture and nutrient-holding capacity. The status of exchangeable calcium and magnesium may be low and declining.

Biological Characteristics

Flora

The Nandom Ko project site just like Nandom Kpee is also an admixture of farmlands (predominantly rice fields) and grassland with isolated trees. Rice cultivation and cattle grazing as well as wildfires have led to a loss of the typical tree and shrub strata of the Guinea savanna vegetation. Some of the tree species found on the site are *Vitellaria paradoxa*, *Parkia biglobosa*, *Tectona grandis*, *Azadirachta indica*, and *Diospyros mespiliformis*.

Fauna

Most of the large mammals which were common in the area have moved away due to human activities such as farming and cattle grazing as well as wildfires.

Notable among these are the elephant, lion, leopard, warthog, several parrots, terns, songbirds (passerines), land tortoises, pythons other snakes, lizards, bats, birds of prey, mongooses, bovids (e.g. the African buffalo and several duikers), egrets, ducks, pigeons. A number of the species known to occur in the area are of both national and global (IUCN, CITES) conservation significance.

Conclusion

The results of the survey indicate that none of the floral and faunal species recorded are of conservation concern due to the project area being an extensively modified habitat. The project will therefore have no significant impact on the existing vegetation and fauna as well as their habitat.

Few *Vitellaria paradoxa* (shea tree) were observed on the project site. These are commonly found in many other parts of the municipality.

Water Resources

The Gbafiong River, a tributary of the Volta River drains the project area which is a vital water source for many communities who use it for drinking, washing, cooking and farming.

There was no groundwater available for sampling in the project area at the time of visit. The closest borehole to the project site is about 2.5 km away.

Water Quality

The Gbafiong River was sampled and also tested in- situ for pH, Conductivity, TSS, TDS, Turbidity and Chloride levels using the Hanna multipara meter. The results of the following parameters were as follows; Temperature- 31.58, pH - 8.86, Electrical conductivity – 44.62, Total Dissolved solids – 22.40, Turbidity- 299.55, Total suspended solids – 23.0, Biological oxygen demand (BOD)- 6.88, Iron - 0.272 and Manganese - 0.028. All parameters recorded were within the acceptable guidelines. However, Total suspended solids, pH, turbidity and Iron seem elevated.

Socio-economic Characteristics

Respondents sampled for the socio-economic data comprised of individuals from both Nandom Kpee and Nandom Ko communities. As such, the analysis already described in the socio-economic section of Nandom Kpee reflects the characteristics of the Nandom Ko community.

0.7 Potential Moderate and Major Impacts

The process of determining an impact's significance involves two main steps:

- Assessing Impact Magnitude – This is based on extent, duration, scale, and frequency. Magnitude is rated as negligible, small, medium, or large for negative impacts, while positive impacts are simply noted as beneficial. Judgement and experience guide this evaluation.
- Assessing Receptor Sensitivity – This is determined by legal standards, the importance of the receptor, its capacity to absorb change, and its ability to recover.

Once both magnitude and sensitivity are established, a significance rating is assigned using a standard matrix (see Table below), then refined through professional judgement. Significance is classified as *negligible, minor, moderate* or *major*.

	Sensitivity		
Magnitude	Low [1]	Medium [2]	High [3]
Negligible [0]	Negligible [0]	Negligible [0]	Negligible [0]
Small [1]	Negligible [1]	Minor [2]	Moderate [3]
Medium [2]	Minor [2]	Moderate [4]	Major [6]
Large [3]	Moderate [3]	Major [6]	Major [9]

Key: Negligible – 0 to 1, Minor – 2, Moderate – 3 to 4, Major – 6 to 9

The table below outlines the potential environmental and social issues and their significant impacts associated with the REWARD Project.

Potential Impacts and their significant impact

AfDB No.	Impacts	Description	Magnitude	Sensitivity	Significance
Preparatory Phase					
OS 1	<i>Environmental and Social Assessment</i>	Poor assessment of environmental and social risks and impacts	Large [3]	High [3]	Major [9]
OS 5	<i>Involuntary Resettlement, Land Acquisition, Population Displacement and Compensation</i>	Land related disputes	Medium [2]	Medium [2]	Moderate [4]
		Impact on livelihoods (Economic displacement)	Medium [2]	Medium [2]	Moderate [4]
		Physical Displacement	Negligible [0]	High [3]	Negligible [0]
OS 6	<i>Biodiversity, renewable resources and ecosystem services</i>	Removal of vegetation and displacement of wildlife	Small [1]	Medium [2]	Minor [2]
Construction Phase					
OS2	<i>Labour conditions, health and safety</i>	Project site accidents/incidents and animal/insect threat/bites	Medium [2]	High [3]	Major [6]
		Poor labour working conditions	Medium [2]	High [3]	Major [6]
		Sexual Harassment (SH) and Gender Based Violence (GBV)	Medium [2]	High [3]	Major [6]
OS3	<i>Resource Efficiency and Pollution Prevention and Management</i>	Soil erosion and Contamination	Medium [2]	Medium [2]	Moderate [4]
		Air Pollution	Medium [2]	Medium [2]	Moderate [4]
		Water Pollution	Medium [2]	Medium [2]	Moderate [4]
		Noise and Vibration	Medium [2]	Medium [2]	Moderate [4]

AfDB No.	Impacts	Description	Magnitude	Sensitivity	Significance
		Waste generation and Disposal	Medium [2]	Medium [2]	Moderate [4]
OS4	Community Health Safety and Security	Traffic Management	Medium [2]	Medium [2]	Moderate [4]
		Fire outbreak	Medium [2]	Medium [2]	Moderate [4]
		Public health issues	Small [1]	High [3]	Moderate [3]
		Security concerns	Small [1]	Medium [2]	Minor [2]
		Risk of Drowning	Medium [2]	Medium [2]	Moderate [4]
Operation Stage					
OS2	Labour conditions, health and safety	Farm incidents/accidents	Medium [2]	High [3]	Major [6]
		Poor labour working conditions	Medium [2]	High [3]	Major [6]
		Sexual Harassment (SH) and Gender Based Violence (GBV)	Medium [2]	High [3]	Major [6]
		Child Labour	Medium [2]	High [3]	Major [6]
OS3	Resource Efficiency and Pollution Prevention and Management	Soil erosion and degradation	Medium [2]	Medium [2]	Moderate [4]
		Air Pollution	Medium [2]	Medium [2]	Moderate [4]
		Water Pollution	Medium [2]	Medium [2]	Moderate [4]
		Noise and Vibration	Medium [2]	Medium [2]	Moderate [4]
		Solid waste generation and disposal	Medium [2]	Medium [2]	Moderate [4]
OS4	Community Health Safety and Security	Fire Outbreak	Medium [2]	Medium [2]	Moderate [4]
		Polluted Waterbodies	Medium [2]	Medium [2]	Moderate [4]
		Sexual Transmitted Diseases	Medium [2]	Medium [2]	Moderate [4]
		Security concerns	Small [1]	Medium [2]	Minor [2]
		Flooding	Medium [2]	High [3]	Major [6]
		Traffic management	Small [1]	Medium [2]	Minor [2]

AfDB No.	Impacts	Description	Magnitude	Sensitivity	Significance
		Risk of Drowning	Medium [2]	Medium [2]	Moderate [4]
Decommissioning Phase					
OS2	<i>Labour conditions, health and safety</i>	Workplace incidents/accidents	Medium [2]	High [3]	Major [6]
OS3	<i>Pollution prevention and control, hazardous materials and resource efficiency</i>	Waste generation and disposal	Medium [2]	Medium [2]	Moderate [4]
OS4	<i>Community Health, Safety and Security</i>	Traffic management	Medium [2]	Medium [2]	Moderate [4]

0.8 Stakeholder Consultations

0.8.1 Stakeholders consulted

Stakeholder institutions and affected communities identified and consulted include the Ministry of Food and Agriculture, Ministry of Lands, PIU, EPA, Fire Service, Nandom Municipal Assembly, Commercial farmers, Input Suppliers, Traditional Authorities and Focus Groups (including women and youth) within the project communities.

All stakeholders consulted expressed enthusiasm about the project and indicated their readiness to lend their support for its successful implementation. Below are the key environmental and social issues discussed with the stakeholders.

- **Employment and Livelihoods**
 - The project will generate short- and long-term job opportunities for skilled and unskilled local labour, including women. However, unmet expectations regarding opportunities could result in social agitation or unrest.
 - Labour and employment issues such as delayed wages, discriminatory practices, or exclusion of women and youth could undermine project credibility.
 - Transparent, inclusive recruitment and training plans must be clearly communicated and coordinated with local stakeholders.
- **Food Security, Economic Growth and Market Development**
 - Project benefits such as food security, and improved access to mechanization and input services which will raise agricultural productivity and income for value chain actors must be shared with stakeholders to obtain their buy-in for a smooth project implementation.
 - The project will stimulate local commerce and attract new investments in processing, marketing, and quality control services.
 - Increased agricultural output will reduce rice imports and help Ghana conserve foreign exchange.
- **Knowledge, Capacity Building, and Technology Transfer**
 - Training of farmers and stakeholders in good agricultural practices will promote climate-smart farming, reduce losses, and improve resilience.
 - Introduction of modern technologies and digital tools (e.g. RiceAdvice, pest control methods) will enhance productivity and efficiency in farming.
- **Land Access, Tenure, and Use**
 - Farmers and landowners may be either physically or economically displaced by the project and should be engaged extensively on the impacts and mitigation measures including compensation.
 - Improper land acquisition or voluntary land donations which are not transparent and inclusive may lead to disputes and restrict access to traditional lands and resources.
 - Tenant farmers and informal land users may be overlooked in consultation or compensation processes if stakeholder mapping is not comprehensive.
- **Water Use and Resource Consumption**
 - Water-intensive rice cultivation may increase pressure on local water resources, especially during dry periods.
 - Inclusive planning and monitoring involving local communities and water user associations are essential to ensure fair and sustainable water use.

- **Environmental Degradation**
 - Site clearing and infrastructure development may result in loss of vegetation and some trees.
 - Soil degradation and erosion may occur due to land preparation, bare farmlands, and construction activities.
 - Dust, emissions, and fumes from construction and operations may degrade local air quality, especially on untarred roads.
 - Runoff, domestic waste, chemicals, and effluent may pollute surface and groundwater, affecting aquatic life and users.
 - Operation of machinery and vehicle movement will generate noise and vibration, causing nuisance to nearby communities.
- **Pesticide and Agrochemical Use**
 - The application of synthetic fertilizers and pesticides poses risks of water pollution, biodiversity loss, and adverse health impacts on farmers and surrounding communities.
 - Capacity building is needed for smallholder farmers on Integrated Pest Management (IPM), safe handling practices, and the use of environmentally safer alternatives.
- **Health, Safety, and Labour Conditions**
 - Workers face risks of injuries, accidents, insect/animal bites, agrochemical exposure, dust-inhalation and equipment-related injuries during construction and operation.
 - Poor labour conditions, including lack of contracts and inadequate welfare facilities, may expose workers to exploitation and health risks.
 - Fires from negligence or improper burning could cause property loss and injuries.
- **Social Risks and Community Impacts**
 - Presence of workers may increase incidents of gender-based violence, rape, and defilement in host communities.
 - Pollution and unsafe practices may lead to spread of communicable diseases, including HIV/AIDS and cholera.
 - Rising social tensions, theft, confrontations, and conflicts may emerge between workers and locals over cultural, financial, or sexual issues.
 - Increased road traffic may cause congestion and accidents due to broken-down or poorly parked haulage vehicles.
 - Local communities must be made aware of potential risks and emergency response protocols must be clearly established.
- **Gender-Based Violence, Sexual Exploitation and Abuse, and Child Labour**
 - Labour influx during construction and agro-industrial operations may increase the risk of GBV, SEA, and child labour.
 - Without strong safeguards, women, girls, and persons with disabilities may face heightened vulnerabilities.
 - Community engagement is crucial to raise awareness, strengthen prevention mechanisms, and ensure access to referral and support services.
- **Grievance Redress**
 - The project must implement a well-functioning and accessible Grievance Redress Mechanism (GRM) that all stakeholders can use.
 - Existing community grievance structures should be formally recognized and integrated into the broader project-level redress system.

0.8.2 Concerns raised by stakeholders consulted and proposed solutions

Some of the specific issues and concerns raised by the stakeholders, and their proposed solution/suggestions and responses include:

Group of stakeholders	Stakeholders	Issues/Concerns	Proposed Solution/Responses
Project Implementer	Ministry of Food and Agriculture (Nandom Municipal)	- The municipal MoFA is aware that land has been successfully acquired for the project. - The farmers rely on rain-fed agriculture which makes farming less reliable and profitable. - The municipal MoFA requires adequate resources (finance/logistics) to be effective in its extension, monitoring and supervisory functions. - Farmers should be supported with farm inputs and machinery for land preparation and harvesting - Provision of irrigation facilities should be factored into the project design to enhance agricultural output. - All relevant stakeholders should be consulted and fully involved in the project. - There should be ready market for the rice that will be produced. - The road network in the project area should be improved to enhance mobility of people and goods.	- The issues raised were acknowledged and the MoFA team referred to the project documents for more relevant information. E.g. SEP, PMP, ESMP - The project is expected to have a positive impact on community members by creating job opportunities in the rice value chain
Regulatory Institution	Environmental Protection Authority (Upper West Region)	- Compensation arrangements to be considered for any project affected farmers within the valley. - Compensation should be addressed through comprehensive resettlement action plan.	Assurance was given to EPA team that the project will follow all EPA guidelines and that the EPA will be involved in providing monitoring and support for the implementation of the project. Additionally,

Group of stakeholders	Stakeholders	Issues/Concerns	Proposed Solution/ Responses
		- There must be valuation of properties if any, as well as compensation for any form of displacement. - Environmental permit is required for the project. - Biodiversity conservation should be a consideration in the project implementation. - If there are RAP issues, it should be handled properly in order not to impoverish persons involved. - There will be periodic field visits by the EPA team to monitor environmental compliance during implementation.	budget will be provided for their role.
Other Government Institutions	Water Resources Commission	Education on agrochemical use for farmers to avoid pollution of local water bodies.	Concerns of the WRC official were noted and that they will be consulted to participate in the project implementation when/ if the need arises.
	Nandom Municipal Assembly	- The Assembly is willing to provide support to any project that will improve the productivity of farmers in the community. - Compensation issues are important to the Assembly and must be comprehensively addressed. - A grievance mechanism should be established to assist the PIU to resolve complaints and grievances in a timely, effective and efficient manner. - Main agricultural challenges in the area are the lack of	- All the relevant stakeholders will be engaged and the ESIA will provide mitigation measures especially for farmers who will be directly affected by the project implementation. - The Assembly will assist in any grievance mechanism measures implemented in the project.

Group of stakeholders	Stakeholders	Issues/Concerns	Proposed Solution/ Responses
		mechanization and the high cost of agricultural input. - There is concern about the inadequate road network and the roads are mostly in poor condition. - Assembly members and the beneficiary community leadership should be particularly well sensitized about the project to ensure smooth implementation.	
	National Disaster Management Organization, Nandom	- Seasonal floods occur regularly during the rainy season leading to loss of farmlands and increased food insecurity. - Drought is also experienced during the dry season leading to bushfires. - NADMO is concerned that communities farm close to waterways. - Project should ensure improved drainage within the valley to avoid flooding.	- The challenges of NADMO officials were noted as well as their importance to the project. - Budget will be allocated for the training of fire fighters and community volunteers to handle bush fires as well provide education on the effects of bush fires on the project.
	Ghana National Fire Service, Nandom	- The project should put measures in place to preserve existing water bodies as this serves as farm boundaries and also helps to curb bush fires. - The GNFS should be adequately resourced to train fire volunteers from the farming communities. - Fire incidents have minimized in recent times due to continuous education given to the communities. - One of the main causes of fire is the indiscriminate burning of bushes (i.e. deliberate, post-harvest).	- The challenges of the GNFS were noted as well as their importance to the project. - As part of the ESMP, resources will be provided to support the training of participants as well as community volunteers.

Group of stakeholders	Stakeholders	Issues/Concerns	Proposed Solution/ Responses
		- Most fires occur between the months of November and January leading to loss of community income, lives and properties, and soil fertility. - The closest Fire station is about 10km and it is minimally equipped. - The local Fire service station will assist the project when/ if required including community education	
Community based business entities	Small Holder Farmer	- Common crops cultivated include soybean, maize, rice, sorghum, yam, cassava and groundnut. - Urgent needs include tractor services, access to agrochemicals including fertilizers. - Concerns about the poor road network need to be addressed. - Inputs and credit support will be required for the beneficiaries on the project. - Drought and pest resistant seed varieties should be provided for production. - Ready market for produce is key to encourage more people to get involved. - Land preparation support is required before planting. - Existing farmers on the proposed project site must be compensated if they are to move out. - Gender sensitivity required for a successful project - Political influences should be avoided in the project implementation.	- The challenges of participants were noted and they were assured of the benefits that the project will offer them. - Existing farmers' fears were allayed as they were promised compensation if they got affected by the project. - Roads leading to project sites will be improved to enhance transportation.

Group of stakeholders	Stakeholders	Issues/Concerns	Proposed Solution/ Responses
		- Farmers should be trained on sustainable farm practices by extension officers. - The road in the project area should be improved especially during the rainy season.	
	Aggregators	- Low purchasing power of farmers. - High transportation cost due to poor road network. - Lack of access to finance. - Inadequate storage infrastructure. - There are no formal agreements between aggregators and farmers. - Aggregators carry out limited processing of the rice such as cleaning and drying prior to transporting to local markets.	Concerns were well noted and participants were assured of benefits that the project will bring to them with the main focus of enhancing the profitability of their business.
	Agro Input Dealers	- Main business activities include trading of fertilizers, seeds, chemicals, tools and equipment, sourced from local distributors. - Customers are mostly small-holder farmers. - Peak season is between March and June of the year. - They offer technical advice/training to farmers. - Some concerns include difficulty in connecting to suppliers, inadequate storage facilities, high transport cost and lack of access to finance. - The agro input dealers mostly source their goods from local distributors on cash and carry basis. They are hardly out of stock. All transactions are manual.	Participants were advised to intensify their efforts in educating the farmers including the proper disposal of empty containers of agrochemicals and fertilizers by licensed waste management company.

Group of stakeholders	Stakeholders	Issues/Concerns	Proposed Solution/ Responses
Civil Society Organizations (CSO)	Farmer Based Organization (FBO)	• The project should avoid political biases. • Vulnerable groups especially households should be given special consideration during project implementation • Traditional authorities are important for the success of the project. • Agricultural inputs should be subsidized to ensure affordability to farmers. • Extensive consultation should be conducted to comprehensively address any land reallocation issues. • The use of agro-chemicals and the management of waste from organic fertilizers should be properly managed to prevent the contamination of water bodies flowing through the valleys. • Farmers are in urgent need of easy access to affordable finance. • A close cooperation is required between farmers and suppliers, credit/financial services etc. A cooperative arrangement among farmers facilitated by CSOs/ NGOs will be useful • Initiatives by the Rural Enterprise Programme to provide financial support to farmers is a good one which includes business advisory services. • The REP is challenged by high illiteracy levels, difficulty in loan repayment by programme beneficiaries and inadequate finance.	• Participants were assured that the REWARD project was a non-partisan one and that the project will require their support in providing advocacy and training.

Group of stakeholders	Stakeholders	Issues/Concerns	Proposed Solution/ Responses
Community stakeholders	Traditional Authority, Nandom	- Land is predominantly owned by the traditional authorities and mostly used for agricultural purposes. - Some concerns include conflicts with herdsmen, compensation for displaced farmers, fairness in selection of project beneficiary farmers. - They recommend timely supply of seeds and agro-chemicals, and improvement in the road network. - Incidences of gender-based violence, sexual exploitation or abuse cases are uncommon in the project area. - There are usual petty quarrels between members of the opposite sex but these are settled amicably by family heads/parents or traditional authority depending on which is readily available and accessible.	- The project was explained to participants to make them understand the benefits to the project communities. - Participants' assistance was sought to ensure cooperation from affected farmers. The leaders were thanked for donating their lands for the project. The LEAP will be implemented to support vulnerable persons who may be affected by the project e.g. bicycles will be given to farmers to ease transportation to their farms. - The Grievance redress mechanism will be put in place to ensure farmers benefit and not suffer from the project implementation.
	Womens' Group	- Women are mostly vulnerable and will require special assistance from the project. - Concerns include difficulty in accessing ready market for farm produce, lack of processing facilities. - Local groups include VSLA which provide some financial support to the women. - Vulnerable households mostly receive support from Livelihood Empowerment Against Poverty (LEAP).	- The womens' value to the community was acknowledged and as such, the project has been designed to benefit women and encourage full participation. - There will be no room for sexual harassment and in the unlikely event of that happening, the case should be reported to the relevant authorities.
	Men's Group	Main source of livelihood is farming and rearing of livestock.	Participants concerns were acknowledged and they were assured of job

Group of stakeholders	Stakeholders	Issues/Concerns	Proposed Solution/ Responses
		- Deforestation has contributed to unreliable rainfall patterns and has affected the planting season (June – December). - Their top concerns are the poor road network, lack of access to potable drinking water and financial support. - They have confidence in the extension support service and that must be made more effective. - Processing facilities are needed to support their farming activities.	opportunities that will arise from the project. - In addition, local persons will be considered first for any job opportunities. - Participants were advised to follow the grievance redress process to address any concerns.
	Youth group	- The youth are willing and available to participate in the project as this will help to reduce unemployment and alleviate poverty. - Ready markets for the rice produce will be required to ensure reliable flow of income. - Irrigation is necessary to make the project more effective and sustainable. - Extension officers should play a major role in the implementation of the project.	- Concerns of participants were acknowledged and they were assured of job opportunities that will arise from the project. - In addition, local persons will be considered first for any job role associated with the project. - Participants were referred to follow the grievance redress process to address any concerns from them.

0.9 Environmental and Social Management Plan

AfDB No.	AfDB OS Description	Potential Impact/ Issue	Impact description	Receptor(s)	Significance	Proposed Mitigation and Management Measures	Responsibility (implementation / supervision)	Estimated Cost (GHS/USD)	Monitoring responsibility	Verifiable Monitoring Indicator	Means of Verification	Timetable for Implementation
Preparatory Phase												
OS1	<i>Environmental and Social Assessment</i>	Poor assessment of environmental and social risks and impacts	Unidentified risks and impacts could prevent or stall project implementation. Selection of unqualified persons for assessment studies	Project proponent (MoFA), environment, community	Major [9]	- Detailed and high quality assessment of environmental and social risks - Selection of qualified ESIA consultant - Environmental permit acquisition	PIU	358,000/33,966 35,000/3,321	Lender	Project E&S Instruments (ESIA, RAP, SEP, PMP) EPA Permit	E&S Report Permit	Apr – Sep 2025 31 st Oct 2025
OS5	<i>Involuntary resettlement, land acquisition, population displacement and compensation</i>	Land related disputes	Proposed site is owned by the chief of Nandom Ko and Kpee	Farmers; Community	Moderate [4]	- Acquire signed Voluntary Land Donation (VLD) forms - Provide training on completion of VLD forms	- PIU - ESIA Consultant	2,000/190 2,500/237	Lender	Signed VLD	Signed VLD	Sep 2025
		Impact on livelihoods	The project activities could restrict thirty nine (39) farmers access to lands that were otherwise used for farming.	Project affected Farmers	Moderate [4]	- Develop a Resettlement Action Plan (RAP)/ Livelihood Restoration Plan - Implement the Resettlement Action Plan (RAP)	- RAP Consultant - PIU	80,000/7,590 116,210/11,026	PIU/Lender Lender	RAP Report RAP Implementation report	RAP Report RAP Implementation audit	Sep 2025 Qtr 1, 2026
						Build PIU's capacity for RAP implementation	RAP Consultant	20,000/190	PIU/Lender	Training for RAP implementation team	Training reports	Qtr 1, 2026
OS6	<i>Biodiversity, renewable resources and ecosystem services</i>	Destruction of vegetation and displacement of wildlife	The project site is an already disturbed area due to previous human activities such as farming. The floristic analysis conducted indicates that none of the species identified at the site are of conservation concern according to the Forest Reserves of Ghana Information Exhibitor (FROGGIE) data base. Site clearing will not lead to any major destruction of biodiversity of significant	Flora and Fauna	Minor [2]	- Restrict vegetation clearance to the required area only and prohibit hunting of animals which may stray to the project area by providing temporary fences. This must be included in the contractor's bill of quantities and code of Conduct. - Train contractor's E&S Officer on ESMP requirements	- Contractor - PIU	20,000/1,900 10,000/949	PIU Lender	Installation of Fence Training for E&S officer	Physical inspection Training reports	Before construction Before construction

AfDB No.	AfDB OS Description	Potential Impact/ Issue	Impact description	Receptor(s)	Significance	Proposed Mitigation and Management Measures	Responsibility (implementation / supervision)	Estimated Cost (GHS/USD)	Monitoring responsibility	Verifiable Monitoring Indicator	Means of Verification	Timetable for Implementation
			importance, only a few trees and destruction of the habitats of some animals.									
Construction Phase												
OS 2	<i>Labour conditions, health and safety</i>	Project Site incidents/accidents	Project site accidents/incidents and animal/insect threat/bites	All Project workforce, Vulnerable categories of workers, Women	Major [6]	Develop and implement an Occupational, Health and Safety Management Plan that covers at a minimum good housekeeping, provision and use of PPE, incident/accident reporting and investigation, emergency response and training	Project Contractor	50,000/4,744	PIU	CESMP Records and purchase of PPEs, training on PPE use, housekeeping, emergency response etc.	Review of CESMP OHS audits	Before construction During construction
		Poor labour working conditions	Lack of employment contracts could lead to workers being paid rates below the stipulated national minimum wage or work under poor conditions. Workers could face issues of discrimination, forced labour, child labour, freedom of association and collective bargaining, lack of or ineffective worker grievance redress mechanisms	All Project workforce, Vulnerable categories of workers, Women	Major [6]	- Adhere to national labour laws as provided in the Labour Act of 2003 (Act 651) and international best practice such as provisions of AfDB ISS (2023) OS 2 on Labour and Working Conditions - Specific considerations should include the following: - Provide all workers with signed contracts - Provide welfare facilities as required. - Encourage frequent breaks and job-rotation to reduce impact of the hot weather on workers. - Require workers to sign Code of Conduct - Develop policies against discrimination, forced and child labour, sexual harassment and all forms of abuse including restriction of right to unionize or freedom of speech.	Project Contractor	120,000/11,385	PIU	Signed contract, welfare facilities, Grievance redress mechanism/ records	E&S audits	During construction

AfDB No.	AfDB OS Description	Potential Impact/ Issue	Impact description	Receptor(s)	Significance	Proposed Mitigation and Management Measures	Responsibility (implementation / supervision)	Estimated Cost (GHS/USD)	Monitoring responsibility	Verifiable Monitoring Indicator	Means of Verification	Timetable for Implementation
						- Provide adequate training for workers on safety, GBV, SEA/SH, child labour/human rights, social norms. - Establish an effective worker grievance redress mechanism						
		Sexual Harassment (SH) and Gender Based Violence (GBV)	Presence of workers and increase in incidents of rape, defilement, child molestation and GBV.	Women, Children	Major [6]	• Include the requirements of policies on GBV, SEA/SH, Child Labour and Human Rights in the contractor's Code of Conduct • Provide training for workers on required lawful conduct and legal consequences for failure to comply with laws on non-discrimination and GBV • Insert clause requiring contractors and consultants to cooperate with law enforcement agencies investigating cases of gender-based violence • A minimum requirement of female employment should be indicated in contract documents • Contact numbers of representative on the Grievance Redress Committee and GBV Service Providers should be pasted around the project site and within the immediate project zone • Discuss issues of Gender Based Violence at daily Toolbox meetings • Display on site posters prohibiting sexual exploitation and harassment.	Project Contractor	80,000/7,590	PIU	Clauses on GBV, SEA/SH, Child Labour and Human Rights in the contractor's Code of Conduct	Review of contractor's code of conduct	During construction
OS3	Resource Efficiency and Pollution Prevention and Management	Soil erosion and Contamination	Excavation for foundation of structures could lead to soil erosion and creation of gullies through runoff especially in the rainy season Soil contamination could also occur from	Soil	Moderate [4]	• Develop an Erosion Management Plan • Implement the Erosion Management Plan	Contractor Contractor	50,000/4,744 100,000/9,488	PIU/Lender	Erosion Management Plan Sediment traps	Inspection/review Inspection	Before construction During construction

AfDB No.	AfDB OS Description	Potential Impact/ Issue	Impact description	Receptor(s)	Significance	Proposed Mitigation and Management Measures	Responsibility (implementation / supervision)	Estimated Cost (GHS/USD)	Monitoring responsibility	Verifiable Monitoring Indicator	Means of Verification	Timetable for Implementation
			inappropriate disposal of waste oil, spilled oil during machinery operation and maintenance as well as fuel storage sites and leaks from vehicle refuelling			Train contractor's E&S Officer on ESMP requirements	PIU	20,000/1,898		Training on erosion management	Training records	During construction
		Air Pollution	Emission of fumes and dust from transport of materials especially on untarred routes to project site. Baseline air quality data (PM _{2.5} – 30µg/m ³ , PM ₁₀ – 109µg/m ³ , NO ₂ , SO ₂ and CO were all below the minimum detection limit of 0.06 mg/m ³ at the time of sampling. This shows that the project area's airshed is not degraded as all parameters are within the emissions thresholds except for PM ₁₀ whose higher value could be attributed to high coarse particulate pollution, likely arising from mechanical disturbances during farming, vehicular movement, and possibly wind-driven dust due to the site's open, dry landscape.	Health of workers and members of the surrounding communities	Moderate [4]	- Trucks and heavy machinery with a valid emission test pass certificate should only be allowed on the project site. - Dust pollution must be reduced by ensuring that drivers do not speed especially on untarred roads. - Suppress dust by watering dusty construction areas. - Ensure the use of nose mask in dusty environment.	Project Contractor	60,000/5,693	PIU/ Supervising Engineer	Valid emission test certificate Speed limit signage Wet road surfaces Complaints/grievances	Inspection	During construction
		Water Pollution	Sediment and waste oil transport into the Gbafiong river and nearby water bodies. Domestic waste from the construction workers and food vendors providing services to the construction crew.	The Gbafiong river and pools of water in the valley.	Moderate [4]	- Undertake construction in the dry season - Carry out maintenance activities away from water bodies. - Install sediment traps. - Educate workers on the importance of waste management.	Project Contractor	60,000/5,693 10,000/949	PIU/ Supervising Engineer	Sediment traps Toolbox exercises	Inspection Toolbox records	During construction

AfDB No.	AfDB OS Description	Potential Impact/ Issue	Impact description	Receptor(s)	Significance	Proposed Mitigation and Management Measures	Responsibility (implementation / supervision)	Estimated Cost (GHS/USD)	Monitoring responsibility	Verifiable Monitoring Indicator	Means of Verification	Timetable for Implementation
		Noise and Vibration	Operation of construction equipment, movement of haulage vehicles and tooting of horns.	Health of project workforce and members of the surrounding communities	Moderate [4]	- Ensure construction activities are carried out during the day. - Provide and enforce wearing of hearing protection by workers - Sensitize workers on effects of noise pollution - Ensure the use of well serviced/maintained vehicles and other equipment with acceptable noise emission levels.	Project Contractor	20,000/1,898	PIU/ Supervising Engineer	Noise emission levels	Noise monitoring report	During construction
		Waste generation and Disposal	Clearance of vegetation at project site, construction debris, pieces of steel/metal, packaging materials, plastic pieces, human waste etc. if not disposed properly could clog drains and facilitate the outbreak of sanitary related diseases such as cholera.	Health of project workforce and members of the Local communities within the project area	Moderate [4]	- Ensure that contractor develops and implements a detailed Construction Waste Management Plan. - Ensure efficiency in the use of materials. - Reuse materials such as pieces of wood, and metals. - Recycle scrap metal - Ensure collection and proper disposal of construction debris - Provide adequate waste bins for waste collection and segregation - Sensitize workers on waste management - Develop SOPs for managing hazardous and non-hazardous waste.	Project Contractor	100,000/9,488	PIU/ Supervising Engineer	Inventory of waste generated/ disposed	Inspection/ review of records/inventor y	During construction
OS4	Community Health, Safety and Security	Traffic Management	Transport of materials and equipment to and from the project site through communities and townships raises traffic/public safety concerns. Broken-down, inappropriately parked or slow-moving haulage/construction trucks could lead to road accidents and traffic congestion especially on busy roads.	Local communities near the project area of influence	Moderate [4]	- Avoid transportation of materials and workers during peak hours - Train drivers on and ensure adherence to the Highway Code - Ensure regular maintenance of vehicles - Use flagmen and designated parking areas for safety onsite	Project Contractor	50,000/4,744	PIU/ Supervising Engineer	Records of traffic incident and accidents	Review/ inspection of records	During construction

AfDB No.	AfDB OS Description	Potential Impact/ Issue	Impact description	Receptor(s)	Significance	Proposed Mitigation and Management Measures	Responsibility (implementation / supervision)	Estimated Cost (GHS/USD)	Monitoring responsibility	Verifiable Monitoring Indicator	Means of Verification	Timetable for Implementation
		Fire Outbreak	Fire outbreaks from negligence of workers or the community burning refuse, game hunting and workers not properly extinguishing stubs of cigarette. These fires could spread causing injuries to persons and destruction of property.	Vegetation, Project workforce and Local communities near the project area of influence	Moderate [4]	- Create fire belts to prevent spread of fire into the active working areas. - Sensitize workers and community on the dangers of bushfires - Store flammable materials away from fire sources - Designate cooking and smoking areas onsite. - Provide fire-fighting equipment onsite. - Train workers on fire fighting and where applicable include community fire volunteers	Project Contractor	50,000/4,744	PIU/ Supervising Engineer	Records of fire incidence Training of fire safety and risk	Review/ inspection of records	During construction
		Visual / Aesthetic Impacts	Presence of construction machinery, material stockpiles, temporary work camps; Vegetation clearance, earthworks (bare ground); Dust plumes.	Local communities (Kpee and Ko), commuters.	Moderate [4]	- Maintain tidy construction sites (good housekeeping). - Minimize area of land clearance beyond essential footprint. - Locate temporary facilities at unobtrusive areas to reduce visibility. - Promptly rehabilitate disturbed areas post-construction. (grading, seeding). - Ensure permanent structures (patios, sheds) use materials/colours that blend reasonably with the surroundings.	Contractor PIU	20,000/1,898	PIU Lender	Site tidiness. Area cleared. Community feedback (via GRM).	Site Inspections, Photographic records	During construction
		Public Health Issues	Pollution of local water bodies will adversely affect the health of users. Sexual relations between workers and locals may bring about increase in sexually transmitted diseases including HIV/AIDs.	Local communities near the project area of influence	Moderate [3]	- Potable water tanks or containers could be used on the project site to keep water for drinking. - Sexual harassment or violence on the project site will not be tolerated and project contractor should be made aware of such incidences to ensure that any complaints are addressed in accordance with the law. - Undertake sexual health education programs for workers and also ensure they desist from irresponsible sexual behaviour during project implementation.	Project Contractor	60,000/5,693	PIU/ Supervising Engineer	Potable water tanks on site Records of sensitization of workers on GBV/SH Availability of condoms in washrooms	Physical inspection Review of records Inspection	During construction

AfDB No.	AfDB OS Description	Potential Impact/ Issue	Impact description	Receptor(s)	Significance	Proposed Mitigation and Management Measures	Responsibility (implementation / supervision)	Estimated Cost (GHS/USD)	Monitoring responsibility	Verifiable Monitoring Indicator	Means of Verification	Timetable for Implementation	
						- Encourage handwashing after work and if possible provide hand sanitizers to workers. - Encourage workers to get vaccinated. - Provide information, instructions and trainings on STDs, drug abuse etc. to the workers to create awareness. - Provide female and male condoms to the community and workers.				Availability of hand washing sinks/basins and sanitizers on site	Inspection		
		Security Concerns	Violent behaviour and confrontations between workers and locals. Workers who are deemed to be financially sound could be victims of theft and burglary Potential conflict over illicit sexual affairs, child labour, drunk driving, accidents and destruction of property.	Local communities near the project area of influence	Minor [2]	- Sensitize local community on cultural tolerance and grievance mechanisms to prevent confrontations. - Migrant workers should be made aware of the community’s cultural and traditional values/beliefs so they may not go against them. - The contractor should prioritize employing locals especially the youth who may be unemployed which can ultimately lead to unrest or other social vices.	Project Contractor	30,000/2,846	PIU	Community meetings Toolbox exercises Number of locally employed workers	Inspection of community meeting minutes Review of toolbox records Inspection of records of locally employed workers	During construction	
		Risk of Drowning	Any borrow or dug-out pits created as a result of excavation of construction materials can accumulate water when it rains. This can pose the risk of drowning for workers especially contract staff who are not familiar with the local terrain. Children who may play around the sites and unsuspecting community members may also be at risk of drowning especially when it rains and the place get flooded.	Project workforce and Local communities near the project area of influence	Moderate [4]	- Fence dug outs or borrow pits to prevent drowning. - Provide warning signage at borrow pit sites. - Sensitize community members on risk of drowning	Project Contractor	100,000/9,488	PIU	Presence of fence and signage Records of drowning incidents/accidents Records of community sensitization programmes	Inspection Review/audits of records	During construction	
Operation Stage													

AfDB No.	AfDB OS Description	Potential Impact/ Issue	Impact description	Receptor(s)	Significance	Proposed Mitigation and Management Measures	Responsibility (implementation / supervision)	Estimated Cost (GHS/USD)	Monitoring responsibility	Verifiable Monitoring Indicator	Means of Verification	Timetable for Implementation
OS2	<i>Labour conditions, health and safety</i>	Farm incidents/accidents	Farm accidents/incidents and animal/insect threat/bites	All Farm workers, Vulnerable categories of workers, Women	Moderate [4]	- Develop and implement an Occupational, Health and Safety Management Plan that covers at a minimum good housekeeping, provision and use of PPE, incident/accident reporting and investigation, emergency response and training - Training and sensitization of farmers on the use of PPE, farm implements and agro-chemicals	Municipal MoFA/ Assembly	300,000/28,463	Regional MoFA	Records of training on PPE use, housekeeping, emergency response etc.	Review of ESMP OHS audits	During operation
		Poor labour working conditions	Lack of employment contracts could lead to farm workers being paid rates below the stipulated national minimum wage or work under poor conditions. Farm workers could be exposed to discrimination, forced and child labour, restriction of freedom of association and collective bargaining, non-existent or ineffective farm worker grievance redress mechanism.	All Project workforce, Vulnerable categories of workers, Women	Moderate [4]	- Adhere to national labour laws as provided in the Labour Act of 2003 (Act 651) and international best practice such as provisions of AfDB ISS (2023) OS 2 on Labour and Working Conditions - Specific considerations should include the following: - Provide all workers with signed contracts - Provide welfare facilities as required. - Encourage frequent breaks and job-rotation to reduce impact of the hot weather on workers. - Require workers to sign Code of Conduct - Develop policies against discrimination, forced and child labour, sexual harassment and all forms of abuse including restriction of right to unionize or freedom of speech. - Provide adequate training for farm workers on safety, GBV, SEA/SH, child labour/human rights, social norms. - Establish an effective grievance redress mechanism for farm workers	Municipal MoFA / Department of Community Development	200,000/18,975	Regional MoFA	Number of labour related complaints and grievances	Review of the records	During operation

AfDB No.	AfDB OS Description	Potential Impact/ Issue	Impact description	Receptor(s)	Significance	Proposed Mitigation and Management Measures	Responsibility (implementation / supervision)	Estimated Cost (GHS/USD)	Monitoring responsibility	Verifiable Monitoring Indicator	Means of Verification	Timetable for Implementation
		Sexual Harassment (SH) and Gender Based Violence (GBV)	Presence of migrant farm workers could increase incidents of rape, defilement and GBV.	Women	Moderate [4]	- Provide sensitization and training for farm workers on required lawful conduct, access to GBV service providers and legal consequences for failure to comply with laws on non-discrimination and GBV - Farm owners to be encouraged to employ females as farm workers.	Municipal MoFA/ Department of Community Development	100,000/9,488	Regional MoFA	Number of recorded incidents of GBV/SH cases	Review of records	During operation
		Child Labour	Employment and deployment of Children under the working age at the expense of their education and exposure to hazards that endanger their health and well-being.	Children	Moderate [4]	- Prohibit the employment of children under age 15 on farms. - Ensure children who spend time with their parents on the farm do not do so at the expense of their education and well-being.	Municipal MoFA/ Department of Community Development	50,000/4,744	Regional MoFA	Number of recorded incidents of child labour cases	Review of records	During operation
OS3	Resource Efficiency and Pollution Prevention and Management	Soil erosion and degradation	Abuse of fertilizer use could lead to soil degradation. Leaving farmlands bare especially after harvesting could expose the soil to erosion.	Soil	Moderate [4]	Provide education to farmers on the MoFA extension guide on soil, water and nutrient management.	Municipal MoFA	100,000/9,488	Regional MoFA	Training of farmers on soil, water and nutrient management	Inspection/ review	During operation
		Air Pollution	Use of farm machinery, clearing of dry lands and emission of fumes/dust from tricycles or motorcycles conveying farmers and farm produce especially on untarred routes from farms are some of the activities that have the potential of affecting the air quality within the project area. Stubble burning to prepare the field for the next planting season can also affect the air quality within the project area. Baseline air quality data i.e. PM _{2.5} –	Health of farm workers and surrounding community members.	Moderate [4]	- Practicing No-till or Low-till methods where crop residues are retained on the field or incorporated into the soil can help decompose the stubble naturally, reducing the need for stubble burning. - Mobile, small-scale threshers can be used in place of manual threshing so as to reduce the amount of dust or rice chuff emitted into the atmosphere. - Minimizing dust generation activities as much as possible especially during windy periods. - Vehicle speed, particularly on untarred roads transporting farm produce and agric inputs to and	Municipal MoFA	100,000/9,488	Regional MoFA	Training of farmers on good farming practices	Inspection of training records	During Operation

AfDB No.	AfDB OS Description	Potential Impact/ Issue	Impact description	Receptor(s)	Significance	Proposed Mitigation and Management Measures	Responsibility (implementation / supervision)	Estimated Cost (GHS/USD)	Monitoring responsibility	Verifiable Monitoring Indicator	Means of Verification	Timetable for Implementation
			30µg/m ³ , PM ₁₀ – 109µg/m ³ , NO ₂ , SO ₂ and CO were all below the minimum detection limit of 0.06 mg/m ³ at the time of sampling. This shows that the project area's airshed is not degraded as all parameters are within the emissions thresholds except for PM ₁₀ whose higher value could be attributed to high coarse particulate pollution, likely arising from mechanical disturbances during farming, vehicular movement, and possibly wind-driven dust due to the site's open, dry landscape. Emissions from farming activities such as tilling, threshing and transportation of farm produce are therefore not expected to result in significant air quality deterioration.			from the farm will be strictly controlled to minimize dust generation.						
		Water Pollution	Sediment laden with excess fertilizers and other agrochemicals and waste oil transport into the Gbafiong river and nearby water bodies. Pollution of watercourses caused by wastes generated by farm workers as well as runoff from land used for growing rice (containing fertilisers, pesticides and herbicides etc.).	The Gbafiong river and water which has gathered as ponds in the valley.	Moderate [4]	- Provide education to farmers on the MoFA extension guide on soil, water and nutrient management. - There will be proper timing in the application of fertilizers/herbicides and other agrochemicals considering the crop's nutrient needs and soil conditions in order to maximize fertilizer uptake and minimize leaching and runoff. - Implement Pest Management Plan (PMP)	Municipal MoFA	300,000/28,463	Regional MoFA	Training of farmers on good farming practices	Inspection	During operation

AfDB No.	AfDB OS Description	Potential Impact/ Issue	Impact description	Receptor(s)	Significance	Proposed Mitigation and Management Measures	Responsibility (implementation / supervision)	Estimated Cost (GHS/USD)	Monitoring responsibility	Verifiable Monitoring Indicator	Means of Verification	Timetable for Implementation
						- Provision of on-site sanitation facilities and encourage the farm workers to use it. - Educate farm workers to avoid open defecation. - Sediments traps will be designed and constructed within the farm lands to contain contaminated sediments which will later be harvested for producing blocks for building.						
		Noise and Vibration	Noise from activities like tilling the land for the next planting season, threshing the rice after cultivating and screaming sounds from farmers or labourers to scare away birds can all generate noise. Tricycles and motorbikes conveying farmers and farm produce to the milling factories or markets could generate some noise including the sounds from tooting horns.	Health and wellbeing of farm workers and members of communities close to the project area	Moderate [4]	- Scare crows should be encouraged instead of the screaming sounds from farmers or labourers to scare away birds. - Use threshing machines with soundproofing devices	Municipal MoFA	50,000/4,744	Regional MoFA	Sensitization of farmers	MoFA participation in community engagements	Throughout the operational phase
		Solid waste generation and disposal	Improper disposal of waste, i.e. empty containers of agrochemicals and fertilizers which can serve as breeding grounds for mosquitoes. Threshing will produce rice husk that may pile up to form heaps of waste.	Health of farm workers and the Local community.	Moderate [4]	- Provide education to farmers on the MoFA extension guide on compost production using rice husk, straw, and other organic waste. - Provide adequate waste skips to collect empty containers of agrochemicals and fertilizers for disposal by a licenced waste management company. - Good housekeeping should be encouraged on farms. - Implement Pest Management Plan (PMP)	Municipal MoFA	75,000/7,116	Regional MoFA	Sensitization of farmers	MoFA participation in community engagements	Throughout the operational phase

AfDB No.	AfDB OS Description	Potential Impact/ Issue	Impact description	Receptor(s)	Significance	Proposed Mitigation and Management Measures	Responsibility (implementation / supervision)	Estimated Cost (GHS/USD)	Monitoring responsibility	Verifiable Monitoring Indicator	Means of Verification	Timetable for Implementation
OS4	Community Health Safety and Security	Fire Outbreak	Fire outbreaks from negligence of farm workers and community members, burning refuse, game hunting, cooking and not properly extinguishing stubs of cigarette. These fires could spread to adjoining farms causing injuries to persons and destruction of property.	Rice farms, nearby vegetation, farm workers and local community.	Moderate [4]	- Create fire belts to prevent spread of fire into the active working areas. - Sensitize farm workers and community on the dangers of bushfires - Store flammable materials away from fire sources - Designate cooking and smoking areas on farms. - Provide fire-fighting equipment onsite - Train farm workers on fire fighting and where applicable include community fire volunteers	Municipal MoFA/GNFS/NA DMO	100,000/9,488	Regional MoFA	Sensitization of farmers	Participation in community engagements by MoFA/GNFS and NADMO.	Throughout the operational phase
		Traffic Management	Transportation of farmers and farm produce through communities raises traffic/public safety concerns.	Local communities	Minor [2]	- Drivers should exercise caution when driving through crowded areas such as markets. - Installation of speed rumps to check speeding vehicles. - Identify safe parking areas off main roads to allow for unloading and long-term parking of vehicles.	MoFA/Assembly	50,000/4,744	Regional MoFA	Records of traffic incident and accidents Community complaints/grievances	MoFA and Assembly participation in community engagements	Throughout the operational phase
		Security Concern	Violent behaviour and confrontations between migrant farm workers and locals. Farm workers who are deemed to be financially sound could be victims of theft and burglary Potential conflict over sexual affairs, child labour, drunk driving, accidents and destruction of property.	Farm workers and Local communities	Minor [2]	- Sensitize local community on cultural tolerance and grievance mechanisms at community durbars to prevent confrontations - Migrant farm workers should be made aware of the community's cultural and traditional values/beliefs so they may not go against them. - Farm owners should prioritize employing locals into their farms especially the youth who may be unemployed which can ultimately lead to unrest or other social vices.	MoFA/Assembly	30,000/2,846	Regional MoFA	Records of traffic incident and accidents Community complaints/grievances	MoFA and Assembly participation in community engagements	Throughout the operational phase
		Polluted Waterbodies	Pollution of local water bodies i.e. the Gbafiong river and other water bodies, from contaminated sediments and run-off will	Farm workers and Local communities	Moderate [4]	Provide education to farmers on the MoFA extension guide on soil, water and nutrient management. Educate farm workers to avoid open defecation.	Municipal MoFA	50,000/4,744	Regional MoFA	Sensitization of farmers	Records of MoFA participation in community engagements	Throughout the operational phase

AfDB No.	AfDB OS Description	Potential Impact/ Issue	Impact description	Receptor(s)	Significance	Proposed Mitigation and Management Measures	Responsibility (implementation / supervision)	Estimated Cost (GHS/USD)	Monitoring responsibility	Verifiable Monitoring Indicator	Means of Verification	Timetable for Implementation
			adversely affect the health of community members.									
		Sexual Transmitted Diseases	Sexual relations between migrant farm workers and locals may bring about increase in sexually transmitted diseases including HIV/AIDs.	Farm workers and Local communities	Moderate [4]	Undertake sexual health education programs for farm workers to desist from irresponsible sexual behaviour.	Municipal MoFA/ Municipal Health Directorate	50,000/4,744	Regional MoFA	Sensitization of farmers	Records of participation in community engagement by MoFA and the District Health Directorate.	Throughout the operational phase
		Flooding	The project implementation could be adversely affected by events of flood from torrential rainfall in the wet season especially in low-lying areas affecting properties and lives.	Farmers, Local community, Flora and Fauna	Major [6]	- Educate farmers and community on early warning signs of flood. - Discourage the siting of farms within or close to river beds. - Collaborate with spatial planning and disaster management agencies, using disaster maps and systems, to stay away from flood-prone areas. - Infrastructure for agricultural establishments should be constructed preferably on high grounds. - Sensitive farmers on the benefits of insurance cover for equipment and personnel.	MoFA/Assembly /NADMO	150,000/14,231	Regional MoFA	Sensitization of farmers	Records of participation in community engagement by MoFA, the Assembly and NADMO.	Throughout the operational phase
		Risk of Drowning	Any borrow or dug-out pits created as a result of excavation of construction materials can accumulate water when it rains. This can pose the risk of drowning for communities in the project area especially children.	Farmers and Local community members	Moderate [4]	- Maintenance of dug outs or borrow pits fence to prevent drowning. - Provide and replace warning signage at borrow pit sites when necessary. - Sensitize community members on risk of drowning	Municipal MoFA	50,000/4,744	Regional MoFA	Sensitization of community members/ farmers	Records of participation in community engagement by MoFA.	Throughout the operational phase
Decommissioning Phase												
OS2	Occupational health and safety (OHS) impacts and risks	Project Site incidents/accidents	Project site accidents/incidents and animal/insect threat/bites	All Project workforce, Vulnerable categories of workers, Women	Major [6]	Develop and implement an Occupational, Health and Safety Management Plan that covers at a minimum good housekeeping, provision and use of PPE,	Project Contractor	50,000/4,744	PIU	ESMP Records and purchase of PPEs, training on	Review of ESMP OHS audits	Immediately after construction

AfDB No.	AfDB OS Description	Potential Impact/ Issue	Impact description	Receptor(s)	Significance	Proposed Mitigation and Management Measures	Responsibility (implementation / supervision)	Estimated Cost (GHS/USD)	Monitoring responsibility	Verifiable Monitoring Indicator	Means of Verification	Timetable for Implementation
						incident/accident reporting and investigation, emergency response and training				PPE use, housekeeping, emergency response etc.		
OS3	Resource Efficiency and Pollution Prevention and Management	Waste generation and Disposal	Clearance of vegetation at project site, construction debris, pieces of steel/metal, packaging materials, plastic pieces, human waste etc. if not disposed properly could clog drains and facilitate the outbreak of sanitary related diseases such as cholera.	Health of project workforce and members of the Local communities within the project area	Moderate [4]	- Ensure efficiency in the use of materials. - Reuse materials such as pieces of wood, and metals. - Recycle scrap metal - Ensure collection and proper disposal of construction debris - Provide adequate waste bins for waste collection and segregation - Sensitize workers on waste management - Develop SOPs for managing hazardous and non-hazardous waste. - Develop and ensure implementation of Pest Management Plan (PMP)	Project Contractor	120,000/11,385	PIU	Inventory of waste generated/disposed	Inspection/ review of records/ inventory	Immediately after construction
OS4	Community Health and Safety	Traffic Management	Transport of materials and equipment to and from the project site through communities and townships raises traffic/public safety concerns. Broken-down, inappropriately parked or slow-moving haulage/construction trucks could lead to road accidents and traffic congestion especially on busy roads.	Local communities near the project area of influence	Moderate [4]	- Avoid transportation of materials and workers during peak hours - Train drivers on and ensure adherence to the Highway Code - Ensure regular maintenance of vehicles - Use flagmen and designated parking areas for safety onsite.	Project Contractor	50,000/4,744	PIU	Records of traffic incident and accidents Community complaints/grievances	Review/ inspection of records	Immediately after construction

0.10 Environmental Monitoring

No.	Potential Environmental and Social Impacts	Monitoring Indicators/Mean of verification	Monitoring Site	Frequency	Responsibility (Implementation/ Monitoring)	Cost Estimate/ Year GHS (USD)
CONSTRUCTION PHASE						
1	Project site accidents/incidents	- Records of accidents, incidents and near misses. - Records of PPE disbursed - Housekeeping	Nandom Kpee and Nandom Ko valleys	Monthly	PIU Environmental and Social Safeguards Specialists	52,700 (5,000)
2	Poor labour working conditions	- Availability of copies of signed contracts - Human Resource Management Plan/Recruitment Policy - Complaints lodged by workers	Nandom Kpee and Nandom Ko valley construction sites	Quarterly	PIU Environmental and Social Safeguards Specialists	31,620 (3,000)
3	Soil impacts and sediment transport	- Observable change in turbidity of water in drains or water bodies - Observable oil sheen in drain - Observation of rills/gullies	Nandom Kpee and Nandom Ko valley construction sites and Immediate environs	Monthly	PIU Environmental Safeguards Specialist	42,160 (4,000)
4	Air and Noise Pollution	Number of complaints by community members/workers	Nandom Kpee and Nandom Ko valley construction sites and Immediate environs	Monthly	PIU Environmental Safeguards Specialist	52,700 (5,000)
5	Waste generation and inefficient management	- Number of mobile toilets and dustbins provided on site - Cleanliness of site/housekeeping - Odour - Presence of human waste on site	Nandom Kpee and Nandom Ko valley construction sites and Immediate environs	Weekly	PIU Environmental Safeguards Specialist	26,245 (2,490)

No.	Potential Environmental and Social Impacts	Monitoring Indicators/Mean of verification	Monitoring Site	Frequency	Responsibility (Implementation/ Monitoring)	Cost Estimate/ Year GHS (USD)
		Complaints by workers/community members				
6	Traffic accident risks/Public safety concerns	- Grievance records - Traffic related incidents/accidents - Records of accidents, incidents and near misses.	Nandom Kpee and Nandom Ko valley Farms and Immediate environs	Monthly	PIU Environmental and Social Safeguards Specialists	52,700 (5,000)
7	Fire outbreaks	- Fire related incidents/accidents - Records of fire incidents and near misses. - Number of functional fire extinguishers onsite	Nandom Kpee and Nandom Ko valley and Immediate environs	Monthly	PIU Environmental and Social Safeguards Specialists	52,700 (5,000)
8	Visual / Aesthetic Impacts	- Site tidiness. - Area cleared. - Community feedback (via GRM).	Nandom Kpee and Nandom Ko valley and Immediate environs	Monthly	PIU Environmental and Social Safeguards Specialists	5,375 (510)
9	Public health issues	- Number of sensitization campaigns - Number of condoms distributed to Contractor's staff in a month - Number of STD cases reported to local health facilities involving encounters with Contractor's staff	Nandom Kpee and Nandom Ko valleys construction sites and Immediate environs	Monthly	PIU Environmental and Social Safeguards Specialists	47,430 (4,500)
10	Security and SH/GBV concerns	Number of conflicts/cases reported to the Grievance Redress Committee/Community Liaison Officer	Nandom Kpee and Nandom Ko valleys construction sites and Immediate environs	Monthly	PIU Environmental and Social Safeguards Specialists	36,890 (3,500)

No.	Potential Environmental and Social Impacts	Monitoring Indicators/Mean of verification	Monitoring Site	Frequency	Responsibility (Implementation/ Monitoring)	Cost Estimate/ Year GHS (USD)
		• Number of conflicts/cases dealt with by the Grievance Redress Committee • Number of crimes such as theft, defilement and rape reported, investigated, and concluded by the police involving the Contractor's workers				
Sub Total						400,520 (38,000)
OPERATIONAL PHASE						
1	Farm accidents/incidents	• Records of accidents, incidents and near misses. • Records of PPE disbursed • Housekeeping	• Nandom Kpee and Nandom Ko valley Farm	Monthly	Municipal MoFA Extension officers/ Regional MoFA	31,620 (3,000)
2	Poor labour working conditions	• Availability of copies of signed contracts • Complaints lodged by farm hands and other workers	• Nandom Kpee and Nandom Ko valley Farms	Monthly	Municipal MoFA Extension officers/ Regional MoFA	42,160 (4000)
3	Soil impacts and sediment transport	• Observable change in turbidity of water collected in the valley. • Observable oil sheen in the water. • Observation of rills/gullies	• Nandom Kpee and Nandom Ko valley Farms and immediate environs	Monthly	Municipal MoFA Extension officers/ Regional MoFA	52,700 (5,000)
4	Air and Noise Pollution	• Number of complaints by community members/farmhands	• Nandom Kpee and Nandom Ko valley Farms and community	Monthly	Municipal MoFA Extension officers/ Regional MoFA	31,620 (3,000)

No.	Potential Environmental and Social Impacts	Monitoring Indicators/Mean of verification	Monitoring Site	Frequency	Responsibility (Implementation/ Monitoring)	Cost Estimate/ Year GHS (USD)
5	Waste generation and inefficient management	• Presence of toilet facilities and number dustbins provided on site • Cleanliness of site/housekeeping • Odour • Presence of human waste on site • Complaints by farm workers/community members	• Nandom Kpee and Nandom Ko valley Farms and immediate environs	Weekly	Municipal MoFA Extension officers/ Regional MoFA	52,700 (5,000)
6	Traffic accident risks/Community safety concerns	• Grievance records • Traffic related incidents/accidents • Records of all accidents, incidents and near misses.	• Nandom Kpee and Nandom Ko valley Farms / community and immediate environs	Monthly	Municipal MoFA Extension officers/ Regional MoFA	52,700 (5,000)
7	Fire outbreaks	• Fire related incidents/accidents • Records of fire incidents and near misses. • Number of functional fire extinguishers onsite	• Nandom Kpee and Nandom Ko valley Farms and immediate environs	Monthly	Municipal MoFA Extension officers/ Regional MoFA	31,620 (3,000)
8	Community health issues	• Number of sensitization campaigns • Number of condoms distributed to farm workers or placed at convenient places in a month • Prevalence of STD cases reported to local health facilities	• Nandom Kpee and Nandom Ko valley Farms / Nandom Kpee and Nandom Ko communities and immediate environs	Monthly	Municipal MoFA Extension officers/ Regional MoFA	47,430 (4,500)
9	Security and SH/GBV concerns	• Number of conflicts/cases reported to the Grievance Redress	• Nandom Kpee and Nandom Ko valley Farms / Nandom Kpee	Monthly	Municipal MoFA Extension officers/ Regional MoFA	36,890 (3,500)

No.	Potential Environmental and Social Impacts	Monitoring Indicators/Mean of verification	Monitoring Site	Frequency	Responsibility (Implementation/ Monitoring)	Cost Estimate/ Year GHS (USD)
		Committee/Community Liaison Officer • Number of conflicts/cases dealt with by the Grievance Redress Committee • Number of crimes such as theft, defilement and rape reported, investigated, and concluded by the police involving workers or patrons	and Nandom Ko communities and immediate environs			
10	Risk of Drowning	• Number of drowning cases reported and investigated involving unsuspecting community members and animals.	• Dugout (from the previous sand winning site now used as water source)	Weekly	Municipal MoFA Extension Officers, Municipal Assembly/ Regional MoFA	31,620 (3,000)
Sub-Total						411,060 (39,000)
DECOMMISSIONING PHASE						
1	Project site accidents/incidents	• Records of accidents, incidents and near misses. • Records of PPE disbursed • Housekeeping	• Nandom Kpee and Ko valleys	Monthly	PIU Environmental and Social Safeguards Specialists	52,700 (5,000)
2	Waste generation and inefficient management	• Number of mobile toilets and dustbins provided on site • Cleanliness of site/housekeeping • Odour • Presence of human waste on site • Complaints by workers/community members	• Nandom Kpee and Ko valley construction site and immediate environs	Weekly	PIU Environmental Safeguards Specialist	31,620 (3,000)

No.	Potential Environmental and Social Impacts	Monitoring Indicators/Mean of verification	Monitoring Site	Frequency	Responsibility (Implementation/ Monitoring)	Cost Estimate/ Year GHS (USD)
3	Traffic accident risks/Public safety concerns	- Grievance records - Traffic related incidents/accidents - Records of accidents, incidents and near misses.	Nandom Kpee and Ko valley construction site and immediate environs	Monthly	PIU Environmental and Social Safeguards Specialists	52,700 (5,000)
Sub-Total						137,020 (13,000)
TOTAL COST FOR MONITORING						948,600 (90,000)

0.11 Institutional capacity to implement ESMP

The capacity assessment presented in the table provides a description of institutional roles, their existing capacities, the gaps that may hinder performance, and actionable recommendations to close these gaps. The responsibility and budget to implement the recommendations have been included in the ESMP budget.

Institutional Roles, Capacity Gaps and Recommendations

Institution	Role in ESMP Implementation	Capacity Assessment	Capacity Gaps	Recommendations
MoFA (District & Regional)	Lead implementer; coordination, extension, safeguards compliance	Regional/district offices have limited environmental and social safeguards knowledge. However, national divisional office has stronger capacity	Weak safeguards integration at local level; and limited tools for monitoring	Provide intensive training on safeguards compliance; Supply digital data collection tools; Integrate ESMP indicators into MoFA M&E systems
Project Implementation Unit (PIU)	Safeguards oversight and project management	Adequately staffed with environmental and social safeguards officers	Limited operational linkages with district institutions	Strengthen coordination platforms with MoFA, EPA, and District Assembly; and formalize reporting schedules
EPA (Regional Office)	Regulatory oversight; and participation in joint inspections	Strong technical expertise, but logistics constrained (e.g., transport, field equipment)	Inability to conduct regular field inspections due to lack of resources	Engage EPA to improve support at regional level such as vehicles, field logistics, and budget for regular compliance monitoring
Nandom Assembly	Local governance; grievance redress; community mobilization	Some competence in grievance handling, but limited awareness of safeguards	Weak capacity in grievance redress aligned with ESMP	Provide structured training on grievance mechanisms and safeguards at district/regional levels
CSIR – Water Research Institute	Technical monitoring of water quality	Adequate technical competence and facilities	Underutilized in field implementation	Formalize role in ESMP monitoring with budget and data-sharing mandate
CSIR – Soil Research Institute	Technical monitoring of soil quality	Adequate technical competence and facilities	Underutilized in project-specific monitoring	Formalize role in ESMP monitoring with budget and data-sharing mandate

Institution	Role in ESMP Implementation	Capacity Assessment	Capacity Gaps	Recommendations
GNFS (Regional/District)	Fire education, prevention, and response	Strong institutional mandate, but inadequate fire hydrants, tenders, and trained personnel	Limited firefighting equipment; inadequate training capacity	Engage GNFS to improve fire-fighting equipment resources at the district level; build capacity on prevention and community training methods
NADMO (District Office)	Disaster risk education, preparedness, and response	Active but under-resourced with limited staff and logistics	Staffing and logistical deficits constrain rapid response	Engage district NADMO to recruit additional staff; provide disaster response logistics (vehicles, equipment); and build staff capacity
NGOs/CSOs	Community engagement and sensitization	Active presence but limited technical expertise on safeguards	Weak technical understanding of ESMP safeguards	Provide training in safeguards, participatory monitoring, and technical engagement

MoFA should establish formal coordination mechanisms, including joint monitoring schedules and shared reporting platforms to enhance accountability and synergy across agencies.

0.12 Grievance Redress Mechanism

The activities of the project may generate grievances arising from the interaction between project and local authorities/community, workers and the host community. Some potential grievances identified and likely to occur during project implementation include:

- Complaints from the local community on the conduct of workers, especially sexual harassment and other gender-based offenses;
- Complaints related to noise, dust, traffic incidents;
- Restriction of access to persons who otherwise were using portions of land e.g. for grazing
- Failure to consider the recruitment of local man-labour;
- Non-respect of the habits and customs of the host community by the contractor/ consultants/ MoFA personnel etc;
- Non-compliance with the measures or provisions contained in the ESMP.

In managing grievances, the REWARD project proposed measures for resolution of grievances that may arise due to project implementation. This is a three-tier grievance redress structure which are;

- Community level structures (1st Tier) – These includes; a Grievance Redress Committee and Site-level Grievance Redress Mechanism.
- District level structure (2nd Tier) – Municipal Grievance Redress Committee

- Project-wide level structure (3rd Tier) – Project Grievance Redress Committee

Community Level (1st Tier):

- Includes Community Grievance Redress Committees (GRCs) and site-level Grievance Redress Mechanisms (GRMs).
- Handles initial complaints from individuals or communities related to agricultural or infrastructure activities.
- Site-level GRMs are managed by contractors and report monthly to the project team; oversight is provided by the PIU Environmental and Social Safeguard Specialists.

District Level (2nd Tier):

- Municipal Grievance Redress Committees (Municipal GRCs) address unresolved complaints from the community level or cases where community GRCs fail to act within 30 days.
- They meet quarterly or as needed for urgent matters.

Project Level (3rd Tier):

- Project Grievance Redress Committee led by the Project Coordinator or Social Safeguard Specialist.
- Handles cases escalated from the municipal level, especially if not resolved in 30 days or if the complainant is dissatisfied with the resolution.

0.13 ESMP Implementation Budget

Project Stage	Project Activities	Estimated ESMP Cost (USD)	Estimated ESMP Cost (GHS)
Preconstruction (Preparatory) Phase	- E & S assessment and permit acquisition.	37,287	393,000
	- Training and completion of VLD forms.	427	4,500
	- RAP/LRP Implementation and capacity building for PIU.	13,237	139,520
	- Fencing of site to restrict vegetation clearance	2,841	30,000
	- Training of E&S officers on ESMP.		
- Sub Total		53,792	567,020
Construction Phase	- Development and implementation of an Occupational, Health and safety management plan.	4,735	50,000
	- Labour force management and training on safety, discrimination, GBV, SEA/SH, child labour/human rights and ethical conduct.	18,939	200,000
	- Erosion management and ESMP training for contractor's E&S team	16,098	170,000
	- Air quality deterioration abatement measures and PPE provision	5,682	60,000
	- Water pollution abatement measures	6,629	70,000
	- Noise abatement measures implementation and PPE provision	1,894	20,000
	- Waste management including hazardous and non-hazardous waste	11,364	120,000

Project Stage	Project Activities	Estimated ESMP Cost (USD)	Estimated ESMP Cost (GHS)
	- Traffic management and road safety training for drivers	4,735	50,000
	- Implementation of fire prevention/fighting measures and training for workers and community	4,735	50,000
	- Management of grievances including GBV, SEA/SH, child labour/human rights	5,682	60,000
	- Sensitization of workers and community on cultural tolerance and conflict management	2,841	30,000
	- Management and community sensitization on drowning risks	9,470	100,000
Sub-Total		92,804	980,000
Operation Phase	- Development and implementation of occupational health and safety plan/measures	28,463	300,000
	- Sensitization on good labour practices, rights and ethical conduct.	18,975	200,000
	- GBV sensitization for farm owners/workers	9,569	100,000
	- Child labour sensitization for farm owners	4,744	50,000
	- Education on soil, water and nutrient management for farmers.	9,488	100,000
	- Education of farmers on air quality deterioration abatement measures	9,488	100,000
	- Education on soil, water, and nutrient management, waste management, pollution prevention and PMP Implementation	28,463	300,000
	- Sensitization of farmers on noise abatement measures	4,744	50,000
	- Waste management including provision of skips, collection/disposal and education on composting	7,116	75,000
	- Fire risk management and sensitization of farmers on fire-fighting techniques.	9,488	100,000
	- Education of farmers on soil, water and nutrient management.	4,744	50,000
	- Sexual health education programs for farm workers to promote public health	4,744	50,000
	- Flood risk assessment and management	14,231	150,000
	- Sensitization of workers and community on cultural tolerance, and conflict management	2,841	30,000
	- Traffic management and road safety training for drivers	4,744	50,000
	- Management and community sensitization on drowning risks	4,744	50,000
Sub Total		166,508	1,755,000
Decommissioning Phase	- Development and implementation of an Occupational, Health and safety plan.	4,735	50,000
	- Waste management including hazardous and non-hazardous waste	11,364	120,000
	- Traffic management and road safety training for drivers	4,735	50,000
Sub Total		20,834	220,000

Project Stage	Project Activities	Estimated ESMP Cost (USD)	Estimated ESMP Cost (GHS)
Grievance Redress Mechanism (GRM)		79,000	832,660
Resettlement Action Plan Implementation		11,026	116,210
Environmental & Social Performance Audit		25,000	263,500
RAP Completion Audit		7,000	73,780
Sub Total		122,026	1,286,150
Total		455,319	4,808,170

0.14 Decommissioning

A Decommissioning and Site Closure Plan (DCP) is required to guard against the remote possibility of abandoning temporary constructed structures. Should such a circumstance arise, the potential would exist for impacts from abandonment of the facility such as aesthetic impacts and potential trespassing and safety concerns.

The specific objectives in managing the decommissioning process will be:

- To ensure that rehabilitation and decommissioning are carried out in a planned sequential manner, consistent with best practice;
- To ensure that agreed post-project land-use outcomes are achieved; and
- To avoid on-going liability.

A Full Decommissioning Report is expected to be prepared in the event of any such activity for approval by the EPA and any other requisite state agencies.

Pre-Decommissioning Assessment

Prior to any decommissioning, the EPA will be notified and an assessment will be carried out to identify any potential environmental impacts that need to be addressed and mitigated in the decommissioning process.

Decommissioning Phase Activities

Some of the activities that will be undertaken during the decommissioning phase will mostly be the dismantling and removal of structures and equipment.

Dismantling and Removal of Structures and Equipment

All decommissioning and restoration activities will be in accordance with all applicable state and local permits and requirements and will include the following specific activities:

- *Hardware retirement:* All power sources would be disconnected from structures and equipment before dismantling commences. Cranes and/or other machinery will be used for the disassembly

and removal of structures and associated installations. These will either be transported whole for reconditioning and reuse or disassembled into salvageable, recyclable, or disposable components;

- *Foundation removal:* All foundation materials will be removed as per EPA guidelines or requirements. The remaining excavation will be filled with clean sub-grade material, compacted to a density similar to surrounding sub-grade material, and finished with topsoil;
- *Monitoring:* A monitoring and remediation period of two years immediately following the completion of any decommissioning and restoration activities will be undertaken. If agricultural impacts are identified during this period, follow-up restoration efforts will be implemented; and
- *Area restoration:* Areas where subsurface components are removed will be graded to match adjacent contours, stabilized with an appropriate seed mix, and allowed to re-vegetate naturally. All community roads, impacted by Project decommissioning activity, if any, will be restored to original condition upon completion of decommissioning.

Solid Waste Management

All solid waste resulting from the decommissioning process will be evacuated by handlers commissioned by the Municipal Solid Waste Department.

Post-Decommissioning Assessment

Removal of machinery, equipment and all other materials related to the project will be completed within one year of decommissioning. At the end of the decommissioning exercise, the EPA will be invited to carry out a post-decommissioning assessment to establish compliance with all regulatory requirements and issue a certificate to that effect. The Decommissioning and Closure Plan will be finalized and submitted to the relevant authorities for approval at least six months prior to closure of the site.

A report describing the performance of the final DCP in working towards its objectives, based on monitoring results, and the extent to which it has been complied with, will be submitted to the EPA. The report will be provided to documented stakeholders and will otherwise be publicly available on request. Files and documents used to collate information regarding closure commitments, licenses, approvals and other information concerning closure will be catalogued and maintained in accordance with standard practices.

0.15 Conclusion

The proposed project will be implemented in accordance with relevant national laws and best international practices provided by the applicable Operational Safeguards of the AfDB Integrated Safeguard System.

Stakeholders have been identified and their suggestions and concerns obtained through the consultation and engagement process have been highlighted in the report and addressed. A Stakeholder Engagement Plan (SEP) has been proposed to ensure continued engagement of all stakeholders and the implementation of a grievance redress mechanism to ensure harmony in the project implementation.

The potential adverse impacts of the project have been identified. Adequate mitigation measures have been proposed to manage the moderate to major adverse impacts. Also, management and monitoring plans have been designed to ensure that the proposed mitigation measures are adequately

implemented. The institutional capacities have been assessed and gaps identified with recommendations.

The assessments have shown that the project generally has moderate impacts on the environment and the impacts could be further mitigated with the adoption of good environmental, health and safety practices. A Pest Management Plan (PMP) is required to ensure judicious and safe use of agrochemicals as well as safe disposal of obsolete chemicals and empty containers.

The Chiefs of Nandom Ko and Nandom Kpee communities has donated the land for the project. A Resettlement Action Plan has been proposed to mitigate the livelihood impacts on thirty nine (39) farmers who will vacate their farm lands for use by the project.

The project holds immense benefit for the Nandom Ko and Nandom Kpee communities, the municipal and region regarding food security, job creation, growth of MSMEs, etc. The entire country will benefit from improved food security, increased knowledge and adoption of best agricultural practices for rice production, etc.

1.0 INTRODUCTION

1.1 Background of the Project

The Government of Ghana (GoG) through the Ministry of Food and Agriculture (MoFA), in collaboration with the African Development Bank (AfDB) is undertaking the Resilient Rice Regional Value Chains in West Africa (REWARD) Project.

The Project seeks to develop some selected inland valleys to promote rice production in the Northern part of Ghana specifically, the Northern, Upper West, North-East and Savannah Regions to boost preparedness against food insecurity and improve the resilience of food systems in Ghana.

Specific activities to be undertaken in these selected Inland valleys include but not limited to: development of water control and conveyance systems; construction of drainage system to collect water out of command areas; construction of access roads into the valleys; and land development for crop cultivation. The programme will also seek to address issues with women and youth drawn from the Gender Action Plan (GAP).

This development objective will be achieved through improving farmers' access to usable weather, climate and advisory services; improving access to local climate information services through digital information platforms; facilitating the co-production of services between private and public sector; increasing farmers' access to agricultural and nutrition sensitive technologies developed by a consortium of National Centers of Specialization (NCoS), Consultative Group for International Agricultural Research (CGIAR) and other international research institutes; establishing spatial information system to design and plan climate resilience land management practices; promoting private sector involvement in regional agricultural trade; and supporting women farmers to access services to improve marketing along target commodity value chain.

In line with environmental permitting requirements as provided under the Environmental Protection Act, 2025 (Act 1124), the Environmental Assessment Regulations of 2025 (LI 2504), this assessment has been carried out by SAL Consult Limited to help understand the likely implications of the proposal in order to inform the environmental permitting decision-making prior to project implementation in the Nandom Municipal area. Also, the ESIA will ensure the project and subprojects comply with the requirements of the Bank's Operational Safeguards System (OSS). The main objective of REWARD-Ghana is to reduce importation of rice by increasing competitive local rice production, processing, income, and job creation, which will lead to improved nutrition and food security in a sustainable manner and contribute to reducing poverty through a private-public sector driven interventions along the rice value chain. The specific objectives of the project are;

- To increase rice productivity and production thus increased incomes for farmers, particularly women and young people;
- To increase the resilience and adaptive capacities of rice farms and production systems; and
- To increase the marketing and intra-regional trade of rice.

1.2 Purpose of the ESIA

The scope of work for the ESIA study is to among other things:

- Provide technical description of the proposed project and identify all activities of environmental/social concerns;
- Analyse project alternative and investigate options to the project development in relation to the project site, design, and the “no action alternative” – which assumes that the Project is not implemented.
- Establish the existing environmental and socio-economic baseline conditions of the project area of influence;
- Predict and examine all the significant environmental impacts on the surrounding communities and the general environment during implementation of the proposed project and advise on appropriate mitigation and abatement measures against potential adverse impacts;
- Provide a monitoring program for predicted impacts and mitigation measures;
- Provide an Environmental and Social Management Plan (ESMP) integrating Grievance Redress Mechanism (GRM);
- Document the socio-economic and cultural advantages and disadvantages associated with the proposed project for stakeholders and interested groups to make an informed decision on the level of environmental compromise and permitting.
- Provide a plan to guide the development of an emergency response plan for the project;
- Provide guidelines to be followed in the event of decommissioning; and
- Carry out public consultations and include the outcome in the ESIA report with arrangements to address stakeholder concerns.

1.3 Methodology for the Assessment Process

This report has been prepared in accordance with applicable African Development Bank and Ghanaian environmental assessment guidelines and involves the following activities:

- **Data gathering;** The Consultant assembled and evaluated relevant baseline data relating to the biophysical and socio-economic environment to be influenced by the project. The baseline data include climate, topography and relief, geology and soil, vegetation, demography, access to basic services and socio-economic conditions. In addition, this report has scoped out the issues and provided general assessment of the impacts.
- **Stakeholder identification and consultations;** Key stakeholders identified include Ministry of Food and Agriculture (Department of Agriculture, Nandom Municipal), Environmental Protection Authority (EPA) of Ghana, Nandom Municipal Assembly, Lands Commission, Ghana National Fire Service, Produce Suppliers, Commercial Farmers, Farmer Based Organizations, Assembly Representatives, Community Focus Groups including Traditional Authority, Youth Groups, Women Groups etc. Stakeholders were engaged in April 2025 and the outcome of engagements with key stakeholders have been reviewed and incorporated in the study (**See Details in Section 6 and Annex 5**).
- **Data collation and analysis;** The report preparation involved review of project documents, related Environmental Impact Statements (EIS), as well as EPA, and AfDB reference documents as follows:
 - Project Documents (Project Implementation Document);
 - District Profile for the Nandom Municipality;
 - Medium Term Development Plan;

- Population and Housing Census Report, 2021;
- Technical sheets for project development;
- Ghana EPA Guidelines;
- GoG and AfDB Reference Documents;
- Sector policy documents and regulations; and
- Relevant international conventions.

1.4 The ESIA Report Content and Structure

EPA guidelines for preparation of ESIA and the AfDB Operational Safeguards System (OSS) guided the preparation of this ESIA report. The outline of the report includes the following:

- A non-technical executive summary;
- An introduction describing the ESIA purpose, objectives, approach and methodology;
- A description of the project, with an emphasis on subproject scope;
- Analysis of alternatives;
- Policy, legal and administrative framework;
- Baseline environmental and social conditions of the Nandom Municipal area;
- Stakeholder Engagement and public consultations and disclosure;
- Potential environmental and social issues and impacts;
- Proposed mitigation measures;
- Environmental and social management plan requirements;
- Decommissioning;
- Capacity building and training required to implement the ESMP;
- ESMP implementation budget;
- Conclusion; and
- Annexes.

2.0 PROJECT DESCRIPTION

This section provides a detailed description of the Project in relation to its location, the key project components and an overview of the proposed activities that are to take place during the planning/preparatory, operation, and implementation phase.

2.1 Project Location

The programme will cover generally the Savannah Ecological Zone of Ghana and specifically focus on seven (7) Districts within four (4) administrative regions thus Northern, Upper West, North-East and Savannah Regions, that have the potential for rice production.

The Nandom Municipality where this project site is situated is located in the Upper West Region of Ghana. The Upper West Region makes up one of the sixteen political regions of Ghana and it is located in the Northern belt (specifically north west) between latitudes 9°30'N and 11°N and longitudes 1°25'W and 2°45'W. The region shares boundary with the Upper East Region to the east, the Northern Region to the south, and Burkina Faso to the north and west (**Figure 2-1**). The Upper West Region of Ghana administratively consist of 5 Municipal Assemblies and 6 District Assemblies.

The Nandom Municipality which has a total land area of about 387 sq. km is located at the north-western part of the Upper West Region of Ghana. It shares boundaries with the Lambussie-Karni District to the east, the Lawra District to the south, and the Republic of Burkina Faso to the north and west. The Municipality has about 88 communities with a high percentage of residents living in rural areas.

The proposed Project will be implemented in the selected site (shown in **Table 2-1** and **Figure 2-2** below) which have been identified by the Ministry of Food and Agriculture (MOFA) for Environmental and Social Impact Assessment Studies and subsequent development (if found suitable) for improved rice production.

Table 2-1 : Project Beneficiaries

NO.	REGION	DISTRICT	VALLEY
1.	Upper West	Nandom Municipal	Nandom Kpee, Nandom Ko



Figure 2-1: Map of Ghana showing the beneficiary districts including Nandom

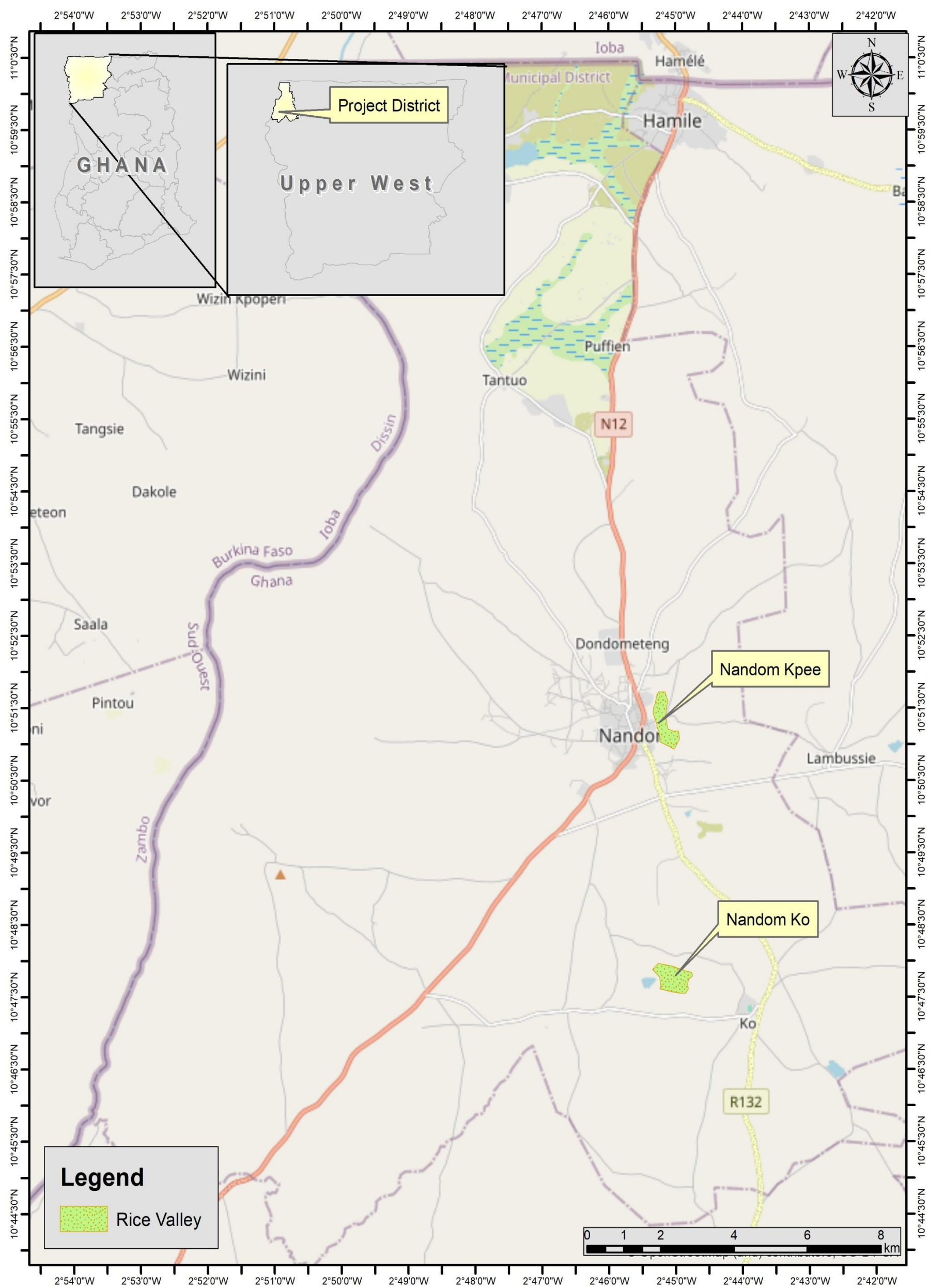


Figure 2-2: Location map of Nandom Municipality showing the Nandom Kpee and Nandom Ko valleys

2.2 Project Components

The Project has four (4) main components namely; production and productivity, processing and marketing, policy and governance, and project coordination and management.

Component 1: Development of sustainable and climate-resilient rice production systems

Sub-component 1.1: Sustainable climate-resilient infrastructure and management services in rice production systems. Key interventions will include:

i. Development of Agricultural Zones

This sub-component will seek to develop new lands and rehabilitate existing water regulatory infrastructure to increase area under rice production. This will leverage on Agricultural Zones being established by Government to address the issue of access to large tracts of land, to drive sustainable and commercially oriented agriculture with the aim to significantly expand Ghana's rice productive capacity.

Under each Agricultural Zone large contiguous tract of arable land of not less than 300 hectares will be designed and developed within which a modern agricultural economic enclave will be located with the intention to create a viable ecosystem for the community to engage in commercial farming. Government will partner with the community for this project. Key activities will include land clearing, bunding of fields, construction of boreholes and small offices, construction of drying patios, farm access tracks, machinery and equipment.

The Ministry of Food and Agriculture (MoFA) has identified various locations across the country which has the potentials of being the food baskets for the country. Some of the potential locations identified for establishment of the Agricultural Zones include the Mamprugu Moagduri district in the North-East region, Mion, Tamale Metro and Savelugu Municipal in the Northern Region, West Gonja in the Savannah Region, Wa and Nandom Municipal in the Upper West Region.

The African Development Bank and other Development Partners since 2015 have supported the development of about 1,700 ha of various valleys for rice production. These valleys will be upgraded with the necessary infrastructure (drying patios etc), including setting up of an agricultural mechanization services centers into an Agricultural Economic Enclave.

ii. Sustainable Land and Water Management (SLWM)

This intervention seeks to enhance environmental resilience and agricultural productivity, to address productivity barriers and opportunities in agriculture and environmental services. These SLM and CSA technologies are being incorporated to address the interplay between agriculture, biodiversity loss, and climate change.

Climate variability and change affects rice production, and may result in increased cost of production, low yields, increased post-harvest losses, low farm income, food insecurity among others if appropriate mitigation and adaptation measures are not put in place.

The Ministry of Food and Agriculture (MoFA) developed a National Climate-Smart Agriculture and Food Security Action Plan (2016 – 2020), with the aim to facilitate and operationalize the national climate change policy for effective integration of climate change into food and agricultural sector development policies and programmes. In line with the CSA Action Plan, the following CSA technologies would be mainstreamed into all activities of the REWARD Project:

- a) Real-time climate and weather information system:
- b) Climate resilient seeds
- c) Soil Nutrient Management
- d) Ecological Organic Agriculture (EOA)
- e) Water Conservation and Management
- f) Alternative Wetting and Drying (AWD)
- g) Build capacity on SLM technologies

iii. ***Form and build capacity of Water Users Association:***

According to the legislative instrument (L.I. 2230) passed on 12th February 2016, Water Users Association (WUA) is to be formed on all public irrigation infrastructures constructed by government and other parties on behalf of or in concert with the government. By this L.I. 2230, the Water User Associations are responsible for the Organisation, Maintenance and Management of the Irrigation infrastructure in their service area. The process of formation involved sensitisation, formation and capacity building of the farmers.

The capacities of the existing Water Users' Associations (WUAs) would be strengthened and new one's formed at the newly constructed sites, to function properly.

iv. ***Social infrastructure development:***

This will support development of rural feeder roads, to enhance transportation of inputs, produce and mobility of humans within the Agricultural Economic Enclaves. It will also support development of water and sanitation facilities and services within the enclaves.

Sub-component 1.2: Improved availability and access to climate-resilient inputs, mechanization services and knowledge

Key interventions will include:

i. **Seed Delivery Systems**

This will support production of improved seeds in collaboration with Research Institutions (Council for Scientific and Industrial Research - Crop Research Institute and Savannah Agricultural Research Institute), Universities and Grains and Legumes Development Board (GLDB). Identified research institutes will be supported with funding to produce adequate quantities of breeder and foundation seeds, for the production of certified seeds by trained and certified seed growers at the targeted irrigation schemes. Resilient varieties like CSIR-Banse Rice (83 days) would be promoted.

Adequate support would also be provided to seed regulatory institutions for monitoring and certification of all classes of seeds. About 244 kg of breeder seeds and 12.2 MT of foundation seeds will be required for project period. The seed unit in Tamale will be rehabilitated and renovated and equipped with modern seed processing facility.

ii. Fertilizers and Pest Control Management Systems

Improve access to agro chemicals (fertilizers and pesticides) through input credits: The proposed project will facilitate access to agro-inputs through input credit system. This will be done through payment guarantee for identified commissioned aggregators to supply/provide agro-inputs to farmers, who will in turn repay in kind at the end of every cropping season.

Optimizing the use of quality agro-inputs are essential for sustainable agriculture production, ensuring optimal crop yields, minimizing environmental impact and meeting food production demands. Capacities of the value-chain actors would be enhanced to provide efficient utilization which would translate to quality and higher yields for better incomes.

iii. Agricultural Mechanization Services Delivery

One key feature of Government Policy on Agriculture is the comprehensive utilization of mechanization services for land preparation, seeding/planting, fertilizer application, crop maintenance/protection, harvesting and post-harvest management to increase productivity of rice. In the same vein, Agricultural Mechanization Service Providers or Agricultural Mechanization Services Centers (AMSECs) would be supported to offer dedicated mechanized services to farmers in the selected Agricultural Economic Enclaves.

iv. Extension Delivery

The role and importance of agricultural extension delivery in Ghana's overall agricultural growth and development like in many other jurisdictions cannot be over emphasized. Agricultural Extension plays a key interface between agricultural research and the farmer and other agricultural value chain actors by packaging technologies into suitable transmittable forms, interventions and innovations that could be utilized by farmers and other value chain. This will be achieved through:

- Promote increased and sustained programme participation
- Incremental adoption of inputs and technologies leading to an increased on-site productivity
- Improved post-production activities
- Capacity building and monitoring of operations of extension officers
- Building and promotion of synergies between extension and research
- Build Skill and Capacity of Machinery Operators and AMSEC managers

Component 2: Development of rice processing clusters, agro-industry and commercial linkages for trade facilitation

Sub-component 2.1: Modernized processing infrastructure and strengthening capacities of value chain actors

This component will focus on construction and installation of processing and storage infrastructure to minimise post-harvest losses and enhance value addition. It will develop information systems using innovative technologies (incl. digital) and consumer-oriented branding to improve access to market.

Additionally, this component will promote private sector investment by supporting business, with special focus on women and youth, and improve availability of financial services across the value chain to facilitate lending to processors, farmers, and other actors.

Promote the consumption of Ghana Rice: Events and promotional activities would as well be organized to encourage the consumption of Ghana rice.

Component 3: Policy/regulatory reforms at the national and regional levels and innovation-oriented regional technical support, for competitive rice value chains in the face of imports

Key activities under this component will include:

- Support to policy reforms and harmonization at regional/national levels
- Finalize the National Rice Development Strategy II (NRDS).
- Organise policy dialogues and workshops to discuss issues relevant to the rice sub-sector.
- Coordinate activities to ensure synergies among rice value chain stakeholders and projects to boost production, processing, marketing and consumption of locally-produced rice.
- Enhance control and regulations for agricultural inputs at regional/national levels.

Component 4: Programme Coordination and Management

This component will be responsible for day-to-day management of project activities to ensure harmony and coherence. A Project Implementation Unit (PIU) will be established or nested under existing PIU to support the coordination and management of the project. Regional and National Management and monitoring systems based on digital technologies will be developed to ensure tracking of results Regional and National levels, and in line with ECOWAS Rice Observatory (ERO).

2.3 Project Activities

The proposed Project will be implemented in seven (7) Districts within four (4) administrative regions thus Northern, Upper West, Savannah and North-East Regions, as indicated in the **Table 2-2**. The valleys will be upgraded with necessary infrastructure, such as water conservation bunds and drains, drying patios and farm access tracks.

Table 2-2: Proposed Rice Valleys for Development

No	Region	District	Community	Valleys	Area (ha)	Project Activities
1	Northern	Mion	Tindantua	Sakoya, Bogni	350	New land development with machinery support, drying patios, farm roads etc
2		Tamale Metro	Nyankpala	SARI	50	Construct bunds and drains of existing area for SARI for seed production
3		Savelugu	Nakpanzoo	Nakpanzoo	300	Rehabilitation of existing valley, reshaped bunds and spot improvement of farm tracks
4	North East	Mamprugu Moagduri	Kubori/ Zanwara	Kubori	250	Land development packaged (bunds, drying patios and site office)

No	Region	District	Community	Valleys	Area (ha)	Project Activities
5	Upper West	Nandom	Nandom-Kpee	-	200	Machinery support with drying patios and land development
			Ko	Gbafin	150	Machinery support with drying patios and land development
6		Wa Municipal	Charia	Kolivege Bor	350	Land development with drying patios inclusive
			Sing	-	200	Reshaping of bunds, drying patios and drainage construction to convey excess water out of the fields
7	Savannah	West Gonja	Busunu	-	200	Land development and bunds
	TOTAL				2,050	-

Source: Department of Agriculture, 2024

The specific project activities to be expected within the Nandom Municipal area during the REWARD Project will be:

Preparatory Phase

The preparatory phase activities include:

- Identification of beneficiary farmers for rice production
- Conduct of relevant studies, including socio-economic surveys and resettlement related issues
- Development and Implementation of Environmental and Social Management Plan (ESMP)
- Request for applications and screening of applicant farmers
- Assessment of soil suitability and GIS mapping of commercial farms using ICT.

Construction Phase

The construction phase activities will include the following:

- Rehabilitation of existing access routes
- Construction of mini work camp
- Vegetation clearance and land preparation
- Winning of construction materials from borrow pits (site yet to be determined)
- Transportation of materials to and from project site
- Construction of drainage channels and flood protection works
- Provision and installation of farm infrastructure such as farm houses and storage facilities
- Waste disposal (cleared vegetation, construction waste etc.)
- Decommissioning of mini work camp

The vegetation will be cleared using suitable machinery for land development to ensure that top soils are not unduly disturbed. Some activities to be undertaken will involve land levelling and In-field bunding.

Bunds which are earthen embankments will be created to retain rainfall runoff. The plots will be formed to conform to the direction of the contours, in this way reducing the earth movement during bunding and levelling to the minimum. The levels of the plots will be set to balance cut and fill. Bunding and land levelling will form the major activities in plot formation. Pegging out of plots boundaries to the standard size of plots will be required during the levelling. All levelled plots would be portioned and bunded by in-field contour bunds into plots.

Roads linking valleys to towns which are mostly in deplorable states will be maintained to reduce post-harvest losses which has been a major problem confronting farmers. Access roads will be maintained to permit the use of agricultural machinery in the cropping zone to do tillage, deliver inputs and send out produce.

Operation Phase

The operation phase activities include:

- Production and promotion of rice.
- Support for out-grower contractual arrangements.
- Conduct surveillance and collect data on pests attacking the Rice in the project zones with specific reference to FAW.
- Community sensitization, Establishment of fire belts and enforcement of community fire by-laws to deal with the impact of bush fires.
- Promotion of quality standards for rice, maize and soybean production, storage and processing
- Support business development, including improvements in business processes of existing commercial farmers
- Enhance access to market information (e.g. quantity, quality, timing and pricing)
- Promote the development of allied services (packaging, new distribution networks for rice products, transport services, new agro-input delivery systems, etc.)
- Support to feed millers to improve feed stock and expand processing capacity
- Promote the sustainable use of agro-chemicals;
- Enhance investment facilitation and promotion to increase the number of commercial producers and processors in the Savannah regions
- Capacity building for women and youth in small-scale commercial rice business management and entrepreneurship, including mentorship.

3.0 ANALYSIS OF ALTERNATIVES

This chapter investigates options to the Project development in relation to the Project site, design, and the “no action alternative” – which assumes that the Project is not implemented.

The consideration of Project alternatives is in compliance with Environmental Assessment Regulation LI 2504, which states that an EIA development for any project should outline the main alternatives for the proposed undertaking, taking into account the main technology, equipment, and location.

The proposed project considered some feasible options in respect of their potential environmental and social impacts. These are analysed in **Table 3-1** and include:

- Site selection;
- Resettlement related options
- Power supply;
- Sources of water;
- Water Management Systems;
- Waste management; and
- Project implementation versus No Project implementation.

Table 3-1: Analysis of Alternative Project Options

Option/ Method of Deployment	Potential Environmental, Social, Technological and Economic Implications		Preferred Option
Site Selection			
1. Nandom Kpee and Nandom Ko Valleys	Advantages 1. Size of the valley 2. Potential benefit to farming communities with limited access to developed rice fields 3. Not a flood prone area 4. Sparsely vegetated fields	Disadvantages 1. Underdeveloped rice fields	The Nandom Kpee and Nandom Ko valleys were selected as the preferred valleys because of their potential benefit to many more communities. Their large sizes also made them the preferred choice.
2. Other Sites	Advantages 1. Already developed rice fields serving nearby communities	Disadvantages 1. Relatively smaller valleys in size 2. Valleys susceptible to flooding 3. Relatively dense vegetation 4. Potential displacement issues	
Resettlement related issues			
1. Nandom Kpee and Nandom Ko Valleys	Advantages	Disadvantage	The preferred option is the Nandom Kpee and

Option/ Method of Deployment	Potential Environmental, Social, Technological and Economic Implications		Preferred Option
	1. The individual land owners willing to donate land for the project. 2. The chief is willing to provide alternate land for the affected farmers. 3. There will be no temporary or permanent physical structures to be removed or destroyed.	3. The livelihood of thirty nine (39) farmers will be disrupted. 4. The affected farmers will have to trek longer distances to access alternate farmlands provided by the chief.	Nandom Ko valley sites due to more favourable resettlement related conditions.
2. Other Sites	Advantages 1. Vast lands available for the project. 2. Alternative lands to be provided for any affected farmers may be closer to the community.	Disadvantages 1. Land is owned by individuals who may not be easily willing to donate for the project. 2. There may not be alternative land for the affected farmers. 4. There will be more farmers affected.	
Power supply			
1. National grid	Advantages 1. The cost of electricity is low decreasing production cost	Disadvantages 1. Unreliable power supply from frequent power cuts	Solar energy installations (Option 2) such as solar powered pumps are preferred for the pump irrigation.
2. Solar energy installations	Advantages 2. Presents a clean and sustainable source of electricity 3. Low operational costs 4. Meets the objective of technology transfer and climate friendliness	Disadvantages 5. Expensive capital cost	
Sources of Water			
1. Groundwater	Advantages 3. Relatively reliable source all year round 4. Seasonal variations are minimal 5. Relatively stable water quality	Disadvantages 1. Expensive to access and abstract 2. Challenges of over-exploitation to meet high demands and associated threat of land subsidence 3. May require farms of boreholes to meet demand	Option 3, which is the use of rain water appears to be the most preferred option as it will be easier to implement water management plans

Option/ Method of Deployment	Potential Environmental, Social, Technological and Economic Implications		Preferred Option
		4. Threat of high iron and fluoride concentration in aquifers in the northern parts of the country	
2. Surface water	Advantages 1. Easier to abstract and use	Disadvantages 6. Seasonal variations in flow 7. Vulnerable to pollution	
3. Rain harvesting	Advantages 1. Easy to trap and store	Disadvantages 1. Source is unreliable 2. Evaporation losses are high in the dry months of the year	
Water Management Systems			
1. The head-bund system	Advantages 1. Water stored in the ponds is conserved and can be used for additional irrigation during dry spells because of the small nature of the storage ponds. 2. The technique allows for deep water infiltration into the soil by trapping the water, thereby enhancing the soil's water retention capacity. 3. This system also help to prevent soil erosion and gully formation by reducing the speed and volume of surface runoff.	Disadvantages 1. Developing of bunds can be laborious and may demand more manpower if size of farm is huge. 2. Having head-bund system in areas with adequate rainfall or irrigation may cause waterlogging which may affect crop growth.	The preferred option is the head-bund system as it is ideal for small to medium-sized farms. It also allows for deep water infiltration into the soil by trapping water, thereby enhancing the soil's water retention capacity which is very essential in rice production.
2. The central-drain system	Advantages 1. The water levels in the rice fields, especially those near the central drain, can be controlled to mitigate against excessive flooding of the fields. 2. Help reduce soil salinity. 3. With water levels being controlled, crops receive optimal water amounts	Disadvantages 1. This system is only suitable for areas with high rainfall and not arid conditions. 2. The central drain can be a conduit for soil erosion if not maintained properly.	

Option/ Method of Deployment	Potential Environmental, Social, Technological and Economic Implications		Preferred Option
	leading to better growth and yield.		
3. The interceptor-canal system	Advantages 1. In periods of high rainfall, the fields are better protected from any rapid overflow of water from the stream and from the lateral runoff from the uplands. 2. The interceptor-canal system can be used to irrigate the rice fields during dry spells in the rainy season.	Disadvantages 1. Water can be lost from the canals through seepage into the ground and evaporation, reducing the overall efficiency of the irrigation system. 2. It can be challenging to distribute water evenly across large areas with this system, as some parts of the irrigated land can receive more water than others. 3. Canals require regular maintenance, such as desilting and repairing leaks, which can be expensive and labor-intensive.	
4. The contour-bund system	Advantages 1. The stream used for irrigation is effectively obliterated and water is allowed to cascade from one levelled area to the next by way of built outlets or spillways to the next field.	Disadvantages 1. Contour bunds are not suitable for uneven or eroded land as overtopping of excess water with subsequent breakage may occur at low spots.	
Waste Management Option			
1. Composting plant	Advantages 1. Improvements in soil quality. 2. Enhances the structure of the soil. 3. Eco-friendly. 4. Fully organic fertilizer. 5. Higher yields.	Disadvantages 1. Requires initial investment. 2. Efficiency depends on the amount of organic waste 3. May attract rats, snakes, and bugs. 4. Requires space 5. Unpleasant smell	Option 1, composting is a better option as it is ecofriendly and could be used to improve soil quality on farms. It will also keep waste away from landfill,

Option/ Method of Deployment	Potential Environmental, Social, Technological and Economic Implications		Preferred Option
2. Municipal Waste Dump/ landfill sites	Advantages 1. Straightforward concept to deal with waste. 2. Filled land can be reused for other community purposes. 3. Landfills can prevent environmental dumping. 4. Good for waste that is non-recyclable.	Disadvantages 1. Completed landfill areas can settle and requires maintenance. 2. Requires proper planning, design, and operation. 3. Can contribute to groundwater pollution. 4. Landfills can be a breeding ground for bacteria.	which already have limited space.
Project Implementation versus No Project Implementation			
1. Project Implementation	Advantages 1. Enhancing rice production, 2. Strengthening market systems, 3. Improving farmer livelihoods. 4. Supporting research to produce breeder seeds, 5. Ensuring widespread access to seed of improved rice varieties. 6. Facilitate the supply of key inputs such as fertilizers and pesticides	Disadvantages 1. Potential displacement issues 2. Depriving other projects from accessing scarce resources	Project implementation is the preferred option as the benefits outweigh that of the no project implementation option
2. No Project Implementation	Advantages 1. Project resources can be channeled into other development programs	Disadvantages 1. Food security challenges 2. High Cost of Land Development: 3. Inadequate Irrigation and Poor Water Management. 4. Limited availability of quality breeder, foundation and certified seeds: 5. Inadequate use of Improved Agro Inputs: 6. Inadequate access to mechanized services 7. Poor knowledge of good agronomic practices	

Option/ Method of Deployment	Potential Environmental, Social, Technological and Economic Implications		Preferred Option
		8. Poor quality of processing and storage facilities	

4.0 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

National and sector legislation and policies relevant to the agriculture sector have been reviewed in this section. Also, institutional requirements, international conventions, AfDB safeguard policies, and national environmental quality guidelines for the management of environmental and social issues have been considered. These have been summarized in **Table 4-1 to Table 4-6** under the following themes:

- National Policies and Plans
- National legal framework;
 - Agriculture sector legislation and related requirements;
 - Local governance, planning and other institutional requirements;
 - Public Health, Safety, Security and Social Protection;
 - Environmental legislation in Ghana;
- National Institutional Framework;
- International Policies and Conventions
 - African Development Bank safeguard policies; and
 - International conventions.

4.1 National Policies and Plans

The policies and plans reviewed and applied in the assessment include:

- Ghana Shared Growth and Development Agenda, 2010;
- National Environmental Policy, 2012;
- National Land Policy, 1999;
- National Water Policy, June 2024;
- National Climate Change Policy, 2013;
- National Gender Policy, 2015;
- Hazardous Child Labour Activity Framework, 2016;
- National Plan of Action Phase II for the Elimination of the Worst Forms of Child Labour in Ghana, 2017-2021;
- Riparian Buffer Zone Policy, 2014;
- Food and Agriculture Sector Development Policy, FASDEPII (MOFA);
- National Environmental Action Plan/Policy, 1994; and
- National Employment Policy, 2012

Table 4-1: National Policies and Plans

No.	Policies and Plans	Applicability to Proposed Project
1.	<u>Ghana Shared Growth and Development Agenda, 2010</u> It provides for the Vision for the Agricultural, Environment and Natural Resource Sectors in Chapter four. The main focus of the agricultural sector is to accelerate the modernization of agriculture and ensure its linkage with industry through the application of science, technology and innovation. The modernized agriculture sector is expected to underpin the transformation of the economy through job creation, increased export	The REWARD Project is in accord with the focus of the policy.

No.	Policies and Plans	Applicability to Proposed Project
	earnings, food security, and supply of raw materials for value addition and rural development as well as significant reduction in the incidence of poverty.	
2.	<u>National Environmental Policy, 2012</u> The ultimate aim of the Policy is to improve the surroundings, living conditions and the quality of life of the entire citizenry, both present and future. It seeks to promote sustainable development through ensuring a balance between economic development and natural resource conservation. The policy thus makes a high-quality environment a key element supporting the country's economic and social development.	The proposed project seeks to promote sustainable development by including economic, social and environmental considerations.
3.	<u>National Land Policy, 1999</u> The key aspects of the policy relevant to the project include: • The use of any land in Ghana for sustainable development, the protection of water bodies and the environment and any other socioeconomic activity will be determined through national land use planning guidelines based on sustainable principles in the long-term national interest. • Land categories outside Ghana's permanent forest and wildlife estates are available for such uses as agriculture, timber, mining and other extractive industries, and human settlement within the context of a national land use plan. • All land and water resources development activities must conform to the environmental laws in the country and where Environmental Impact Assessment report is required this must be provided. Environmental protection within the 'polluter pays' principle will be enforced.	The project sites will not be in protected areas, forests or wildlife estate. The implementation of the project will conform to the environmental laws of the country which includes, registration with EPA, Preliminary Environmental and Social Assessment and obtaining an environmental permit prior to commencement.
4.	<u>National Water Policy, 2024</u> The National Water Policy (revised 2024) is a framework formulated to guide the sustainable use, management and planning of water resources for drinking and other domestic uses. It is targeted at water users, water managers and practitioners, investors, decision makers and policy makers within central and local government structures, non-governmental organisations (NGOs) and international development agencies. The revised policy (2024) also recognises the various cross-sectoral opportunities and challenges related to water use and its links with other relevant sectoral policies such as those on sanitation, agriculture, transport and energy. The objective of Section 2.3.5 Focus Area 4 –Water for Food Security is to ensure availability of water in sufficient quantity and quality for the cultivation of food crops, watering of livestock and sustainable freshwater fisheries to achieve sustainable food security for the country. The relevant policy measures and/or actions to be undertaken include: (i) encouraging efficient use of fertilizers to reduce pollution of water bodies and ensure conservation of water, and (ii) promoting and encouraging water use efficiency techniques in agriculture and reducing transmission losses of water in irrigation systems.	The project's Environmental and Social Management Plan (ESMP) must include mitigation measures against over-exploitation of water resources and also against water pollution which emanate from agrochemicals and unsustainable agricultural practices. The irrigation designs must include water use efficiency techniques especially for the chosen crops".

No.	Policies and Plans	Applicability to Proposed Project
5.	<u>National Environmental Action Plan/Policy, 1994</u> The National Environmental Action Plan was initiated to define a set of policy actions, related investments and institutional strengthening activities that would make Ghana's development strategy more environmentally sustainable. The Plan formulated a national environmental policy as the framework for implementing the Action Plan. The Policy aims at ensuring a sound management of resources and the environment and to avoid any exploitation of these resources in a manner that might cause irreparable damage to the environment. Specifically, it provides for maintenance of ecosystems and ecological processes essential for the functioning of the biosphere, sound management of natural resources and the environment, and protection of humans, animals and plants and their habitats.	The design and implementation of the proposed project will take into consideration measures to promote the sustainable use of natural resources and ensure environmental management.
6.	<u>National Employment Policy, 2012</u> The National Employment Policy indicates that poverty is still high at about 28.5 percent and that there is a strong correlation between the employment situation and poverty. The policy states that the key source of demand for labour emanates from the productive sectors of the economy, namely, agriculture, industry and service. One of the key strategies of the employment policy is to <i>promote farm and non-farm rural employment through modernization of agriculture, improving the productivity of farmers and contract farming arrangements, promoting effective linkages between farm and non-farm activities among others.</i>	The proposed project is consistent with the strategy of the employment policy to promote farm and non-farm rural employment.
7.	<u>National Gender Policy, 2015</u> The National Gender Policy aims at mainstreaming gender equality concerns into the national development processes by improving the social, legal, civic, political, economic and socio-cultural conditions of the people of Ghana. It also seeks to empower the vulnerable groups particularly women, children, and people with special needs such as persons with disabilities and the marginalized.	The project will not discriminate against women and the vulnerable in the local communities. The criteria for selecting beneficiary farmers will consider gender and disability
8.	<u>Hazardous Child Labour Activity Framework (HAF), 2016</u> The overall objective of the Hazardous Child Labour Activity Framework (HAF) project enacted in 2016 is to develop a comprehensive, age-appropriate contextually relevant and acceptable hazardous child labour framework to drive research, intervention, monitoring and enforcement. The framework was formed to facilitate identification, quantification and evaluation of hazardous child labour and raise evidence for future studies. It will also provide the best options for intervention and evaluation to safeguard the health, safety, development and education of children. This framework, guided by ILO Convention 182 (which requires each country through tripartite arrangements to develop a list of hazardous sectors and activities) and its recommendations, addresses the limitations of existing lists and focuses on child-centred strategies that consider both risks and beneficial child work.	The proposed project is consistent with the Hazardous Child Labour Activity Framework and will not involve any child in a hazardous activity.

No.	Policies and Plans	Applicability to Proposed Project
9.	<u>National Plan of Action Phase II for the Elimination of the Worst Forms of Child Labour in Ghana, 2017-2021</u> The Ghana National Plan of Action for the elimination of the worst forms of child labour phase II (2017-2021) was launched in 2017 to address the identified gaps of the National Plan of Action Phase I (NPA1). The Ghana's National Plan of Action Phase I (NPA1) for the Elimination of the Worst Forms of Child Labour (2009-2015) was enacted to address child labour through various interventions, including strengthening technical capacity, enhancing public awareness and empowering communities. The NPA2 aims to build on the gains made subsequent to the implementation of the NPA1 (2009–2015) with the view to utilise the good practices and lessons learned to address the challenges of child labour in a more effective and sustainable way. The main objective of the NPA 2 is to reduce the worst forms of child labour to the barest minimum (<10%) by 2021 while laying strong social, policy and institutional foundations for the elimination and prevention of all forms of child labour in the longer term. The Plan is composed of upstream strategies designed to reinforce awareness creation on child labour, leading to social mobilization and advocacy for improved policy implementation in the areas of education and technical/vocational training, social protection, law enforcement, labour inspection and youth employment; coupled with improvements in coordination and resource mobilization. The upstream strategies will underpin sets of downstream interventions formulated to address child labour directly at the municipal and community levels. These sets of interventions will aim at effective provision and monitoring of social services and economic empowerment programmes by local government administrations and promoting community empowerment and sustainable action against child labour.	The design and implementation of the proposed project will take into consideration the measures of the National Plan of Action Phase II for the elimination of the worst forms of child labour in Ghana.
10.	<u>National Climate Change Policy, 2013</u> The Policy is built on seven (7no.) systematic pillars and the objective of the Policy is to mitigate and ensure an effective adaptation in key sectors of the economy, such as agriculture and food security, natural resources management, energy, industry and infrastructure among others. Under the Agriculture and Food Security area, the key objectives are: ▪ Develop climate-resilient agriculture and food systems for all agro-ecological zones; and ▪ Develop human resource capacity for climate-resilience. The key actions to achieve these objectives which are related to the proposed project include: ▪ Develop climate-resilient cropping and livestock systems as well as crop varieties and livestock breeds tolerant to flooding, drought and salinity; ▪ Promote appropriate technologies for small-scale irrigation, water re-use and water harvesting; and	The climate-resilient technology to be adopted for the proposed project includes use of improved seed varieties and irrigation systems. The project will develop human resource capacity to adapt to changing climate as part of the modernisation of the scheme. and improve post-harvest management through the provision of storage and processing facilities and infrastructure

No.	Policies and Plans	Applicability to Proposed Project
	Improve post-harvest capacity, e.g., storage and processing facilities and infrastructure.	
11.	<u>Buffer Zone Policy, 2011</u> The policy aims at providing comprehensive measures and actions that would guide the creation of vegetative buffers for the preservation and functioning of the nation's water bodies and vital ecosystems. The recommended buffer widths provided in the Policy include: - Minor perennial streams: 10 to 20 meters; and - Important seasonal streams: 10 to 15 meters. The Policy also designates the following as water pollution hazards and must be setback from any stream or water body by the following distances: - Storage of hazardous substances – 45 meters - Raised septic systems – 75 meters - Solid waste landfills – 90 meters	The project will maintain a 100-meter buffer to the Gbafiong River. The setback distances provided for the water pollution hazards is factored in the 100 meter buffer distance observed by the project for the siting of storage facilities for agrochemicals, septic systems and waste bins.
12.	<u>National Irrigation Policy, 2010</u> The objective of irrigation policy is to expand and improve the efficiency of irrigation to support agricultural development and growth. It will be pursued with principles of sustainability in operation and maintenance, and use of natural resources, equitable access by women to benefits of irrigation, and the rights to participate in irrigation management. The targets of the Ghana Irrigation Policy are to attain national food security, increase livelihood options, intensify and diversify production of agricultural commodities.	The proposed project involves the setting up of irrigation systems. The beneficiary farmers will have access to the irrigation systems to increase their productivity and enhance their livelihoods.
13.	<u>Food and Agriculture Sector Development Policy (FASDEP)</u> The revised FASDEP of 2006 (FASDEP II) emphasizes the sustainable utilization of all resources and commercialization of activities in the sector with market-driven growth in mind and with emphasis on environmental sustainability. The Medium Term Agriculture Sector Investment Plan (METASIP) developed to implement FASDEP II over the medium term 2011-2015 includes the following programmes: - Food security and emergency preparedness; - Improved growth in incomes; - Increased competitiveness and enhanced integration into domestic and international markets; - Sustainable management of land and environment; and - Science and technology applied in food and agriculture development	The project will significantly advance the achievement of the FASDEP objectives through improved efficiency and management of the scheme. The project will ensure sustainable utilization of resources and sustainable land and environmental management including through the use of a more efficient irrigation system.

4.2 National Legal Framework

The regulatory areas reviewed and applied in the assessment in compliance with national requirements include:

- The Constitution of the Republic of Ghana, 1992;
- Ghana Investment Promotion Centre Act 1994, Act 478;

- Environmental Protection Act 2025;(Act 1124);
- Environmental Assessment Regulations 2025, LI 2504
- Fees and Charges (Miscellaneous Provisions) Act, 2022 (Act 1080);
- Water Resources Commission Act 1996, Act 522;
- Ghana Meteorological Agency Act 2004, Act 687.

Table 4-2: National Legal Framework

No.	Legal Framework and Key Compliance Requirements	Applicability to Proposed Project
1.	<u>The Constitution of the Republic of Ghana, 1992</u> The Constitution includes some provisions to protect the right of individuals to private property and also sets principles under which citizens may be deprived of their property in the public interest (described in Articles 18 and 20). Article 18 provides that “Every person has the right to own property either alone or in association with others.” In Article 20, the Constitution describes the circumstances under which compulsory acquisition of immovable properties in the public interest can be done. It includes: • the development or utilization of property for public benefit • reasonable justification is provided for acquisition • the prompt payment of fair and adequate compensation • resettlement of displaced persons on suitable alternative land with due regard for their economic well-being, social and cultural values.	This is the overarching legislative framework of Ghana. Articles 18 and 20 provides conditions for the acquisition of property (in this case land) for development projects and compensation
2.	<u>Ghana Investment Promotion Centre Act 1994, Act 478</u> The Ghana Investment Promotion Centre Act 1994 (Act 478) requires that every investor wishing to invest in the country must in its appraisal of proposed investment projects or enterprises, “...have regard to any effect the enterprise is likely to have on the environment and measures proposed for the prevention and control of any harmful effects to the environment...”.	The proposed project has environmental impacts and measures have been proposed in the ESIA/ESMP to address the impacts.
3.	<u>Environmental Protection Act 2025, Act 1124</u> The Environmental Protection Act 2025 (Act 1124) amends the name of the regulator from the Environmental Protection Agency to the Environmental Protection Authority and confers additional powers on the Authority beyond the issue of environmental permits. Act 1124 consolidates the various legislations that regulate environmental protection in the country, such as the Hazardous and Electronic Waste Control and Management Act, 2016 (Act 917) and the Pesticides Control and Management Act, 1996 (Act 528). Act 1124 also establishes	The project will be in compliance with the Environmental Assessment (EA) procedures for approval of the EPA. The proposed project will involve the clearing of vegetation and generation and disposal of waste. Also,

No.	Legal Framework and Key Compliance Requirements	Applicability to Proposed Project
	the Environmental Protection Authority to regulate, protect, co-ordinate, and exercise general oversight over climate change and environmental matters. Part II of the Act 1124 specifically deals with pesticides control and management. This section of the Act provides the rules for registration, pesticides classification, approval, clearance, using, disposing of and non- disclosure of confidential information, the granting of license, labelling and pesticides inspections.	considering that the project area is over 40 hectares and according to the EPA classification, a permit has to be obtained. The Pest Management Plan (PMP) will address concerns of relevant stakeholders with regards to pests and pesticides.
4.	<u>Environmental Assessment Regulations 2025, LI 2504</u> The Environmental Assessment Regulations 2025 (LI 2504) enjoins any proponent or person to register an undertaking with the Authority and obtain an Environmental Permit prior to the commencement of the project. This regulation allows the EPA to place proposed undertakings at the appropriate level of environmental assessment. The LI 2504 seeks to ensure that development is undertaken in a sustainable environment.	The Project will be guided by LI 2504 including registering with the EPA and obtaining an environmental permit.
5.	<u>Fees and Charges (Miscellaneous Provisions) Act, 2022 (Act 1080)</u> The Fees and Charges (Miscellaneous Provisions) 2022 (Act 1080) sets out the fee regime for processing and environmental permits, associated with the Environmental Assessment Regulations. This Act replaces the 2019 Amendment. Processing and permit fees are required for initial registration, and upon submission and approval of Preliminary Environmental Report (PER).	Processing and permit fees are required for initial registration, submission of ESIA report and registration of sub-projects.
6.	<u>Water Resources Commission (WRC) Act 1996, Act 522</u> The Water Resources Commission Act, 1996 (Act 522) establishes and mandates the Water Resources Commission (WRC) as the sole agency responsible for the regulation and management of the utilisation of water resources and for the co-ordination of any policy in relation to them. The Act states under Section 24 that any person who pollutes or fouls a water resource beyond the level that the EPA may prescribe commits an offence and is liable on conviction to a fine or a term of imprisonment or both.	The project will put in place measures to prevent the pollution of water collected in the valley.
7.	<u>Ghana Meteorological Agency 2004, Act 687</u>	The project managers will liaise with the Ghana Meteorological Agency

No.	Legal Framework and Key Compliance Requirements	Applicability to Proposed Project
	This Act establishes the Ghana Meteorological Agency, which replaces the Meteorological Services Department. The Agency is to provide meteorological information, advice, and warnings for the benefit of agriculture, civil and military aviation among others to mitigate the effects of natural disasters such as floods, storms and droughts on socio-economic development and projects. The Agency is to provide the accurate data on climatic which are relevant for establishing climate change trends.	regularly especially in seeking meteorological information and advice

4.2.1 Agriculture Sector Legislation and Related Requirements

The agriculture sector legislation reviewed include:

- Plants and Fertilizer Act 2010 (Act 803);

Table 4-3: Agriculture Sector Legislation and Related Requirements

No.	Legal Framework and Key Compliance Requirements	Applicability to Proposed Project
	<u>Plants and Fertilizer Act 2010 (Act 803)</u> The Act provides for the efficient conduct of plant protection to prevent the introduction and spread of pests and diseases, to regulate imports and exports of plants and planting materials; the regulation and monitoring of the exports, imports and commercial transaction in seeds and related matters; and control and regulation of fertilizer trade.	The Plant Protection Regulatory Services Division (PPRSD) of MoFA will ensure that all seeds/plant materials are safe and also put in monitoring mechanism to prevent the spread of pests and diseases from the project site to other parts of the country.

4.2.2 Local Governance and Planning Requirements

The relevant legislation reviewed include:

- Local Governance Act, 2016 (Act 936);
- National Building Regulations, 1996 (LI 1630);
- The State Lands Act, 1962 (Act 125);
- Lands Commission (LC) Act 2008, Act 767; and
- Land Use and Spatial Planning Act, 2016 (Act 925).

Table 4-4: Local Governance and Planning Requirements

No.	Legal Framework and Key Compliance Requirements	Applicability to Proposed Project
1.	<u>Local Governance Act, 2016 (Act 936)</u> This Act establishes and regulates the local government system and gives authority to the RCC and the Municipal Assembly to exercise political and administrative power in the regions and districts respectively. This includes initiation of development programmes as well as development, improvement and management of human settlements and the environment through departments such as the Urban/Feeder Roads and Physical Planning Departments.	The input of the Physical Planning and Roads Departments of the Municipal Assemblies will be sought in designing water distribution networks
2.	<u>National Building Regulations, 1996 (LI 1630)</u> The National Building Regulations, 1996 (LI 1630) make it an offence for any individual to undertake any development without the acquisition of a Building Permit from the appropriate authority. This ensures that buildings are well planned and are in conformity with the Assembly's plan designs of an area. The LI 1630 ensures that buildings are well planned, consistent with the Assembly's spatial plan for an area.	The project will involve development of agricultural infrastructure such as sheds, storage etc. and the necessary building permit will be acquired.
3.	<u>The State Lands Act, 1962 (Act 125)</u> The Act 125 vests the authority to acquire land for the public interest in the President of the Republic. It also gives responsibility for registering a claim on the affected person or group of persons, and provides details of the procedure to do this. The State Lands Act, 1962 provides some details to be taken into consideration when calculating compensation such as definitions for cost of disturbance, market value, replacement value, and so on.	The project implementation will result in some form of displacement or disturbance, and due process will be followed in accordance with the relevant provisions of this Act
4.	<u>Lands Commission (LC) Act, 2008 (Act 767)</u> The Lands Commission Act 2008 re-establishes the Lands Commission to integrate the operations of public service land institutions in order to secure effective and efficient land administration to provide for related matters. The objectives of the Commission are to (i) promote the judicious use of land by the society and (ii) ensure that land development is in conformity with the nation's development goals.	The Project will be implemented in line with the objectives of the Commission for sustainable development of land and conform to the development goals of the MMDAs.
5.	<u>Land Use and Spatial Planning Act, 2016 (Act 925)</u> The Land Use and Spatial Planning Act, 2016 (Act 925) regulates land use through a decentralised planning system to ensure judicious use of land in order to improve quality of life, promote health and safety in respect of human settlements and generally provide for spatial aspects of socio-economic development and related matters.	The project design will be guided by planning schemes and local plan guides developed by the Land Use and Spatial Planning Departments/District or Municipal Assemblies

4.2.3 National Labour, Environmental Quality, Health, Safety and Social Guidelines

The reviewed legislation includes:

- Labour Act, 2003 (Act 651);
- Occupational Safety and Health Policy of Ghana (Draft, 2004);
- Workmen's Compensation Law, 1987 (PNDCL 187);
- National Workplace HIV/AIDS Policy;
- Environmental Impact Assessment Guideline for the agricultural Sector (EPA, 2010);
- Ghana Standard for Environmental Protection - Requirements for Effluent Discharge (GS1212, 2019);
- Ghana Standards for Environment and Health Protection - Requirements for Ambient Air Quality and Point Source/Stack Emissions (GS 1236, 2019);
- Ghana Standards for Health Protection - Requirements for Ambient Noise Control (GS 1222, 2018);
- Ghana Standards for Environment and Health Protection - Requirements for Motor Vehicle Emissions (GS1219, 2018);
- Ghana National Fire Service Act, 1997 (Act 537);
- Fire Precaution (Premises) Regulations, 2003 (LI1724);
- Control of bush fires law of 1983 (PNDC L 46)
- Control and Prevention of Bush Fire Law (PNDC L 229);
- Children's Act 1998, Act 560; and
- Alternative Dispute Resolution Act 2010 (Act 798).

Table 4-5: National Labour, Environmental Quality, Health, Safety and Social Guidelines

No.	Legal Framework and Key Compliance Requirements	Applicability to Proposed Project
1.	<u>Labour Act, 2003 (Act 651)</u> The Labour Act 2003 (Act 651) Section 118(1) stipulates that it is the duty of an employer to ensure that satisfactory, safe and healthy conditions are provided for every worker. Under these provisions, a worker is required to report situations that he believes may pose <i>"an imminent and serious danger to his or her life, safety or health"</i>.	Construction activities could result in injuries and fatalities. HSE issues have been duly assessed and provided for in the proposed ESMP for the project
2.	<u>Occupational Safety and Health Policy of Ghana (Draft, 2004)</u> The statement of the Occupational Safety and Health Policy of Ghana (Draft, 2004) is: 'to prevent accidents and injuries arising out of or linked with or occurring in the course of work, by minimising as far as reasonably practicable the cause of the hazards in the working environment and, therefore the risk to which employees and the public may be exposed'. The policy is derived from provisions of the International Labour Organisation (ILO) Conventions 155 and 161. The policy document highlights specific strategies, activities promotion and awareness creation which ensure that workers engaged at the construction and operation stages of the project are protected.	Potential sources of accidents and injuries that could occur in the course of work, have been identified and incorporated into safeguards for minimising safety and health risks and hazards as required by the draft OSH Policy.
3.	<u>Workmen's Compensation Law, 1987 (PNDCL 187)</u> It is to provide for the payment of compensation to workmen for personal injuries caused by accidents arising out and in the course of their employment. The tenets of the law place a large share of the burden of	The Labour policy and employment contracts will provide for workmen compensation in the event of injury.

No.	Legal Framework and Key Compliance Requirements	Applicability to Proposed Project
	supporting workers injured at the workplace on the shoulders of the employers.	
4.	<u>National Workplace HIV/AIDS Policy</u> The broad objectives of the National Workplace HIV/AIDS Policy, among others, are to provide protection from discrimination in the workplace to people living with HIV and AIDS; prevent HIV and AIDS spread among workers; and provide care, support and counselling for those infected and affected. The project will institute a plan of action to prevent HIV/AIDS spread through awareness creation.	The project duration will be short-term and use just a few migrant workers. This will reduce the potential for HIV spread but an HIV policy will be provided as required by the national policy
5.	<u>Environmental Impact Assessment Guidelines for the Agricultural Sector (EPA, 2010)</u> The Agriculture Sector Guidelines is meant to assist the Environmental Protection Authority (EPA) in the implementation of its Environmental Impact Assessment procedures in Ghana. The document is in two parts. Part I deals with the background and methodology. Areas covered include overview of the agricultural sector, environmental assessment processes, environmental management programme and project decommissioning. Part II covers information and tools used in the environmental impact assessment. This includes the legal framework for EIA procedures in agriculture, general screening criteria, environmentally sensitive areas in agriculture and impact identification, evaluation and mitigation measures. It is intended to provide guidelines that will be used through all stages of an Agricultural Project Cycle; i.e. identification, preparation, appraisal, implementation and post-implementation monitoring.	These guidelines were taken into consideration in preparing this ESIA report. Also, all other project activities will follow these guidelines
6.	<u>Ghana Standard for Environmental Protection - Requirements for Effluent Discharge (GS1212, 2019)</u> Ghana Standard for Environmental Protection - Requirements for Effluent Discharge (GS1212, 2019); specifies requirements for sector specific effluent quality and also gives guideline discharge into the environment.	Effluent from both construction and operation phases will be managed as specified in the proposed ESMP
7.	<u>Ghana Standards for Environment and Health Protection - Requirements for Ambient Air Quality and Point Source/Stack Emissions (GS 1236, 2019)</u> Ghana Standards for Environment and Health Protection - Requirements for Ambient Air Quality and Point Source/Stack Emissions (GS 1236, 2019) specifies the requirements and methods of analysis for ambient air. It also specifies the requirements and test methods for point source or stack emissions based on the sources of energy.	Dust and vehicular emissions will be controlled as specified in the proposed ESMP
8.	<u>Ghana Standards for Health Protection - Requirements for Ambient Noise Control (GS 1222, 2018)</u>	Noise generated at both the construction and operation

No.	Legal Framework and Key Compliance Requirements	Applicability to Proposed Project
	Ghana Standards for Health Protection - Requirements for Ambient Noise Control (GS 1222, 2018) specifies the requirements for acceptable ambient noise levels within categorized locations. According to the Standards, the test method should be in accordance with the relevant test methods given in GS 1253:2018 (Acoustics- Guide for the measurement of outdoor A-weighted sound levels	stages will be monitored as stated in the proposed ESMP to ensure it does not exceed acceptable limits
9.	<u>Ghana Standards for Environment and Health Protection - Requirements for Motor Vehicle Emissions (GS1219, 2018)</u> Ghana Standards for Environment and Health Protection - Requirements for Motor Vehicle Emissions specifies the requirements for exhaust emissions of motor vehicles as well as tractors, farm equipment (such as combine harvester, etc.), mobile industrial / construction machines (such as excavators).	Vehicles for transportation of materials and workers will produce fumes but will be managed with regular maintenance as stipulated in the proposed ESMP
10.	<u>Ghana National Fire Service Act, 1997 (Act 537)</u> The Ghana National Fire Service (GNFS) Act, 1997 (Act 537) re-established the National Fire Service to provide for the management of undesired fires and to make provision for related matters. The objective of the Service is to prevent and manage undesired fire. For the purpose of achieving its objective, the Service shall organise public fire education programmes to create and sustain awareness of the hazards of fire, heighten the role of the individual in the prevention of fire and provide technical advice for building plans in respect of machinery and structural layouts to facilitate escape from fire, rescue operations and fire management.	The project area is prone to bushfires so the Fire Service will be engaged to provide education/sensitization on fire prevention and fighting.
11.	<u>The Fire Precaution (Premises) Regulations 2003, LI 1724</u> The Fire Precaution (Premises) Regulations 2003 (LI 1724) requires all premises intended for use as workplaces to have Fire Certificates and confers enforcement powers on the Ghana National Fire Service (GNFS) to demand a fire certificate for premises that are put to use as a place of work.	Fire certificates will be obtained for warehouses and project offices.
12.	<u>Control of Bush Fires Law of 1983 (PNDCL 46)</u> It seeks to control the setting of bushfires by criminalizing the intentional, reckless, or negligent causing of such fires and holding the offender liable for all consequences of the fire.	Bushfire is a risk to the proposed project and will be guided by these Laws to take lawful action against any such offender.
13.	<u>Control and Prevention of Bushfire law, PNDCL 229</u> Section 2 defines "starting of a bushfire". A person starts a bushfire if an action of that person results in the uncontrolled burning of a farm, forest or grassland. The Chief Conservator of Forests or the Chief Game and Wildlife Officer may authorize starting of fires by authorized officers in Conservation Areas under section 4.	The project area has been designated as an environmentally sensitive area as climatic conditions make it prone to bushfires. Measures have been

No.	Legal Framework and Key Compliance Requirements	Applicability to Proposed Project
		proposed in this report to deal with fire risks.
14.	<u>The Children's Act 1998, Act 560</u> The Act spells out the rights of the child, quasi-judicial/judicial child adjudication, parentage /custody/access/maintenance, fosterage/ adoption and employment of children issues. The Act defines a child as a person below the age of 18 years. The minimum age for admission of a child to employment is fifteen years and the minimum age for the engagement of a person in hazardous work is eighteen years. No person shall engage a child in exploitative labour and labour is exploitative of a child if it deprives the child of its health, education or development.	The Project will be guided by this Act in the employment of labour for the proposed project and will ensure all labour engaged by the Contractors are not below the minimum age.
15.	<u>Alternative Dispute Resolution Act 2010 (Act 798)</u> The purpose of the Act is to "...provide for the settlement of disputes by arbitration, mediation and customary arbitration, to establish an Alternative Dispute Resolution Centre and to provide for related matters." The Act further defines Alternative Dispute Resolution "as the collective description of methods of resolving disputes otherwise than through the normal trial process" (Section 135). The ADR Act covers both domestic and international arbitration in Ghana and the enforcement of both domestic and foreign arbitral awards within the jurisdiction.	The REWARD Project will ensure that the alternative dispute resolution option is used to address disputes and conflicts instead of the more expensive and time-consuming legal court system under this project.

4.3 National Institutional Framework

The stakeholder institutions identified include:

- Ministry of Food and Agriculture;
- Water Resources Commission;
- Lands Commission;
- Environmental Protection Authority;
- Local Government Authority; and
- Traditional Authorities.

The roles and responsibilities of the Project Implementation Unit (PIU), implementing agencies and other stakeholders, legislative and regulatory requirements for the implementation of the ESMP are provided under **section 9** of this report.

Table 4-6: National Institutional Framework

No.	Institutional Framework and Key Implementation Responsibilities	Applicability to Proposed Project
1.	<u>Ministry of Food and Agriculture (MOFA)</u>	Regional and Municipal/District

No.	Institutional Framework and Key Implementation Responsibilities	Applicability to Proposed Project
	MOFA promotes sustainable agriculture and agribusiness through research and technology development, effective extension and other support services to farmers, processors, and traders for improved human livelihood. The Food and Agriculture Sector Development Policy (FASDEP II) and the Medium-Term Agricultural Sector Investment Plan (METASIP) seeks to guide development and interventions in the agriculture sector. The Resilient Rice Regional Value Chains in West Africa Project (REWARD) of MoFA also seeks to develop agriculture in Ghana in line with the country's efforts at poverty reduction and ensuring food security by promoting inclusive commercial farming along selected commodity value chains.	Departments of Agriculture have the mandate of offering extension services and support to ensure sustainability and the successful implementation of the project
2.	<u>Water Resources Commission (WRC)</u> WRC was established by an Act of Parliament (Act 522 of 1996) with the mandate to regulate and manage Ghana's Water Resources and co-ordinate government policies in relation to them. The Act stipulates that ownership and control of all water resources are vested in the President on behalf of the people, and clearly defines the WRC as the overall body responsible for water resources management in Ghana. The functions of the WRC as established under Act 522 among other things are to: ▪ Formulate and enforce policies in water resources conservation, development and management in the country; ▪ Coordinate the activities of the various agencies (public and private) in the development and conservation of water resources; ▪ Enforce, in collaboration with relevant agencies, measures to control water pollution; and ▪ Be responsible for appraising water resources development project proposals, both public and private, before implementation.	The REWARD Project will collaborate with the WRC for the protection of any water collected in the valley.

No.	Institutional Framework and Key Implementation Responsibilities	Applicability to Proposed Project
3.	<u>Local Government Authority</u> The Regional Coordinating Council (RCC) and the Metropolitan /Municipal/District Assemblies (MMDAs) are responsible for the overall development of the region and metropolis/municipality/district respectively. Acts 462 and 480, which established the current district assembly structure, designate the District/Municipal/Metropolitan Assembly as the planning authority, charged with the overall development of the district. With regard to environmental management at the district level, the District Environmental Management Committees (DEMC) has been set up by law (Act 462) to among other things: ▪ promote and provide guidelines for the establishment of community-level environmental committees to put into effect the environmental programmes of the Assembly in the community; and ▪ plan and recommend to the DA, strategies and activities for the improvement and protection of the environment with emphasis on fragile and sensitive areas, river courses etc.	The project is located in the Nandom Municipal area and will be influenced by decisions and plans of the Northern Regional Coordinating Council and the identified Assembly. The Assembly will play key roles in the successful implementation and related activities of the project.
4.	<u>Lands Commission</u> The Lands Commission was established by Article 258 of the 1992 Constitution and the Lands Commission Act, 2008 (Act 767). The functions of the Lands Commission include amongst others; ▪ advise the Government, local authorities and traditional authorities on the policy framework for the development of particular areas of the country to ensure that the development of individual pieces of land is coordinated with the relevant development plan for the area concerned; ▪ ensure that through sound, sustainable land use planning, socio-economic activities are consistent with sound land use through sustainable land use planning in the long-term national development goals; and promote community participation and public awareness at all levels in sustainable land management and development practices to ensure the highest and best use of land.	The REWARD Project will be implemented in line with the objectives of the Commission for sustainable development of land and conform to the development goals of the MMDAs.

No.	Institutional Framework and Key Implementation Responsibilities	Applicability to Proposed Project
5.	<u>Environmental Protection Authority</u> The EPA is the body responsible for regulating the environment and ensuring the implementation of government policies on the environment. The functions of the Authority include: ▪ ensuring compliance with any laid down environmental impact assessment procedures in the planning and execution of development projects, including compliance in the respect of existing projects; ▪ promoting effective planning in the management of the environment; ▪ imposing and collecting environmental protection levies in accordance with the Environmental Protection Act 2025, Act 1124 or regulations made under the Act; and ▪ acting in liaison and co-operation with government agencies, District Assemblies and other bodies and institutions to control pollution and generally protect the environment.	The REWARD Project will follow and abide by all EPA procedures in the implementation of the project.
6.	<u>Traditional Authorities</u> In Ghana, people of common descent owe allegiance to a symbol of collective authority, such as the ‘stool’ for the Akans of southern Ghana or the ‘skin’ for the northern peoples. Traditional authorities play a role in the administration of the area. At the village level, family and land disputes and development issues are also traditionally dealt with by the village chief and elders. In addition to providing an important leadership role, especially in the more rural areas, chiefs act as custodians of stool/skin land, can mobilise their people for developmental efforts and arbitrate in the resolution of local disputes. Although chiefs have no direct political authority, some are appointed by the Government or Municipal/District Assemblies.	The proposed project site falls under the Nandom Traditional Council that is a key stakeholder in the project.

4.4 International Policies and Conventions

Some international requirements, standards and guidelines reviewed include the African Development Bank Operational Safeguards and other International Conventions which are further discussed in this section.

4.4.1 African Development Bank Operational Safeguards

The African Development Bank (AfDB) has an updated Integrated Safeguards System (ISS), published in 2023, which contains published Operational Safeguards (OSs) to guide the safe development of projects it funds. The applicable Operational Safeguards are described in the **Table 4-7** below. The AfDB requirements are not inconsistent with the national requirements and therefore no implementation conflicts are foreseen.

Table 4-7: Operational Safeguards of AfDB

No.	AfDB Operational Safeguard Policy	Summary of core requirements	Potential for Trigger under proposed project	Applicability to proposed project
1.	OS1– Environmental and social assessment	Borrowers or clients are responsible for conducting the environmental and social assessment (Strategic Environmental and Social Assessment, or SESA, or Environmental and Social Impact Assessment, or ESIA) and for developing, as an integral part of project documentation, an appropriate plan for managing possible impacts. It categorises proposed projects into categories 1, 2, 3, 4 and 5 based on the extent of adverse impacts anticipated from the project.	Applicable	OS1 is applicable because the REWARD Project will be based on the development and rehabilitation of agriculture infrastructures, which may pose adverse environmental and social risks. The REWARD Project risks will be managed throughout the implementation of mitigation measures prescribed in the site specific ESMPs. The project will prepare an ESIA and conduct extensive stakeholder engagements.
2.	OS2– Labour and Working Conditions	This OS outlines the main requirements for borrowers or clients to protect the rights of workers and provide for their basic needs. When the borrower or client intends to employ a workforce for a project, it develops and implements a human resources policy and procedures appropriate to the nature and size of the project, with the scale of the workforce in alignment with this OS and with applicable national laws. The OS requires the protection of the workforce through the institution of appropriate health and safety measures taking into account risks inherent in the particular sector and specific classes of hazards in the borrower's work and does not	Applicable	The Contractor shall comply with the Labour laws and Occupational Health and Safety Best Practice. • Preparation of an occupational health and safety plan. • Develop a worker grievance redress mechanism. • Training of workers on OHS procedures.

No.	AfDB Operational Safeguard Policy	Summary of core requirements	Potential for Trigger under proposed project	Applicability to proposed project
		support the use of child labour and forced labour.		
3.	OS3- Resource Efficiency and Pollution Prevention and Management	This OS outlines the main pollution prevention and control requirements for borrowers or clients to achieve high quality environmental performance, and efficient and sustainable use of natural resources, over the life of a project. It draws on and aligns Bank operations with existing international conventions and standards related to pollution, hazardous materials and waste, and related issues.	Applicable	OS3 is applicable because potential environment and social impact due to emissions of pollutants and waste is anticipated during the construction phase. Likewise, agriculture development activities will involve the use of improved application of fertilizers and agro-chemicals, as well as result in the production of agriculture wastes. These will be managed as per measures prescribed in the ESMP. The project will prepare and implement a Pest Management Plan (PMP).
4.	OS 4– Community Health, Safety and Security	This OS outlines the risks and impacts of the project to the health and safety of the Affected Communities during the project lifecycle and establish preventive and control measures consistent with Best International Practices and commensurate with their nature and magnitude of impacts.	Applicable	OS4 is applicable because the implementation of the project will have some impact on beneficiary communities as well as those close to the project site. The communities have been engaged on the project and there will be continuous engagement of all nearby communities.
5.	OS5– Land Acquisition, Restrictions on Access to Land and Land Use, and Involuntary Resettlement	It relates to Bank-financed projects that cause the involuntary resettlement of people. It seeks to ensure that when people must be displaced they are treated fairly, equitably, and in a socially and culturally sensitive manner; that they receive compensation and resettlement assistance so that their standards of living,	Applicable	OS5 is applicable because there will be loss of livelihood due to land acquisition. Some community members may be restricted from accessing farm lands. The project will develop a process to minimize the impact of the project affected persons through the preparation and implementation of Resettlement Action Plan (RAP) which will include Livelihood

No.	AfDB Operational Safeguard Policy	Summary of core requirements	Potential for Trigger under proposed project	Applicability to proposed project
		income-earning capacity, production levels and overall means of livelihood are improved; and that they share in the benefits of the project that involves their resettlement.		Restoration Plan (LRP) and a Voluntarily Land Donation (VLD) process.
6.	OS6 – Habitat and Biodiversity Conservation and Sustainable Management of Living Natural Resources	This Operational Safeguard (OS) outlines the requirements for borrowers or clients to (i) identify and implement opportunities to conserve and sustainably use biodiversity and natural habitats, and (ii) observe, implement, and respond to requirements for the conservation and sustainable management of priority ecosystem services	Applicable	OS6 is applicable since the proposed interventions will involve the clearing of vegetation and possible impact of local flora and fauna.
7.	OS 7 – Vulnerable Groups	The client will identify, through an environmental and social risks and impacts assessment process, all communities of Indigenous peoples within the project area of influence who may be affected by the project. Also the client will ensure that vulnerable groups and individuals are identified as early as possible in Bank Group operations and that engagement is meaningful, taking into account individuals' and communities' specificities and delivered in an appropriate form, manner and language. The client will adopt a gender-responsive approach to the management of E&S impacts, which takes into account the rights and interests of women	Not applicable	There are no indigenous people on the project site or within the project communities of influence. The Project will prepare a Resettlement Action Plan (RAP) with due cognizance of the interests of vulnerable persons especially women, the elderly, People with disabilities (PWDs) etc. The engagement will be meaningful, taking into account individuals' and communities' specificities and delivered in an appropriate form, manner and language.

No.	AfDB Operational Safeguard Policy	Summary of core requirements	Potential for Trigger under proposed project	Applicability to proposed project
		and girls, men, and boys, including paying specific attention to the differentiated burden of impacts that women and girls might face.		
8.	OS8 – Cultural Heritage	This OS outlines the need of the client must protect cultural heritage from the adverse impacts of project activities and support its preservation. Clients should also promote the equitable sharing of benefits from the use of cultural heritage.	Applicable	There are no sensitive sites like shrines and cemeteries within the proposed project areas. However, water bodies in many Ghanaian societies are believed to house deities. These cultural/traditional beliefs and norms will be documented and respected as part of project implementation.
9.	OS9 - Financial Intermediaries	FIs are required to monitor and manage the environmental and social risks and impacts of their portfolio and FI subprojects, and monitor portfolio risk, as appropriate to the nature of intermediated financing. The way in which the FI will manage its portfolio will take various forms, depending on a number of considerations, including the capacity of the FI and the nature and scope of the funding to be provided by the FI.	Not Applicable	The project design does not foresee the need for a financial intermediary during project implementation.
10.	OS 10 - Stakeholder Engagement and Information Disclosure	Stakeholder Engagement and Information Disclosure recognizes the importance of open and transparent engagement between the Client and project stakeholders as an essential element of good international practice. Effective stakeholder engagement can improve the environmental and social sustainability of projects,	Applicable	All Stakeholders relevant to the project will be engaged according to the prepared stakeholder engagement plan. The stakeholder engagement plan will be updated as required and implemented together with a functional grievance redress mechanism.

No.	AfDB Operational Safeguard Policy	Summary of core requirements	Potential for Trigger under proposed project	Applicability to proposed project
		enhance project acceptance, and make a significant contribution to successful project design and implementation.		

4.4.2 International Conventions

Ghana is a signatory to some of the international conventions that are relevant to the proposed project and it is imperative to analyse the project in light of the commitments made under such conventions. The relevant international conventions are summarised **Table 4-8** below.

Table 4-8: International Policies and Framework

No.	Legal Framework and Key Compliance Requirements	Ratification Date	Applicability to Proposed Project
1.	<u>United Nations Convention on Biological Diversity</u> The three goals of the CBD are to promote the conservation of biodiversity, the sustainable use of its components, and the fair and equitable sharing of benefits arising out of the utilization of genetic resources. The convention calls for the adoption of national strategies, plans and programmes for the conservation and sustainable use of biological diversity into their relevant sectoral and cross-sectional plans, programmes and policies. One of the tools that are prescribed for the management of biodiversity is an environmental assessment. Article 14 of the convention deals with impact assessment and minimization of adverse impacts.	29 August 1994	Ghana is a signatory to these international conventions which are also relevant to the proposed project. The proposed project has potential impacts on biodiversity and will have to implement appropriate climate change adaptation measures. Ghana, being a signatory of these conventions, will work towards the achievement of the respective goals of these conventions. The ESIA will identify endangered species in the project area and recommend appropriate mitigation measures for their protection and conservation.
2.	<u>Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)</u> The objective of the Convention is to conserve wildlife and prevent international trade from threatening species with extinction.	14 November 1975	The Project has not identified any endangered species listed on the CITES on the project farmlands.

No.	Legal Framework and Key Compliance Requirements	Ratification Date	Applicability to Proposed Project
3.	<u>United Nations Framework Convention on Climate Change (UNFCCC)</u> The UNFCCC provides the basis for global action to protect the climate system for present and future generations. The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.	06 September 1995	The REWARD Project is a government agricultural initiative and is therefore bound by the requirements of the regulation.

5.0 ENVIRONMENTAL AND SOCIAL BASELINE CONDITIONS

Baseline conditions give the existing status of the environment in the proposed project area of influence before the commencement of the project activities. The information serves the purpose of a base reference against which the changes due to the implementation of the project can be measured. The description which is informed by relevant literature available/documents from stakeholders, presents a general understanding of the conditions within Nandom Municipal area which is the host district and where necessary, the Upper West Region of Ghana. The site-specific context describes the prevailing conditions at the project sites based on field observation and assessments.

5.1 Nandom Municipal Baseline Conditions

5.1.1 Physical Environment

The physical environment encompasses all natural and built factors in the locality. This section gives a description of the characteristics of physical environment of the Nandom Municipal area.

Climate

The area is characterized by two main seasons, the dry and the raining seasons. The dry season starts from November to April followed by the raining season from late May to early October. The dry season is noted for hunting and burning of bushes for game with most fire disasters occurring during this period. Temperatures are high all year, with a minimum of 23°C at night and a maximum of 42°C during the day and an average monthly temperature range of 21°C and 32°C. The dry season presents an opportunity for the preservation industry, which could use sunlight as a natural preservative while crop production happens in the rainy season.

Rainfall

Owusu (2018) carried out a detailed study on rainfall changes in the savannah zone of northern Ghana from 1961 to 2010. The study examined rainfall variability, trends, and impacts on agriculture and water resource management in the region.

The zone experiences a unimodal rainfall regime that lasts between 5 and 6 months, as shown in **Figure 5-1**. Rainfall is influenced by the Inter-Tropical Discontinuity (ITD) and other atmospheric systems. The mean annual rainfall total is around 1000mm and 90% of the rain occurs from May to October. Rainfall in the region is highly variable, both at the annual and multi-decadal scale (CARE International, 2013). Rain onset is erratic, making forecasting for agricultural applications very difficult.

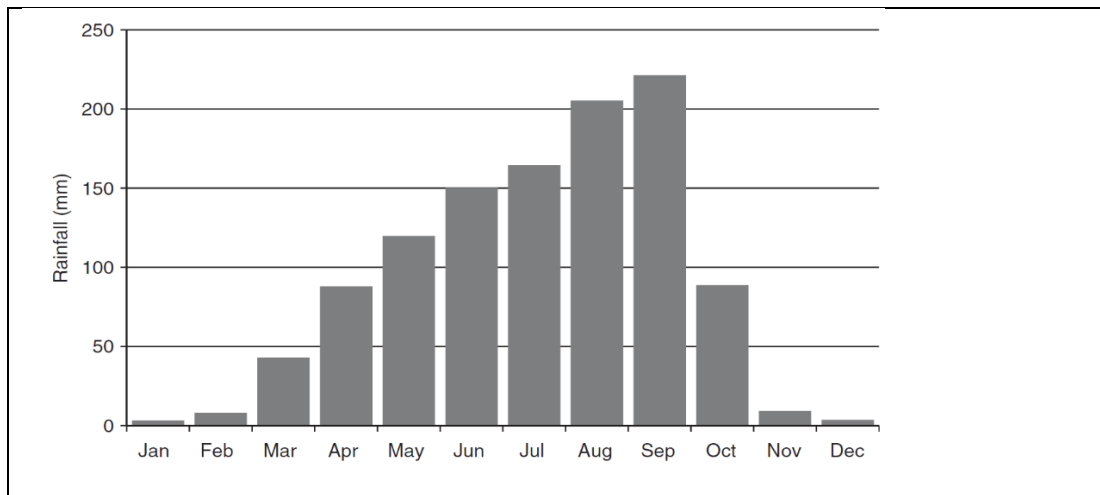


Figure 5-1: Unimodal rainfall regime of northern Ghana, represented by Tamale, 1960–2010.

The trend analysis of rainfall data from four stations (Navrongo, Tamale, Wa, Yendi) showed a decline in rainfall during the 1970s and 1980s, with minimal recovery post-2000. However, the recovery is insufficient to match the wetter periods of the 1950s and 1960s.

The region also experiences high inter-annual and multi-decadal variability, alternating between dry and wet phases every 20–30 years. The 1950s and 1960s were wetter, followed by droughts in the 1970s and 1980s, and a slight recovery post-2000 (see **Figure 5-2**).

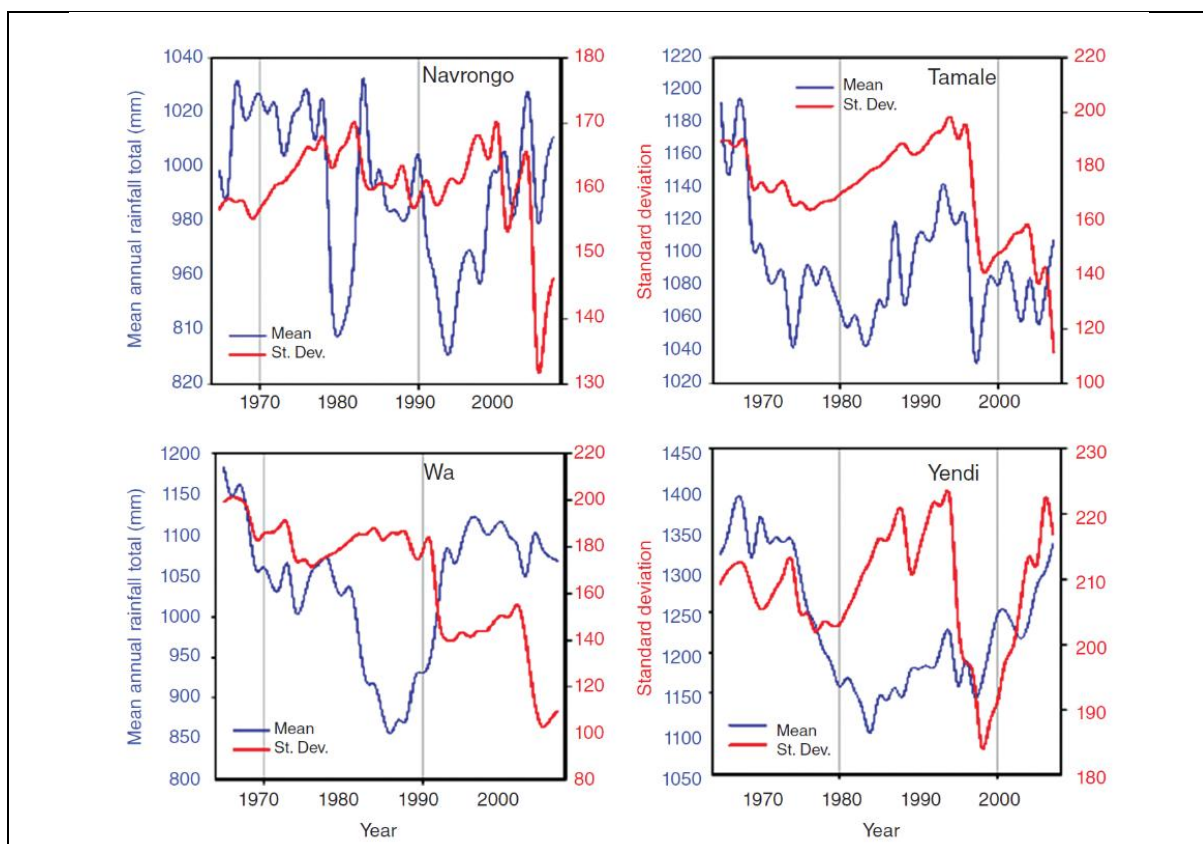


Figure 5-2: Mean annual rainfall total and standard deviation for northern Ghana.

The average monthly total rainfall data from the year 2015 to 2024 for Wa (the nearest meteorological station) is described in **Figure 5-3** below. The figure shows a distinct difference between wet season and dry season. The dry season is between November and March and wet season between April and October, peaking in September.

The highest average total monthly rainfall was recorded in September with a value of 230 mm making it the wettest month and the lowest was recorded in January (<10 mm).

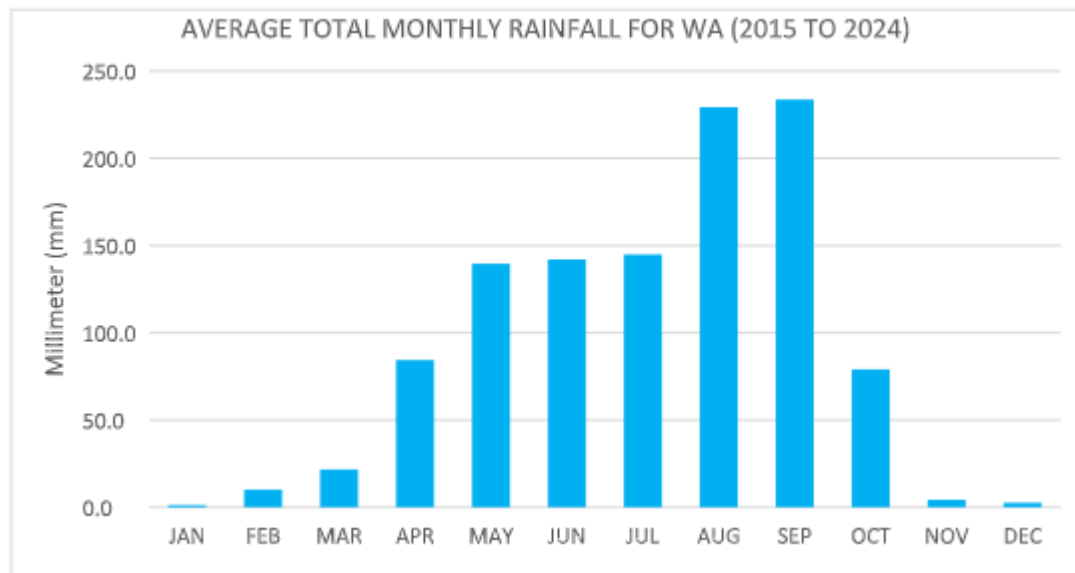


Figure 5-3: Average Monthly rainfall

(Ghana Meteorological Agency, 2025)

Temperature

Figure 5-4 shows the average monthly maximum and minimum temperatures. The hottest months mostly fall between February and March (37–39°C) which is the peak of the dry season. The lowest average minimum temperature was recorded in January (18°C) which usually coincide with the Harmattan, accompanied by cooler mornings and cooler nights.

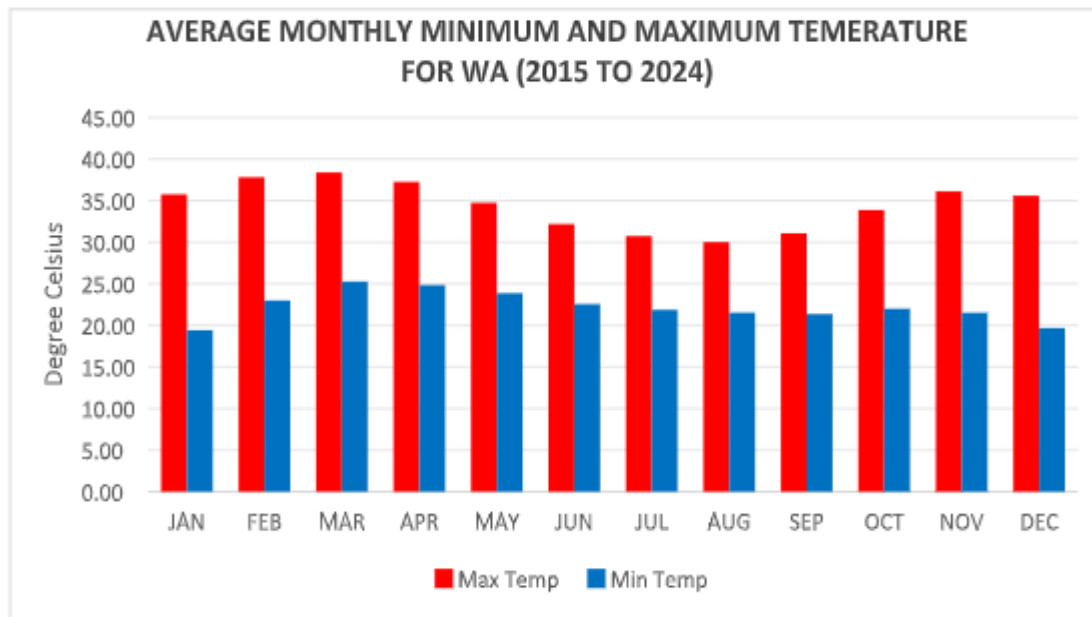


Figure 5-4: Average monthly Minimum and Maximum temperature

(Ghana Meteorological Agency, 2025)

Relative Humidity

The month of January recorded the lowest average monthly relative humidity while the highest was recorded in August. There is a steady decline in humidity levels between October and December with December marking the return to dry season conditions. The pattern indicated is typical for a tropical savanna climate with distinct wet and dry seasons. (Figure 5-5).

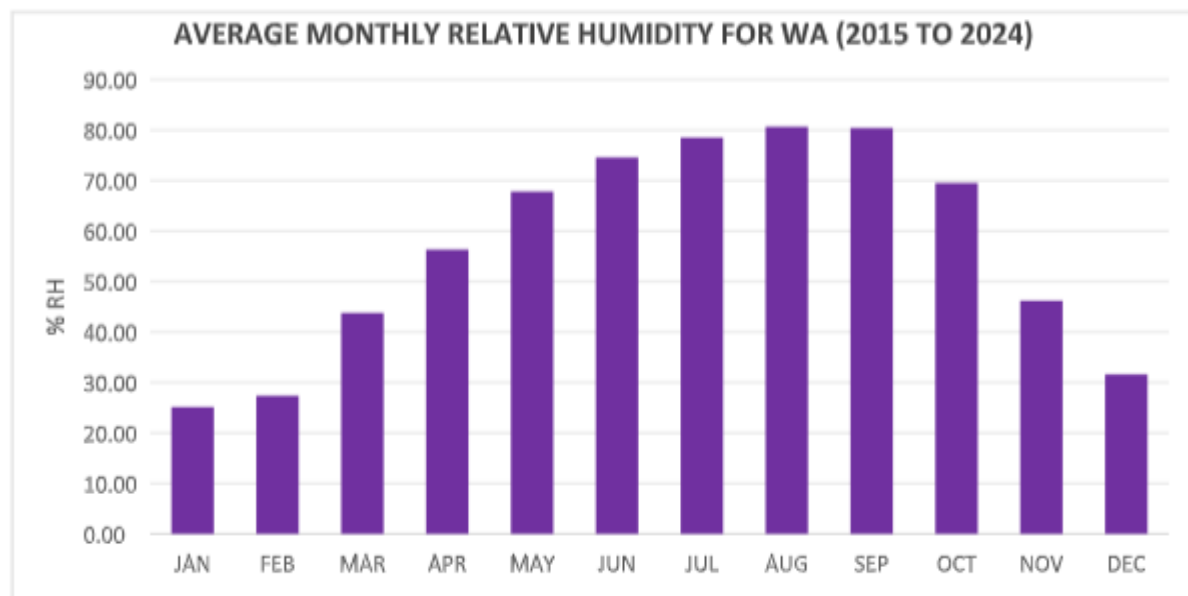


Figure 5-5: Average Monthly Relative Humidity

(Ghana Meteorological Agency, 2025)

Sunshine

High values of sunshine were recorded in November and December, with a gradual decline from June to August. Sunshine hours begin to increase again from September, peaking in November. This rise marks the end of the rainy season and return to drier, sunnier conditions. **(Figure 5-6).**

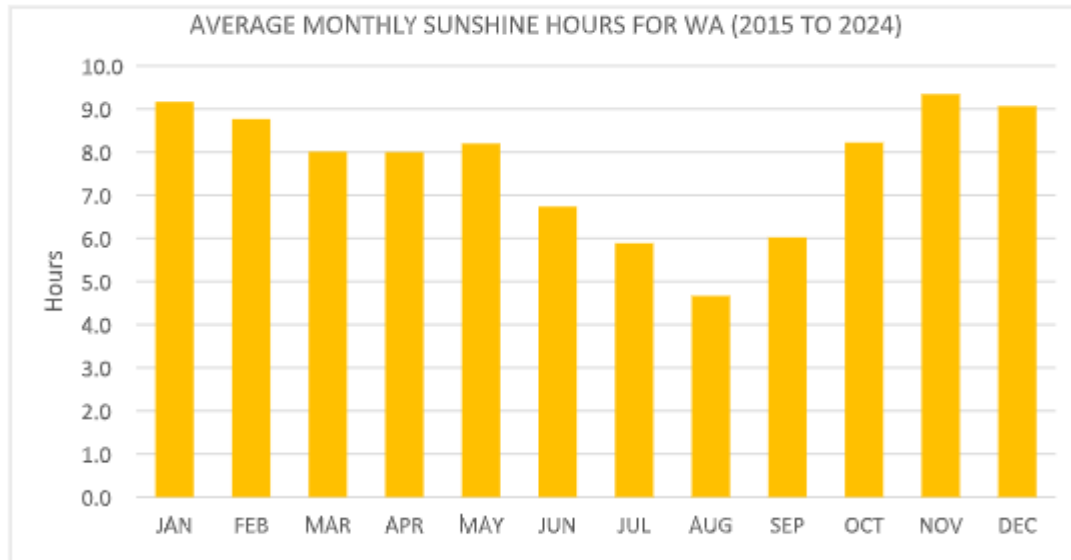


Figure 5-6: Average Total Sunshine Hours

(Ghana Meteorological Agency, 2025)

Wind Speed

As shown in **Figure 5-7**, the general trend indicate that the wind speed fluctuates over the years with two broad periods i.e. high winds from January to July, peaking in April and low winds from September to November. December marks a return to higher wind speeds.

Wind speed variation is generally described as moderate ranging roughly from 3.3 m/s to 4.6 m/s. The difference between the highest and lowest months is significant enough to impact activities dependent on wind including farming.

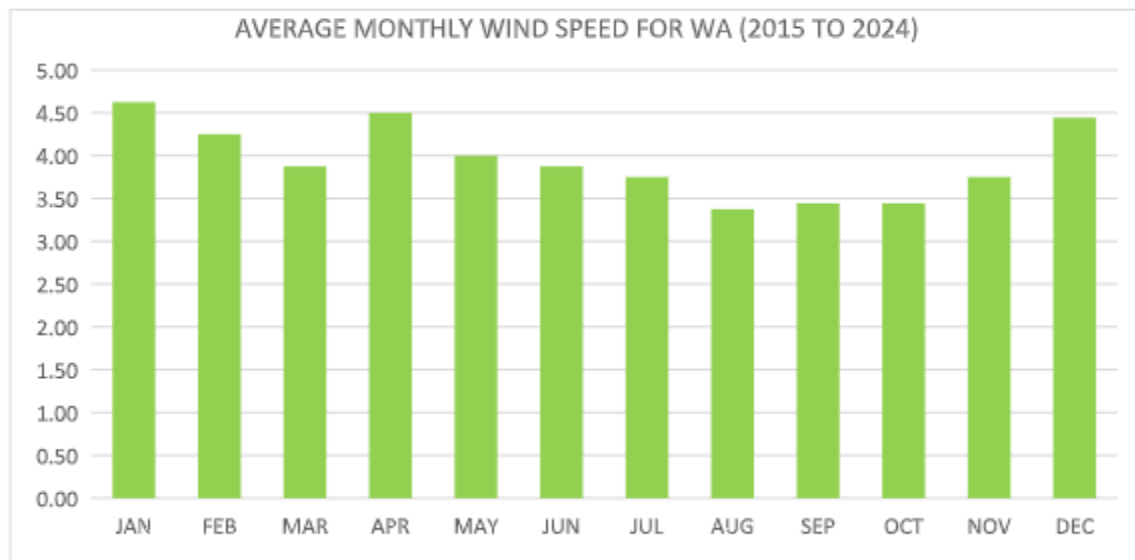


Figure 5-7: Average Monthly Wind Speed

(Ghana Meteorological Agency, 2025)

Water Resources

Ground Water

The occurrence of groundwater in Ghana is associated with 3 main geological formations. These are the basement complex, comprising crystalline igneous and metamorphic rocks; the consolidated sedimentary formations underlying the Volta basin (including the limestone horizon); and the mesozoic and cenozoic sedimentary rocks. The basement complex and the Voltaian formation cover 54 percent and 45 percent of the country respectively. The remaining 1 percent consists of mesozoic and cenozoic sediments.

Groundwater occurrence in the basement complex is associated with the development of secondary porosity as a result of jointing, shearing, fracturing and weathering. The depths of aquifers are normally between 10m and 60m, and yields rarely exceed 6 m³/hr. In the mesozoic and cenozoic formations occurring in the extreme south eastern and western part of the country, the aquifer depths vary from 6 m to 120 m. There are also limestone aquifers, some of which are 120 m to 300 m in depth. The average yield in the limestone aquifers is as high as 180 m³/hr. In all, the total actual renewable water resources are estimated to be 53.2 billion m³ per year. All recharge to water resources is precipitation.

The quality of groundwater resources in Ghana is generally good except for some cases of localised pollution and areas with high levels of iron, fluoride and other minerals. Salinity in certain groundwater occurrences is also found especially in some coastal aquifers. **Figure 5-8** shows a map of the Ground Water Potential Zones in Ghana (Murali Krishna Gumma & Paul Pavelic, 2012).

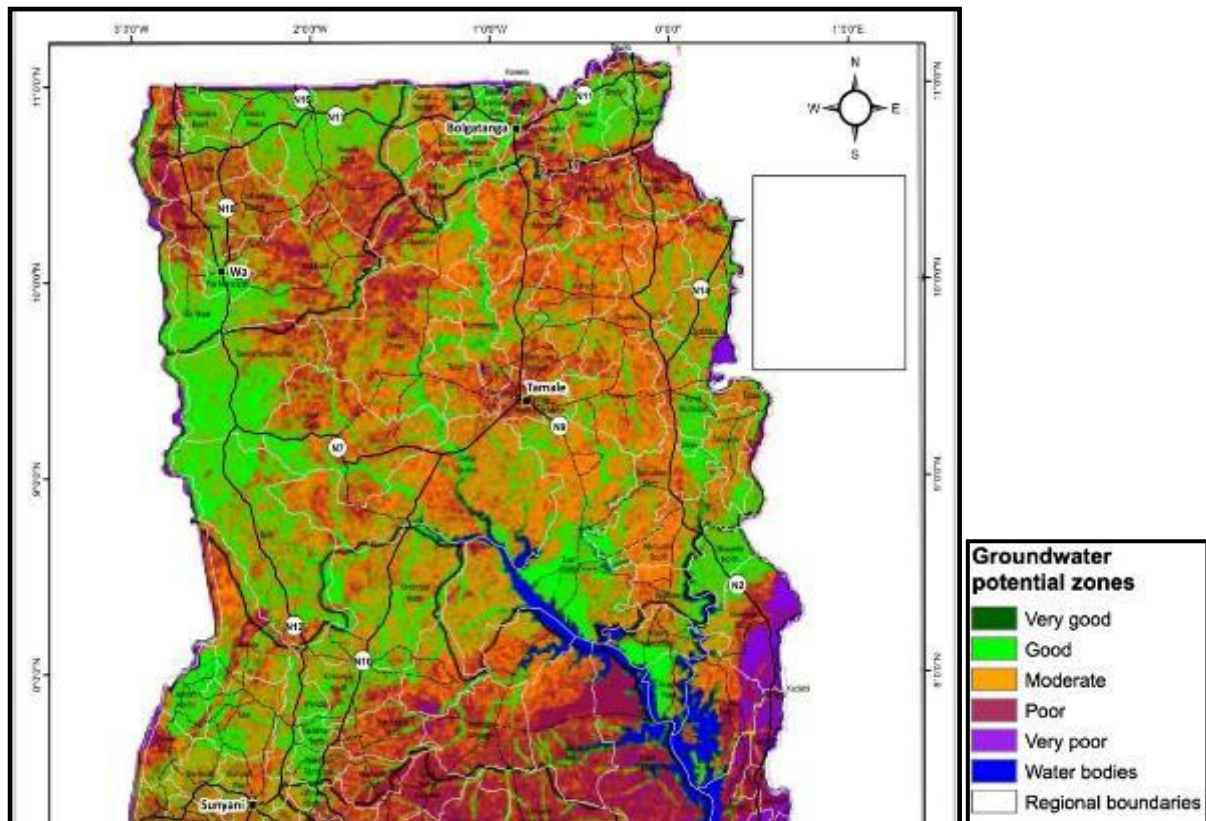


Figure 5-8: Ground Water Potential Zones in the Northern part of Ghana

(Source: Murali Krishna Gumma & Paul Pavelic, 2012)

Surface Water

The municipality's topography is gently undulating with a few isolated hills and an elevation of about 180 m above sea level. The area has just a few natural water bodies, mostly interconnected rivers and streams, such as the Kanbaa River, that flow into the Black Volta (see **Figure 5-9**). A number of dams and dugouts provide water for irrigation, domestic chores, construction, and grazing animals. Except in a few low-lying areas, the interconnected water bodies facilitate storm water drainage, making it less flood-prone. The perennial nature of the flows in most of these rivers and streams is an important feature. During the dry season, many of these bodies of water are reduced to intermittent pools, while others completely dry up. Many of these streams have the potential to be developed to support dry-season farming.

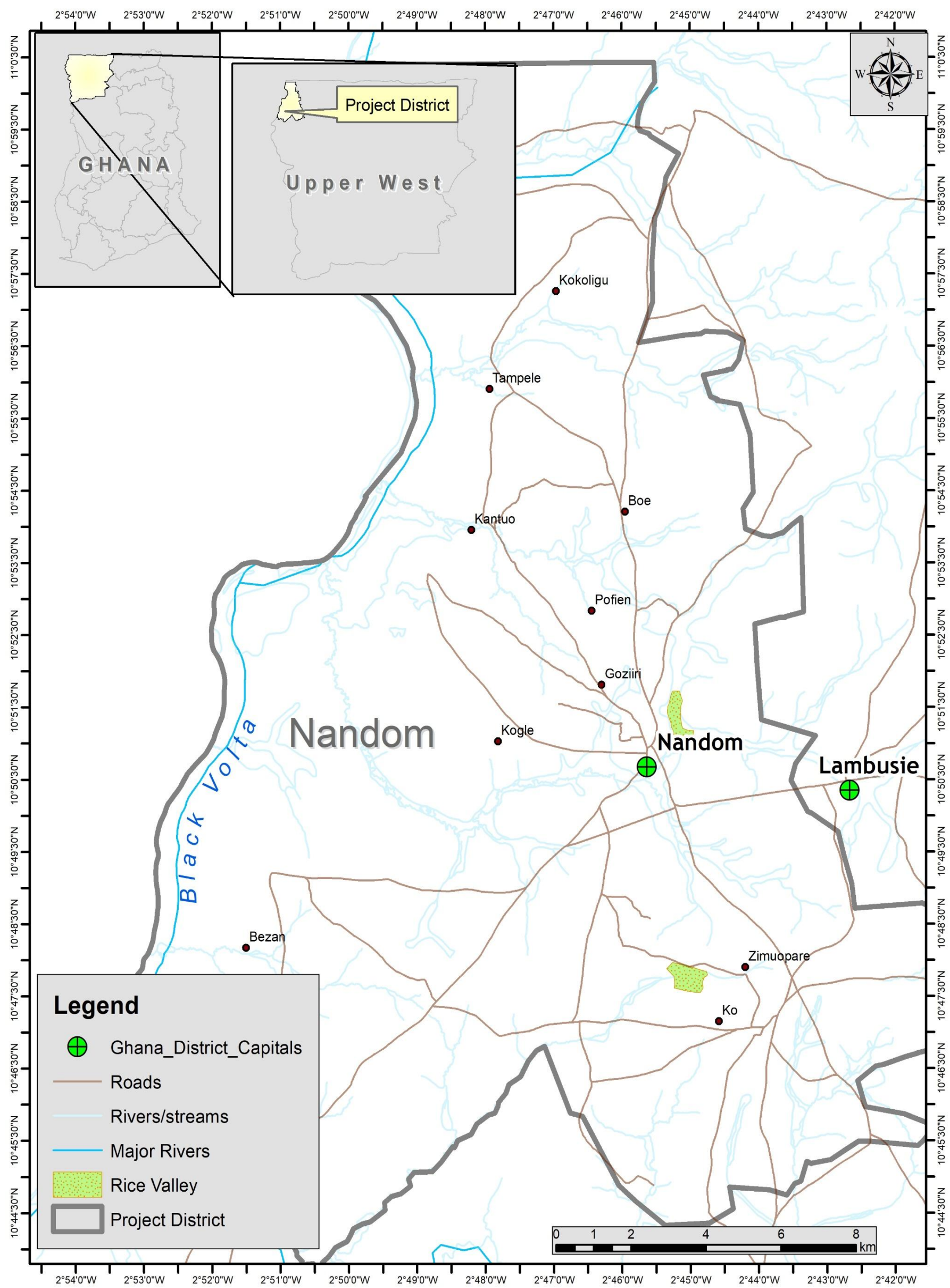


Figure 5-9: Drainage Map of the Nandom Municipal area
(Source: SAL Consult, 2025)

Geology and Soils

The area's rock formation is primarily Birimian, with scattered outcrops of granite. According to some research, there are minor occurrences of manganese, traces of gold and diamond, iron ore, and clay. The well-developed fracture pattern in the rocks creates a high potential for obtaining ground water (see **Figure 5-10**).

The main soil types in the area are sandstone, gravel, mudstone, alluvial, granite, and shale, which have weathered into various soil grades. Sand, clay, and laterite ochrosols are soil types that result from seasonal erosion (see **Figure 5-11**). These soil types are better suited for the cultivation of cereals and root tuber crops such as millet, maize, sorghum, and yam. They respond well to the application of organic manure and commercial fertilizers to produce a high yield. These soils have the potential to improve agriculture production with adequate rains and good farming practices. Also, the availability of these soil types has aided in housing development, which has relied on local building materials such as sand, gravel, and clay.

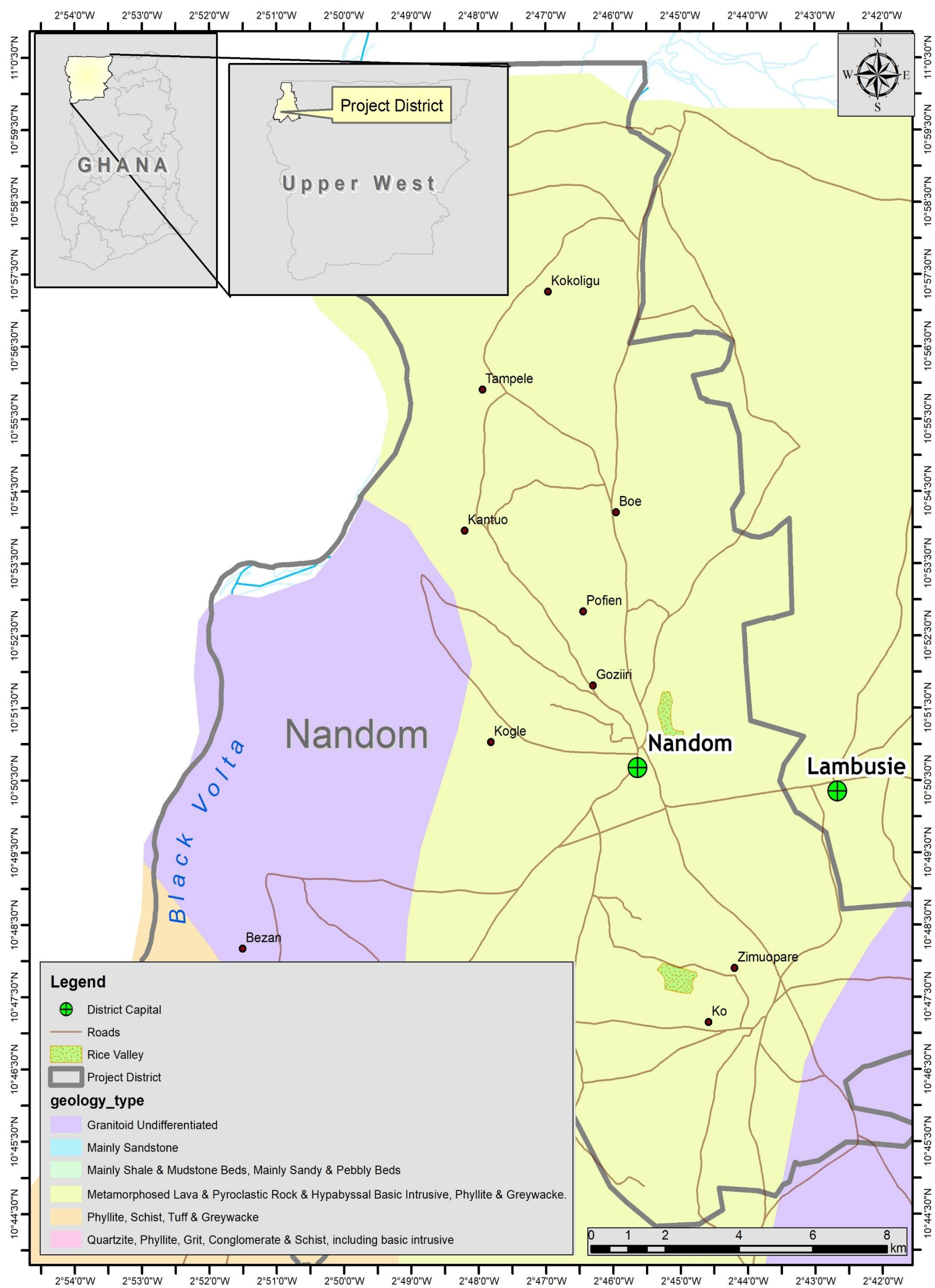


Figure 5-10: Geology Map of the Nandom Municipal area
(Source: SAL Consult, 2025)

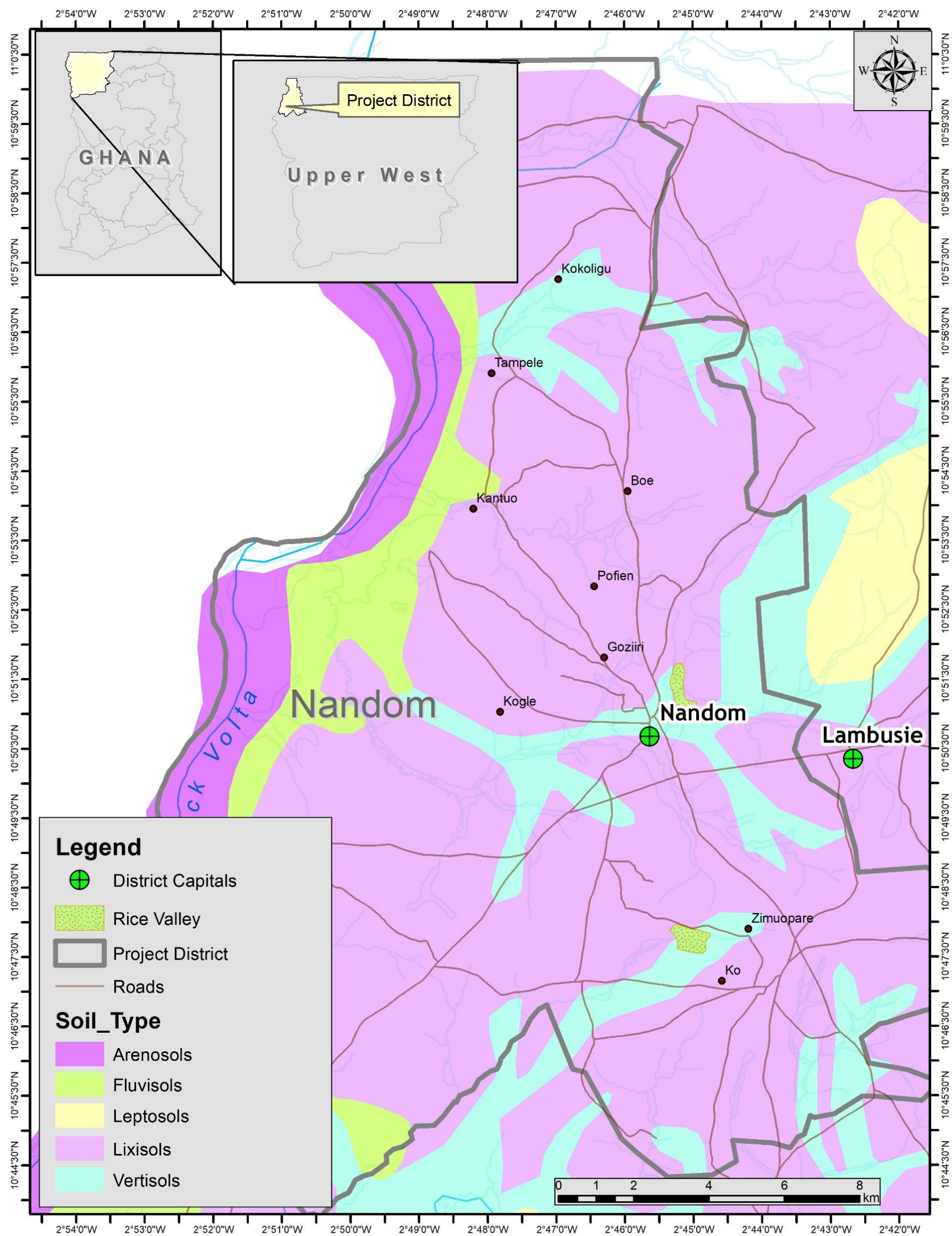


Figure 5-11: Soil Map of the Nandom Municipal area
(Source: SAL Consult, 2025)

5.1.2 Biological Environment

Vegetation

The municipality lies within the Guinea Savannah vegetation belt which is characterized by short grasses interspersed with fire-resistant trees such as Shea, Acacia, and Baobab trees (see **Figure 5-12**). The vegetation is ideal for livestock production, which contributes significantly to household income. The prolonged dry season has the greatest impact on the vegetation. During this time, the grass dries out, and subsequent bush burning leaves the area patchy and nearly devoid of vegetation.

Human activities, particularly indiscriminate tree felling for fuel wood, charcoal, and other purposes, as well as early torrential rain and poor animal husbandry practices, have steadily reduced vegetation cover while increasing soil erosion and depletion of soil fertility. Furthermore, improper farming practices such as shifting cultivation, road construction, and sand and gravel winning contribute to land degradation.

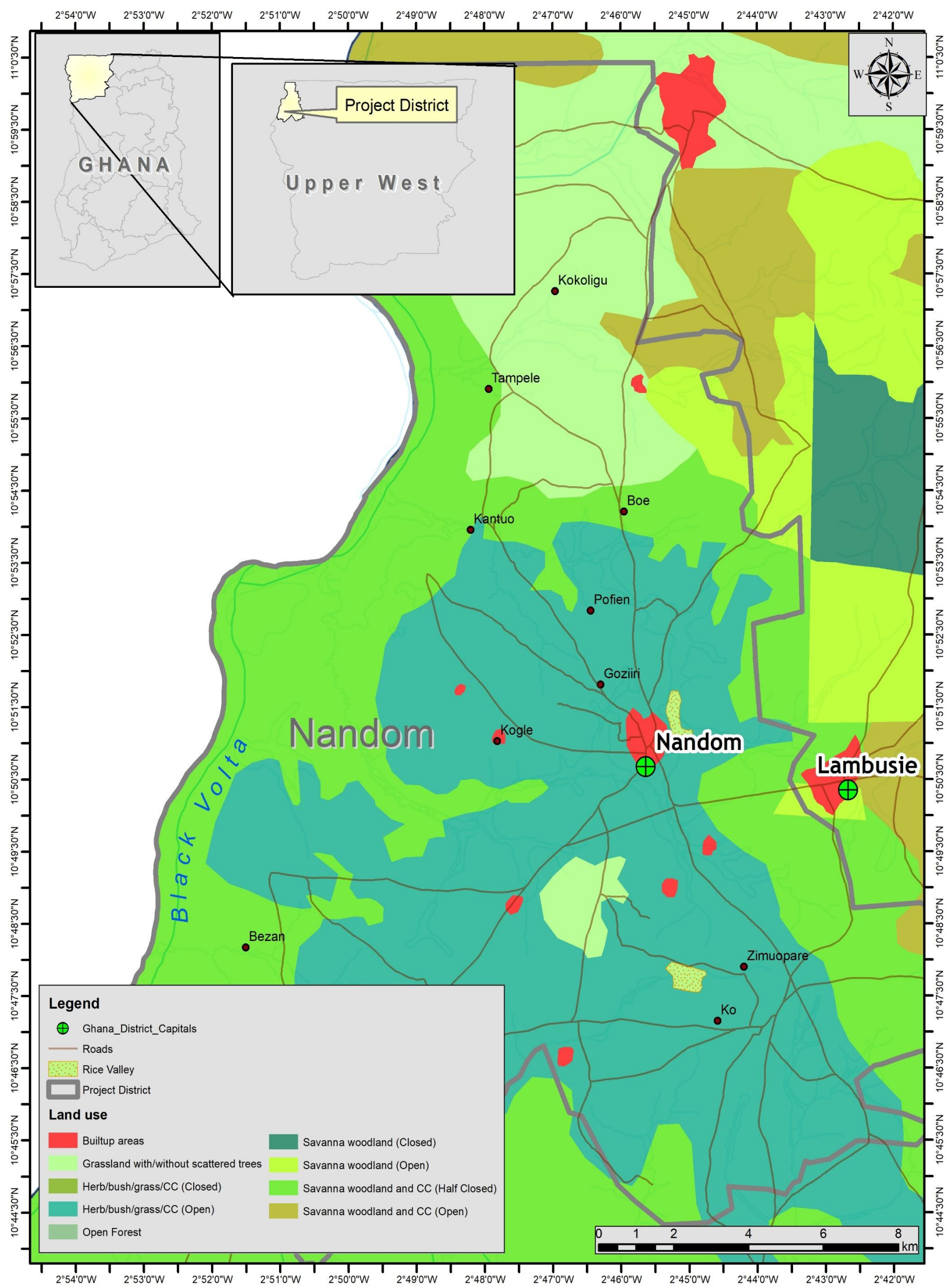


Figure 5-12: Vegetation Map of the Nandom Municipal area
(Source: SAL Consult, 2025)

5.1.3 Socio-economic Environment

Governance Structure

The Nandom Municipality's highest political and administrative body, is tasked with developing and implementing plans, programs, projects, and strategies for the district's overall sustainable development. The municipality has thirty-eight (38) Assembly members, twenty-seven (27) of them are elected members, while the remaining sixteen (16) are government appointees. The Municipal Chief Executive and the Member of Parliament are ex-officio members, bringing the total to thirty-eight (38). Administratively, the municipality is made up of one (1) Town Council, three (3) Area Councils, and twenty-two (22) Unit Committees.

Alongside the decentralized governance system is a supportive traditional governance system which appears to be in harmony with the MMDA System thereby promoting development in the local area. The area has one paramountcy, that is, the Nandom Paramountcy headed by the Nandom Naa. He is supported by Seventeen Divisional Chiefs and several Sub-Divisional Chiefs.

Demography

The municipality, according to the 2021 Population and Housing Census, has a total population of 51,328 comprising 25,577 (49%) males and 25,751 (51%) females. This is about 6% and <1% of the regional and national population respectively. The population density is 133 persons per sqkm with a total of 9,864 households and a household size of 5 persons per household which is lower than the regional average of five (5).

Most households (49%) reside in compound houses, followed by separate houses (30%), 12% in semi-detached houses and flat/apartments (<1%). Dwelling units such as huts, tents, kiosks, containers and attachment to shops or offices and uncompleted buildings together constitute 8% of the total dwelling units for households. The municipality is predominantly rural with 87% and 13% of the population living rural and urban areas respectively.

The Dagaabas are the predominant ethnic group with other minor tribes such as the Hausa, Mossi, Sissala, Asante etc. Unlike other parts of Northern Ghana, about 86% of the population are Christians with Muslims constituting 7%.

Education and Literacy

In terms of literacy, 49% of the population 11 years and older are illiterate. Of the literate population, the majority (56%) are literate in English and Ghanaian language.

Again, 55% are currently enrolled in primary school, compared to 33% who have previously attended primary school. There is a significant decrease in the proportion of people in the Municipality who are currently attending JHS (22%) compared to those who are now in SSS/SHS (7%). In addition, 1% are currently enrolled in tertiary education, while 5% have previously attended tertiary education. Males (1%) outnumber females (1%) in terms of tertiary education enrollment. Furthermore, the proportion of males (7%) who have previously obtained tertiary education is higher than that of females (3%).

Economic Activities

Majority (78%) of the economically active population is engaged in agriculture, forestry and fishery work, 10% in craft and related trade and 4% in service and sales. About 5% are engaged as managers, professionals, and technicians.

Considering that farming is the people's main occupation, it implies that their main sources of livelihood and income are limited during the dry season, resulting in the migration of the youth to the south in search of greener pastures. As a result, adequate irrigation facilities are required to promote and enhance agricultural activities during the dry season.

Utilities and Services

Energy

The municipality's energy supply is a major source of concern as only 27% of the population is connected to the national grid with 41% using kerosene as their primary source of energy for lighting. Firewood and charcoal remain the primary sources of energy for cooking, further depleting the vegetation. As a result, there is a need to extend electricity to underserved communities and ensure district-wide access to LPG.

Water

Boreholes account for 72% of the municipality's drinking water supply, followed by pipe borne outside dwellings (10%), 7% from pipe-borne inside dwelling and 5% from public taps/stand pipes. Majority of rural households (81%) rely on boreholes/pump/tube wells for drinking water, while only a few in the urban sector do (31%).

Sanitation and Waste Management

The sanitation situation in the municipality is among the best in the region, and it ranks first in the region's Open Defecation Free (ODF) League Table with about 91% of communities certified and declared ODF. Majority of households in these communities have their own latrines and an increase in hand washing awareness is resulting in fewer faecal matter-related diseases in the municipality (MTDP 2018 – 2021, Nandom).

Communication

Almost all villages and communities have access to one or either mobile network and this has created a lot of employment for the youth, especially in the area of recharge card retail, transfer of units and Money Transfers. Also, Radio FREED and Radio Von are currently operating as the two radio stations in the area with coverage even beyond the municipality. This makes information dissemination in the Municipal very effective and helps in easy education and response from the grassroots in participatory development agendas. However, the effectiveness of these networks is greatly reduced due to very frequent and constant jam of the air waves.

Health

The Municipal Health Administration is the highest implementing agency in the municipality and is in charge of the Ghana Health Services. The area is divided into five Sub-areas, each of which provides comprehensive Public Health Services (see **Figure 5-13**). Four health centers and one polyclinic serve all five sub-areas. St. Theresa's Hospital is a CHAG facility that also serves as the municipal hospital. With the implementation of the CHPs concept to improve access to health care services, the municipal area now operates thirteen (13) CHPS compounds.

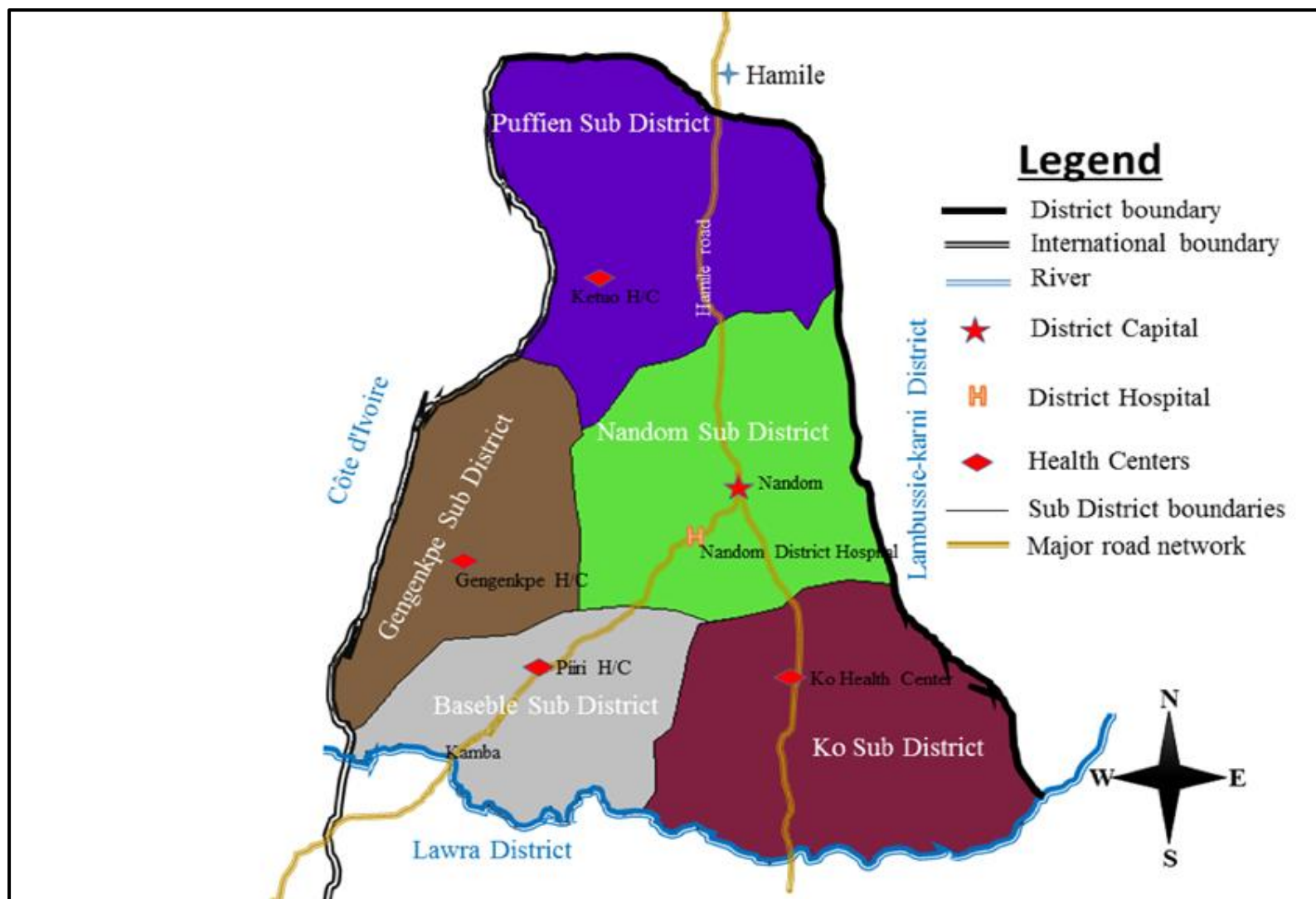


Figure 5-13: Map showing the five sub-areas in Nandom and their health centres

Transportation

In recent years, the area has seen a remarkable improvement in the development of the road sector. The Lawra-Nandom-Hamile Road has seen significant improvement, and work is currently underway. There has been a lot of work done to create access roads to most of the Nandom Township communities and suburbs. This has boosted economic activity in the township, with many commercial stores and buildings being built along these access roads.

Over three-quarters of the feeder road length in the area has now been reshaped or worked on. The two (2) major trunk roads: the Lawra-Nandom-Hamile road (which is receiving some attention), and the Nandom-Ko road, and the Lambussie-Nandom road (which is in a deplorable state). **Figure 5-14** gives the road network of the Nandom community

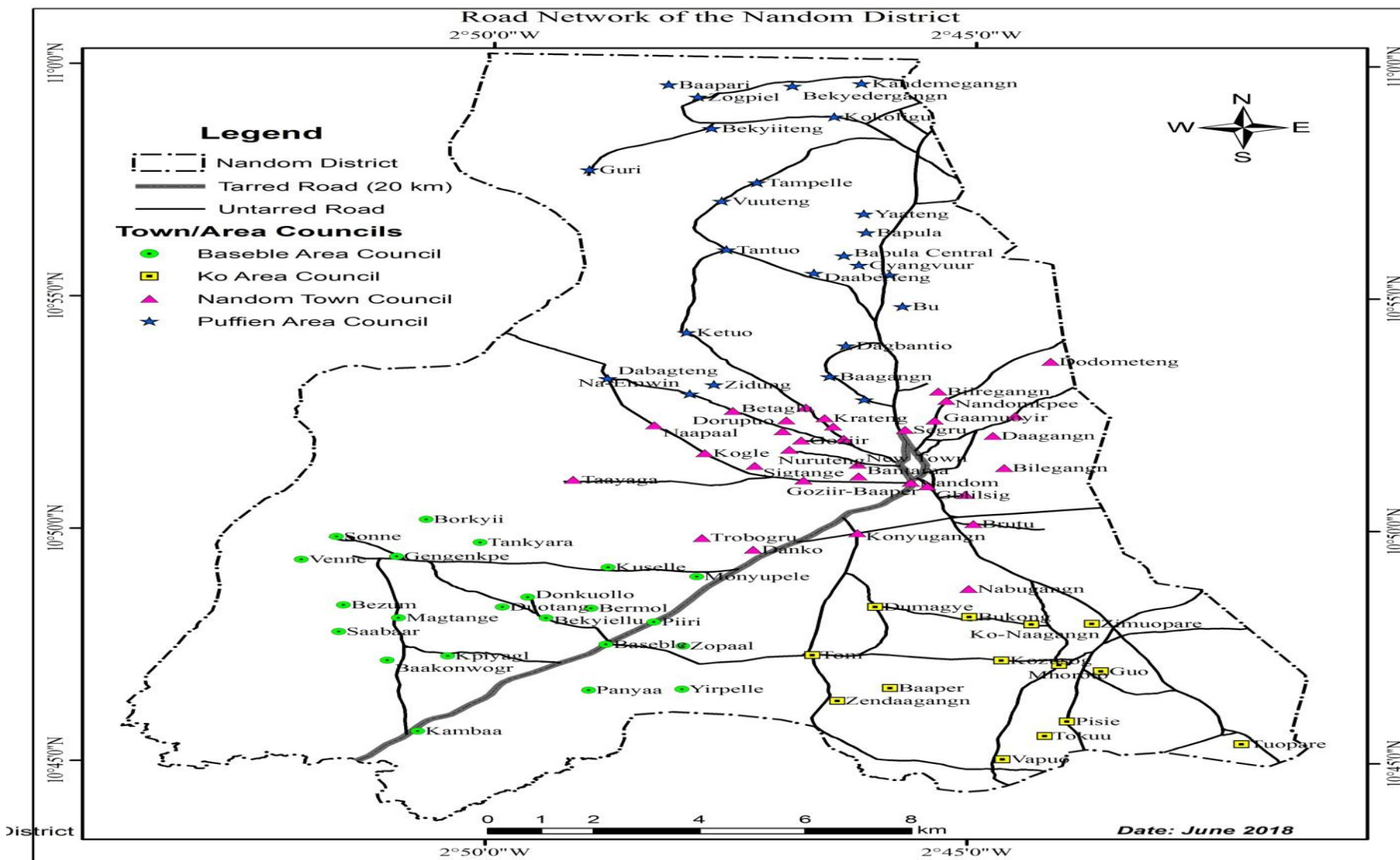


Figure 5-14: Road Network in Nandom Municipality

Land Ownership/Tenure

Land ownership follows a patrilineal system with regards to land inheritance. Accordingly, inheritances can go to the male's sons or brothers. Dagaabas are the land custodians, and according to the customs that have been passed down, women are barred from land ownership and entitlements, which are mostly acquired through inheritance.

Land ownership in traditional society tends to be acknowledged by communal recognition and observation, or that of the ruling traditional elder. Deeds or papers are not usually involved, nor are lawyers. The existence of deeds or papers usually indicates a previous dispute over the land which was taken to the court system. When a conflict emerges the traditional avenue for resolution is to have the traditional elder arbitrate. However, this process usually only works when both parties respect the traditional elder. If one or both parties lack confidence in the traditional elder, local politicians are frequently asked to arbitrate.

Land disputes may be taken to the court system, but these are costly and, in the case of royal land, they can drag on as each party seeks to appeal every judgement that goes against it. In some areas, recourse to the courts is less likely because of the costs involved and less acceptance of that system as a dispute settling mechanism.

Nevertheless, even if a case goes before the courts, the land may still be used and/or occupied by the disputants since it often is the source of livelihood of the disputants. Force may be used to settle cases where traditional authority is ineffective.

The project is not designed to acquire lands for project implementation. However, farmers who already own lands and meet other requirements will be supported. Due diligence will be done to ensure that ownership of farmlands is undisputed.

5.2 Characteristics of the Project site (Nandom Kpee valley)

The immediate beneficiary community, i.e. the Nandom Kpee community has been identified based on the availability of vast land for commercial farming. This section describes the environmental and social conditions in the community and project vicinity. **Plate 5-1** below show a photo of the Nandom Kpee valley.



Plate 5-1: Nandom Kpee Rice Valley

(SAL Consult, 2025)

5.2.1 Air Quality

Active air quality monitoring was carried out between 7th and 10th April 2025 at the proposed project site, that is within the Nandom Kpee valley and the sampling was done in compliance with the requirements of GS 1236:2019 as shown in **Table 5-1**.

Table 5-1: Environment and Health Protection- Requirements for Ambient Air Quality and Point Sources/Stack Emissions (GS 1236:2019).

S/N	Air Quality Parameter	Maximum Limits	Averaging Time
1	Carbon monoxide, mg/m ³	10	8 hours
2	Sulphur dioxide (SO ₂), µg/m ³	50	24hours
3	Nitrogen oxides (measured as NO ₂), µg/m ³	150	24hours
4	PM ₁₀ , µg/m ³	70	24hours
5	PM _{2.5} , µg/m ³	35	24hours

Particulate Matter

The sampling and analysis of ambient particulate matter concentrations was done according to the ASTM Test Method D4096-17. Particulate matter (PM_{2.5} and PM₁₀) was sampled at the Nandom Kpee valley and its nearest receptor (school and household) for 24 hours using ARA N-FRM Air Sampler set to a flow rate of 16.7 L/min drawing air through the inlet onto a 47mm quartz filter for analysis. **Plate 5-2** below shows the mounted equipment at the Nandom Kpee valley and its nearest sensitive receptor (school and household).



Plate 5-2: ARA N-FRM Setup for PM_{2.5} and PM₁₀ sampling (site -left, school – middle and household – right)

(SAL Consult, 2025)

Results

The Particulate Matter (PM_{2.5}) concentrations monitored at the proposed Nandom Kpee Rice Valley was 40.7 µg/m³. The value for the project site exceeded the Ghana Standard (GS 1239:2019) permissible value of 35 (µg/m³) and the WHO 2021 limit of 15 µg/m³. These elevated levels, even before any agricultural activity begins, suggest that background air quality in the area may be already compromised. Nearby bush burning, unpaved roads, and domestic cooking emissions from surrounding communities may contribute to the high particulate load.

The Particulate Matter (PM_{2.5}) concentrations monitored at the nearest sensitive receptors (school and household) were 28.2 µg/m³ and 33 µg/m³. The value for the receptors were less than the Ghana Standard (GS 1239:2019) permissible value of 35 (µg/m³) but exceeded the WHO 2021 limit of 15 µg/m³. This could be as a result of the area around the school exposed to moderate air pollution—likely due to local factors such as cooking with biomass, vehicular dust from unpaved access roads, and windblown particles from the surrounding terrain. These findings indicate that additional impacts from the project would require careful management to avoid exacerbating existing conditions.

The Particulate Matter (PM₁₀) concentrations monitored at the proposed Nandom Kpee Rice Valley was 152 µg/m³. The value for the project site exceeded the Ghana Standard (GS 1239:2019) permissible value of 70 (µg/m³) and the WHO 2021 limit of 45 µg/m³. The high background level likely reflects the influence of seasonal dust storms, exposed soils, and nearby open burning practices. This reinforces the need for the project developers to incorporate environmental safeguards such as green buffers, soil cover management, and dust suppression to avoid adding further to the existing levels of coarse particulate pollution.

The Particulate Matter (PM₁₀) concentrations monitored at the nearest sensitive receptors (school and household) were 157 µg/m³ and 163 µg/m³ respectively. These again exceeded the Ghana Standard (GS 1239:2019) permissible value of 70 (µg/m³) and the WHO 2021 limit of 45 µg/m³. Local factors such as unpaved compounds, proximity to bush-burning or waste burning, and domestic dust emissions are likely

at play a role in this high figure. If the rice development project proceeds, it would be essential to engage with nearby residents and establish air quality monitoring and community-level mitigation strategies, especially since the baseline is already above safe limits.

Figure 5-15 below shows the graphical representation of each particulate matter type sampled and analysed at the proposed rice valley and nearest sensitive receptors respectively.

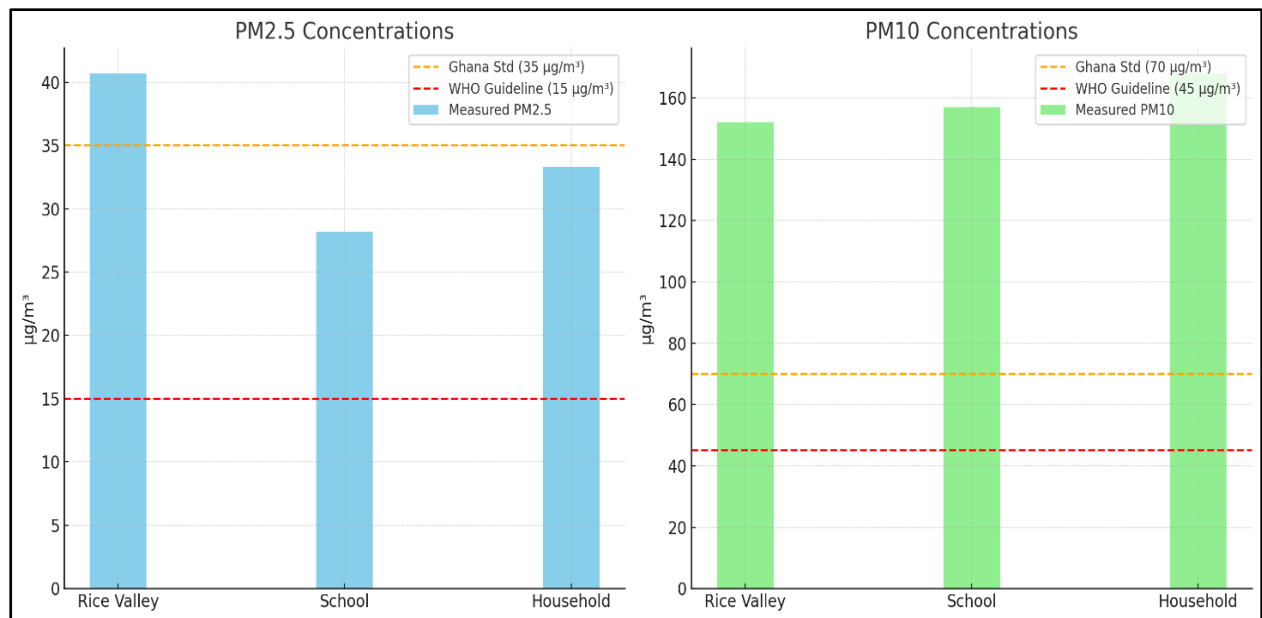


Figure 5-15: Graph showing compliance and or exceedance of particulates to GSA/WHO Standards
(SAL Consult, 2025)

Gases (NO₂, SO₂ and CO)

The Aeroqual Series 500(A-S500) Gas Meter, a high rated device that enables accurate real time surveying of common indoor and outdoor air pollutants, was used to determine the concentration levels of NO₂, SO₂ and CO (**Plate 5-3**). The ambient concentrations were recorded for every minute, from which hourly concentrations were calculated and mean concentrations determined.



Plate 5-3: Gases monitoring at the proposed Nandom Kpee rice valley (left above) and nearest sensitive receptors (above middle – household and left is a school)
(SAL Consult, 2025)

Results

The NO_2 and CO values recorded at the valley were both below the minimum detection limit of 0.06 mg/m^3 at the time of sampling. This suggested that both gases were significantly below both the Ghana Standard and the WHO guidelines and indicate that the area is currently free from major combustion sources such as heavy traffic, industrial activity, or burning of biomass.

The SO_2 concentration of $400 \text{ } \mu\text{g/m}^3$ recorded was much higher than the Ghana standard of $50 \text{ } \mu\text{g/m}^3$ and the WHO guideline of $40 \text{ } \mu\text{g/m}^3$. This sharp spike is unusual and potentially concerning as it may indicate the use of sulphur-rich agrochemicals or local biomass burning near the proposed valley area as at the time of sampling.

At Nearest sensitive receptor (school), values recorded for Nitrogen dioxide (NO_2) and Carbon monoxide (CO) were $0.100 \text{ } \mu\text{g/m}^3$ and 0.250 mg/m^3 respectively while that of Sulphur Dioxide (SO_2) was below the minimum detection limit of 0.06 mg/m^3 at the time of sampling.

These values recorded were all below their respective Ghana Standards and WHO guidelines. This suggests that the area is currently free from major combustion sources such as heavy traffic, industrial activity, or burning of biomass.

The Nitrogen dioxide (NO_2), Sulphur Dioxide (SO_2) and Carbon monoxide (CO) values for the nearest sensitive receptor (household) were all below the minimum detection limit of 0.06 mg/m^3 at the time of sampling. This suggests that combustion-related activities are very limited at the site.

Table 5-2 below shows the results of each gas monitored at the proposed rice valley and nearest sensitive receptors.

Table 5-2: NO₂, SO₂ and CO results measured at the valley compared to GSA and WHO standards

S/N	Sampling Point	Concentration		
		NO ₂ (µg/m ³)	SO ₂ (µg/m ³)	CO (mg/m ³)
1	Nandom Kpee Rive valley	<0.06	400	0.00
2	Nearest sensitive receptor (school)	0.100	<0.06	0.250
3	Nearest sensitive receptor (household)	<0.06	<0.06	<0.06
Ghana Standards (GS 1236:2019)		150	50	10
WHO (2021)		25	40	4

***Values in red shows exceedance whiles values in green shows compliance with standards**

NB: Readings reported as "< (value)" indicate the concentration was below the instrument's Minimum Detection Limit (MDL). The MDLs are based on manufacturer specifications for the Aeroqual sensor heads used: 9.4 µg/m³ for Nitrogen Dioxide (NO₂), 26.2 µg/m³ for Sulfur Dioxide (SO₂), and 0.06 mg/m³ for Carbon Monoxide (CO).

5.2.2 Ambient Noise

For the purposes of establishing the existing ambient noise levels in the proposed project area, a noise assessment was undertaken between 7th and 10th April 2025.

Noise measurements/recordings were taken with a High Precision TSI Quest Sound Level Meter, Model Type 1. The sound level meter has an in-built calibrator and was calibrated before each measurement/recordings were taken. The noise meter was calibrated at 114 dB (A) prior to the measurement. The following statistical indices was computed L_{Aeq}, L_{max}, L_{min} and L_{peak}.

The ambient noise levels (L_{EQ} values) recorded at the Nandom Kpee rice valley was compared to the Ghana Standard (GS 1222:2018) and IFC guideline values. **Plate 5-4** shows the photograph of the daytime noise monitoring at the project site and its nearest sensitive receptor.



Plate 5-4: Ambient Noise monitoring at the proposed valley and nearest sensitive receptors

(SAL Consult, 2025)

Results

The equivalent continuous sound level (LA_{eq}) recorded at the project site was 56.1 dB(A), with a maximum noise level (L_{max}) of 59.4 dB(A), a minimum noise level (L_{min}) of 52.6 dB(A) and a peak (L_{peak}) of 62.7 dB(A). The equivalent continuous sound level (LA_{eq}) recorded at the nearest sensitive receptor (school) was 66.9 dB(A), with a maximum noise level (L_{max}) of 83.5 dB(A), a minimum noise level (L_{min}) of 49.6 dB(A) and a peak (L_{peak}) of 86.1 dB(A).

The equivalent continuous sound level (LA_{eq}) recorded at the nearest sensitive receptor (household) to was 55.6 dB(A), with a maximum noise level (L_{max}) of 64.1 dB(A), a minimum noise level (L_{min}) of 36.2 dB(A) and a peak (L_{peak}) of 71.5 dB(A).

The LA_{eq} value of 56.1 means that the current ambient noise levels at the project site are well within acceptable limits. While the site is compliant under baseline conditions, it's important to note that noise levels could increase during construction or operation—especially with the use of machinery. Monitoring should continue during project implementation to ensure the site remains compliant and doesn't negatively affect nearby receptors.

The LA_{eq} value of 66.9 dB, with noise peaking at 86.1 dB at the nearest school sensitive receptor were notably higher than the recommended maximum of 55 dB, as set by both the Ghana Standard GS 1222:2018 for educational institutions and the IFC Environmental, Health and Safety (EHS) Guidelines. The exceedance—over 11 dB above the limit—could potentially disrupt the learning environment, especially if the project adds more noise during its active phases. This finding suggests a need for early planning of mitigation measures, such as installing noise barriers, maintaining vegetative buffers, or scheduling noisy activities outside of school hours. Reducing noise near the school is particularly important to minimize impacts on students and staff.

The LA_{eq} value of 55.6 dB at the nearest household sensitive receptor were slightly higher than the recommended maximum of 55 dB, as set by both the Ghana residential standard (Category A) and the IFC

EHS guidelines for residential areas. Although the exceedance is minimal (0.6 dB), is close enough to warrant attention, especially if future project activities add to the noise. The peak level of 71.5 dB recorded (while not directly regulated under these guidelines) gives an indication of occasional high noise events. At this stage, no immediate action may be required, but it's recommended to monitor changes in noise levels during project activities and be ready to implement mitigation if necessary to maintain a quiet and healthy residential environment.

Figure 5-16 shows the ambient noise levels measured at the proposed Rice Valley and the nearest sensitive receptors.

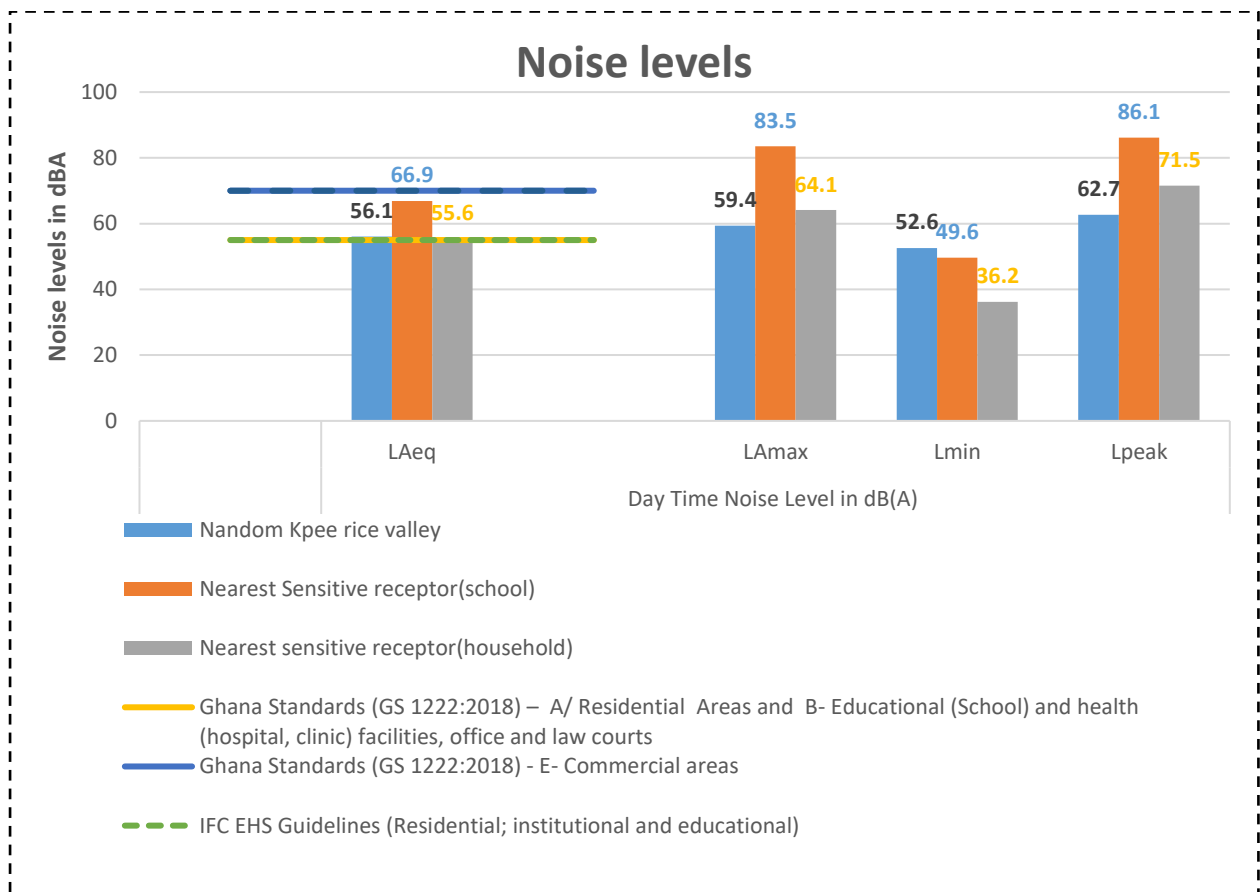


Figure 5-16: Daytime Ambient noise levels measured at the Valley and nearest sensitive receptors
(SAL Consult, 2025)

5.2.3 Water Resources

The Northern Region is located within the Volta Basin. The major sub-basins of the Volta include the Black and White Volta Rivers, the Oti River and the Lower Volta, including Lake Volta.

Surface Water

Surface water gather in the form of ponds in the valley whenever it rains. At the time of visit which was in the dry season, the project area had dried up and there was no sample available to be taken. These ponds when it rains also serve as source of water to the community in the project area.

Groundwater

There is a borehole present in the Nandom Kpee community which is a vital water source to the community who use it for drinking, washing, cooking, and bathing.

Water Quality

Water was sampled and tested in- situ for pH, Conductivity, TSS, TDS, Turbidity and Chloride using the Hanna multipara meter.

Plate 5-5 shows the sampling and in-situ testing of the borehole in the Nandom Kpee community.



Plate 5-5: Sampling and in-situ testing

Results

Temperature

The measured temperature slightly exceeds the Ghana Standards' preferred range of 25–30°C, likely due to the region's ambient environmental conditions and shallow groundwater depth. Although the WHO does not set a maximum limit, elevated temperatures can reduce water palatability and encourage microbial growth in storage. Nonetheless, this temperature does not pose a health risk and is considered acceptable for drinking under tropical conditions. For irrigation, particularly for rice which thrives in warm, wet environments, this temperature is not restrictive and may even be beneficial for early-stage seedling development.

pH

With a pH value of 6.94, the water falls well within the Ghanaian and WHO recommended range of 6.5–8.5. This slightly acidic-neutral balance is optimal for human consumption, avoiding corrosivity or taste

issues. In terms of irrigation, the pH is also well suited for rice farming, as rice can tolerate a slightly acidic to neutral environment. This means the water is unlikely to affect soil chemistry negatively or restrict nutrient uptake by rice plants.

Electrical Conductivity

An EC of 344 $\mu\text{S}/\text{cm}$ is significantly below the Ghana Standards limit of 2000 $\mu\text{S}/\text{cm}$, indicating low salinity and a low concentration of dissolved ions. For drinking, this confirms the water is mineral-balanced and safe. From an agricultural perspective, water with low EC is ideal for sensitive crops like rice, as it prevents salt buildup in soils, which can stunt plant growth and reduce yield. This value supports long-term use for irrigation without posing risks of salinization.

Total Dissolved Solids (TDS)

The TDS level of 172 mg/L further confirms the low mineral content, comfortably below the 500 mg/L Ghana Standard. Such levels are well within the acceptable range for human consumption, and also favourable for irrigation. According to FAO guidelines, water with TDS less than 450 mg/L is considered excellent for irrigation, especially for flood-irrigated crops like rice.

Turbidity

The turbidity of 0.00 NTU reflects excellent water clarity, surpassing the maximum allowable limit of 5 NTU. This means there is no visible particulate contamination, making the water aesthetically and hygienically suitable for drinking. For irrigation, especially in drip or sprinkler systems, low turbidity is desirable as it prevents clogging of nozzles or pipes, though it's less critical for rice paddy systems. Overall, this result is highly favourable.

Total Suspended Solids (TSS)

The TSS is recorded at <1.00 mg/L, slightly within the strict Ghana guideline of 0 mg/L. This indicates minimal physical impurities, with no significant implications for health or usability. For irrigation, such a low TSS is ideal, ensuring minimal sediment load in fields and preventing any soil crusting or blockage of irrigation systems.

Biological Oxygen Demand (BOD)

Although there are no WHO or Ghana standards for BOD in drinking water, a value of 0.660 mg/L is very low and suggests minimal biodegradable organic pollution. This is an indicator of good microbiological safety and absence of sewage or organic contamination, supporting its use for drinking and domestic purposes. For irrigation, low BOD ensures oxygen balance in flooded rice fields, preventing anaerobic conditions that can inhibit plant growth or promote methane generation.

Iron

The iron concentration of 0.343 mg/L slightly exceeds both the WHO guideline of 0.2 mg/L and the Ghanaian threshold of 0.3 mg/L. While not harmful to health, this level may lead to metallic taste, staining of fixtures, or encourage iron bacteria growth in pipes. For drinking, it may warrant basic filtration for aesthetic improvement. However, for irrigation, this level is not concerning, as rice has a relatively high tolerance to iron in water, and iron even contributes to plant nutrition in small amounts.

Manganese

At 0.029 mg/L, manganese levels are well within both the WHO (0.08 mg/L) and Ghana (0.4 mg/L) limits. This poses no risk for human health and avoids issues such as metallic taste or staining. In irrigation contexts, this level is safe and unlikely to impact soil health or rice growth.

Table 5-3 below shows the In-situ and laboratory analysis results of the groundwater sampled.

Table 5-3: In-situ and laboratory analysis results

S/N	Parameter		Nandom Kpee Community BH	GS 175:2017 5th Edition	WHO 4th edition (2011)
In-situ testing results					
1	Temp	[°C]	31.60	*25 - 30	NG
2	pH	pH units	6.94	6.5 – 8.5	6.5 – 8.5
3	EC	[μS/cm]	344.0	*2000	NG
4	TDS	[mg/L]	172.0	500	NG
5	Turbidity	NTU	0.00	5	5
Laboratory analysed results					
6	Total Suspended Solids	[Mg/L]	<1.00	0	NG
7	Biological Oxygen Demand	[mg/L]	0.660	NG	NG
8	Iron	[mg/L]	0.343	0.3	0.2
9	Manganese	[mg/L]	0.029	0.4	0.08

**denotes GS 175 – 1:2013 drinking water guideline*

*NG denotes no guideline available for comparison. **Red** denotes exceedance while **green** denotes compliance to the applicable guideline.*

5.2.4 Soil, Vegetation and Biodiversity

Soil

Generally, the soils in the Upper West region are suitable for cereal crop production including rice. The project site is expected to have marginal, with shallow soil depth as the major limitation with a soil depth <50 cm. The soil texture may be sandy with clay content <6%. The topsoil may tend to be droughty, while the subsoil may have a high level of gravel and concretions (hard, compact masses). The soils are therefore prone to erosion and have low moisture and nutrient-holding capacity. The status of exchangeable calcium and magnesium may be low and declining. The chemical and physical analysis of soil samples taken from Wa East, the closest sampling location is presented in **Table 5-4**.

Table 5-4: Chemical and physical analysis of soil samples

Location	Depth	Site	pH	OC ^a (g/kg)	TN ^b (g/kg)	OM ^c (g/kg)	Bray's available		Exchangeable cations (cmol(+) /kg)							Base sat. (%)	Particle size analysis			Texture
							P (mg/kg)	K (mg/kg)	Ca	Mg	K	Na	TEB	Exch. Acidity	ECEC		Sand (%)	Silt (%)	Clay (%)	
Wa East	0–20	Loggu	6.95	50	4	86	4.31	103.14	3.61	1.07	0.17	0.08	4.93	0.05	4.98	99.0	76.9	21.1	2	L. sand
		Bulenga	6.78	102	9	176	34.2	137.29	2.67	2.27	0.24	0.09	5.27	0.08	5.35	98.5	65.5	30.3	4.25	S. loam
		Kpalinye	7.21	88	7	152	8.37	126.81	4.54	2	0.31	0.1	6.95	0.05	7	99.3	69.1	26.4	4.5	S. loam
		Zinye	6.58	60	5	103	8.61	97.73	3.2	0.53	0.3	0.08	4.11	0.08	4.19	98.1	79.4	18.4	2.2	L. sand
		Naaha	6.54	60	5	103	1.36	93.38	2.94	1.34	0.58	0.16	5.02	0.09	5.11	98.2	82.6	13.2	4.22	L. sand
	20–40	Loggu	6.62	36	3	62	1.51	64.25	2.4	0.8	0.11	0.04	3.35	0.07	3.42	98.0	76.3	21.4	2.3	L. sand
		Bulenga	6.81	95	8	164	1.28	96.04	3.74	1.6	0.21	0.07	5.62	0.08	5.7	98.6	64.4	29.4	6	S. loam
		Kpalinye	6.82	67	6	116	2.39	92.66	3.74	2.4	0.27	0.08	6.49	0.08	6.57	98.8	56.4	35.3	8.3	S. loam
		Zinye	6.71	53	4	91	7.57	61.88	2.67	0.53	0.54	0.15	3.89	0.08	3.97	98.0	75.3	22.3	2.4	L. sand
		Naaha	6.49	32	3	55	1.04	63.24	3.74	1.34	0.34	0.1	5.52	0.1	5.62	98.2	55.4	34.6	10	S. loam

(Source: Tetteh et.al, 2016)

Vegetation

The Nandom Kpee project site is an admixture of farmlands (predominantly rice fields) and grassland with isolated trees. Rice cultivation and cattle grazing as well as wildfires have led to a loss of the typical tree and shrub strata of the Guinea savanna vegetation (see **Plate 5-6**). Some of the tree species found on the site are *Vitellaria paradoxa*, *Parkia biglobosa*, *Tectona grandis*, *Azadirachta indica*, and *Diospyros mespiliformis*.



Plate 5-6: Nandom Kpee Valley Site with predominant rice field
(Sal Consult, 2025)

Floral Survey

A flora survey was conducted in April 2025 with an initial reconnaissance survey done within the project site and external boundaries to obtain an overview of the extent, topography and complexity of the vegetation. Sample quadrats of size 20 m x 20 m were studied in the proposed site and a total of 3 vegetation samples were taken and analysed during the survey. The locations of the samples were recorded with a Garmin 64s GPS. **Table 5-5** shows the sample location coordinates and their associated vegetation types.

The ecological significance and national conservation status of the species encountered were defined using the ecological guild and star rating system (see **Table 5-6**) adopted in the Forest of Ghana Geographic Information Exhibitor manual (Hawthorne, 1993). The Global conservation status (**Table 5-7**) of each species was determined using the International Union of Conservation of Nature (IUCN) red list of threatened species (IUCN, 2024).

Table 5-5: Coordinates of sampling locations and associated vegetation types

Site	Lat (N)	Long (W)	Description
Nandom Kpee (Dambolteng)	N 10.88159	W 002.74288	Seasonally flooded farmland/Rice with isolated trees/
Nandon Kpee Gangn)	N 10.87383	W 002.75054	Farmland/isolated trees/grassland

Nandon Kpee [Bilegangn]	N 10.85756	W 002.75311	Rice filed with isolated trees
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(SAL Consult, 2025)

Table 5-6: Star Rating system

Rating	Description
Black Star species	Species rare internationally and at least uncommon in Ghana; urgent attention to conservation of populations needed
Gold Star species	Fairly rare internationally and/or locally
Blue star species	Widespread internationally but rare in Ghana or vice-versa
Scarlet star species	Common, but under serious pressure from heavy exploitation
Red Star species	Common, but under pressure from exploitation
Pink Star species	Common and moderately exploited. Also, non-abundant species of high potential value
Green Star species	No particular conservation concern, common in Ghana

Table 5-7: IUCN Red List categories

Category	Description
Extinct (EX)	A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.
Extinct in the Wild (EW)	A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed Extinct in the Wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.
Critically Endangered (CR)	A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered, and it is therefore considered to be facing an extremely high risk of extinction in the wild.
Endangered (EN)	A taxon is endangered when the best available evidence indicates that it meets any of the criteria for Endangered, and it is therefore considered to be facing a very high risk of extinction in the wild.
Vulnerable (VU)	A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria for Vulnerable, and it is therefore considered to be facing a high risk of extinction in the wild.
Near Threatened (NT)	A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.
Least Concern (LC)	A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category

Category	Description
Data Deficient (DD)	A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking.
Not Assessed (NA)	A taxon is Not yet Assessed when it has not yet been evaluated against the criteria

(IUCN, 2024)

Results and Floral Analysis

The species lists for the 3 samples analysed are presented in **Table 5-8** while the floristic analysis of the project site is presented in **Table 5-9**. The sampling recorded a total of 20 species in 18 genera belonging to 12 flowering plant families. The families with high species representation were *Combretaceae* (4) and *Fabaceae* (3). These 2 families (out of total of 12) accounted for 58% of the species recorded. The rest of the families were poorly represented with 2 or less species. The diversity of species on the site is low. This is not surprising since most of the herbs and shrubs have been destroyed by cultivation, bush fires and cattle grazing.

Table 5-8: Sample profiles and species composition of Nandom Kpee Valley

Seasonally flooded farmland/Rice with isolated trees/ Grassland	Farmland/isolated trees/grassland	Rice field with isolated trees
N 10.88159	N 10.87383	N 10.85756
W 002.74288	W 002.75054	W 002.75311
Elev. 277m	Elev. 269m	Elev. 267m
Species	Species	Species
<i>Combretum adenogonium</i>	<i>Lannea kerstingii</i>	<i>Tectona grandis</i>
<i>Tectona grandis</i>	<i>Azadirachta indica</i>	<i>Azadirachta indica</i>
<i>Diospyros mespiliformis</i>	<i>Diospyros mespiliformis</i>	<i>Diospyros mespiliformis</i>
<i>Terminalia avicennioides</i>	<i>Mangifera indica</i>	<i>Diospyros abyssinica</i>
<i>Azadirachta indica</i>	<i>Cola gigantea</i>	<i>Vernonia galamensis</i>
<i>Ficus sp</i>	<i>Parkia biglobosa</i>	<i>Lannea kerstingii</i>
<i>Piliostigma thonningii</i>	<i>Tectona grandis</i>	<i>Mangifera indica</i>
<i>Parkia biglobosa</i>	<i>Mitragyna inermis</i>	
<i>Vitellaria paradoxa</i>	<i>Anogeissus leiocarpus</i>	
	<i>Ficus sp.</i>	
	<i>Acacia senegal</i>	
	<i>Lannea acida</i>	
	<i>Ceiba pentandra</i>	
	<i>Hyparrhenia rufa</i>	

(SAL Consult, 2025)

Table 5-9: Floristic Analysis of Valley

Species	Family	Life Form	Guild	Star Rating	IUCN
<i>Acacia senegal</i>	Fabaceae	Tree	Non forest Savana/planted	NE	NE
<i>Anogeissus leiocarpus</i>	Combretaceae	Tree	NE	Green	LC
<i>Azadirachta indica</i>	Meliaceae	Tree	Non forest Savana/planted	NE	LC
<i>Ceiba pentandra</i>	Malvaceae	Tree	Pioneer	Green	LC
<i>Cola gigantea</i>	Malvaceae	Tree	NPLD	Green	LC
<i>Combretum adenogonium</i>	Combretaceae	Tree	Non forest Savana/planted	NE	LC
<i>Diospyros abyssinica</i>	Ebenaceae	Tree	Pioneer	Green	LC
<i>Diospyros mespiliformis</i>	Ebenaceae	Tree	NE	Green	NE
<i>Ficus sp.</i>	Moraceae	Tree	NE	Green	LC
<i>Hyparrhenia rufa</i>	Poaceae	Herb	NE	NE	NE
<i>Lannea acida</i>	Anacardiaceae	Tree	Non forest Savana/planted	NE	LC
<i>Lannea kerstingii</i>	Anacardiaceae	Tree	Non forest Savana/planted	NE	LC
<i>Mangifera indica</i>	Anacardiaceae	Tree	Non forest Savana/planted	NE	DD
<i>Mitragyna inermis</i>	Rubiaceae	Tree	Non forest Savana/planted	NE	LC
<i>Parkia biglobosa</i>	Fabaceae	Tree	Non forest Savana/planted	NE	LC
<i>Piliostigma thonningii</i>	Fabaceae	Tree	Non forest Savana/planted	NE	LC
<i>Tectona grandis</i>	Lamiaceae	Tree	Non forest Savana/planted	NE	NE
<i>Terminalia avicennioides</i>	Combretaceae	Tree	Non forest Savana/planted	NE	LC
<i>Vernonia galamensis</i>	Asteraceae	Herb	NE	NE	NE
<i>Vitellaria paradoxa</i>	Sapotaceae	Tree	Pioneer	NE	VU

(SAL Consult, 2025)

The Life form composition of the flora (**Table 5-10**) showed a dominance of the Tree Life form (about 90%) followed by Herb (10%). No records were made for Shrubs and Climbers. The open nature of the vegetation, due to land cultivation, wildfires and grazing, could explain the observed low diversity of life forms.

Table 5-10: Life Form Composition of the Flora

Life form	No.	%
Climber	-	-
Herb	2	10

Shrub	-	
Tree	18	90
Total	20	100

(SAL Consult, 2025)

The ecological guilds of the species, which gives an indication of the developmental/successional stage of the vegetation, shows a predominance of savanna and species of waste places and depicts typical savanna woodland vegetation, which is undergoing regeneration after disturbance (**Table 5-11**). The regeneration here is a regrowth of the plants left behind during cultivation.

Table 5-11: Ecological Guilds of the Flora

Guild	No.	%
NPLD	1	5
Pioneer	3	15
NE	5	25
Non Forest Savanna/Planted	11	55
Total	20	100

Legend: NE: Not evaluated; NFS/P: Non-Forest Savanna/Planted species; NPLD: Non-Pioneer Light Demander

(SAL Consult, 2025)

Species of National Conservation Concern

Inspection of **Table 5-9** reveals that none of the species recorded on the site are of conservation concern according to the Froggie data base. However, it must be noted that *Vitellaria paradoxa* (Shea tree) is a tree of economic importance to the local people in the project area.

Species of Global Conservation Concern

Table 5-12 shows that only 1 Vulnerable species (*Vitellaria paradoxa*) was recorded on the project site. The rest of the species (95%) were either Least Concern, Data Deficient or Not Evaluated and do not merit conservation action globally.

Table 5-12: IUCN Red List Status Composition of the Flora

IUCN Red list Status	Number (No.)	Percentage (%)
DD	1	5
LC	13	65
NE	5	25
VU	1	5
Total	20	100

(SAL Consult, 2025)

Fauna of the project site

The faunal list of the project (see **Table 5-13**) was based on the information gathered through desk surveys, interviews and observation which involved recording any animal sightings while driving or walking along the main road or animal trails to the areas bordering the proposed project site and identification of animal spoor. General walks through the project sites to spot animal spoor (any sign left by a living animal, such as feeding sites, regular pathways, tracks, footprints, faecal pellets, nests, etc.)

were also undertaken. The animals identified were classified as either Schedule 1 (S.1) or Schedule 1 (S.2) depending on the degree of protection they enjoy under the national wildlife conservation regulation (Schedules, 1995) as follows:

- S.1. (Schedule 1) - The hunting, capturing or destroying of these species is prohibited at all times.
- S.2. (Schedule 2) - The hunting capturing or destroying of these species is absolutely prohibited between 1st August and 1st December of any season. The hunting, capturing or destroying of any young animal, or adult accompanied by its young, of these species is absolutely prohibited at all times.

According to the hunters interviewed, most of the large mammals which were common in the area have moved away due to human activities such as farming and cattle grazing as well as wildfires. Notable among these are the elephant, lion, leopard, warthog, several parrots, terns, songbirds (passerines), land tortoises, pythons other snakes, lizards, bats, birds of prey, mongooses, bovids (e.g. the African buffalo and several duikers), egrets, ducks and pigeons. No species of conservation concern were recorded during the survey.

Table 5-13: Fauna of the Project Area

Order	Name		Conservation Significance		Abundance Status
	Common	Species	IUCN	National	
Artiodactyla (Even-toed ungulates)	Bushbuck	<i>Tragelaphus scriptus</i>	LC	II	Rare
	Common Duiker	<i>Sylvicapra grimmia</i>	LC	II	Rare
	Oribi	<i>Ourebia ourebi</i>	LC	II	Rare
	Red River Hog	<i>Potamochoerus porcus</i>	LC	II	Rare
Canivora (Carnivores)	African Civet	<i>Civettictis civetta</i>	LC	II	Rare
	Common Slender Mongoose	<i>Herpestes sanguineus</i>	LC	II	Common
	Common Kusimanse	<i>Crossarchus obscurus</i>	LC	II	Common
	Marsh Mongoose	<i>Atilax paludinosus</i>	LC	II	Common
Lagomorpha	African Savanna Hare	<i>Lepus microtis</i>	LC	Not Listed	Common
Rodentia	Gambian Pouched Rat	<i>Cricetomys gambianus</i>	LC	Not Listed	Common
	Grasscutter	<i>Thryonomys swinderianus</i>	LC	Not Listed	Common
	Gambian sun squirrel	<i>Heliosciurus gambianus</i>	LC	Not Listed	
	Guinea multimammate mouse	<i>Mastomys erythroleucus</i>	LC	Not Listed	
	Stripped Ground Squirrel	<i>Euxerus erythropus</i>	LC	Not Listed	Abundant
Anura (Frogs and Toads)	Common Frog	<i>Amnirana galamensis</i>	LC	Not listed	
	Common Toad	<i>Sclerophrys regularis</i>	LC	Not listed	
	Crowned Bull Frog	<i>Hoplobatrachus occipitalis</i>	LC	Not listed	
Squamata	Agama Lizard	<i>Agama agama</i>	LC	Not listed	
(Snakes and Lizards)	African Rock Python	<i>Python sebae</i>	NT	II	
	Boomslang	<i>Dispholidus typus</i>	LC	Not listed	
	Forest Cobra	<i>Naja melanoleuca</i>	LC	Not listed	
	Gaboon Viper	<i>Bitis gabonica</i>	LC	Not listed	
	Hissing Sandsnake	<i>Psammophis sibilans</i>	LC	Not listed	
	Night Adder	<i>Causus rhombeatus</i>	LC	Not listed	
	Nile Monitor	<i>Varanus niloticus</i>	LC	I	

Order	Name		Conservation Significance		Abundance Status
	Common	Species	IUCN	National	
	Puff Adder	<i>Night Adder</i>	LC	Not listed	
	Savanna Monitor	<i>Varanus exanthematicus</i>	LC	Not listed	
	Spitting cobra	<i>Naja nigricollis</i>	LC	Not listed	
Accipitriformes	Black Kite	<i>Milvus migrans</i>	LC	I	
	Shikra	<i>Accipiter badius</i>	LC	I	
	Lizard Buzzard	<i>Kaupifalco monogrammicus</i>	LC	I	
Bucerotiformes	African Grey Hornbill	<i>Lophoceros nasutus</i>	LC	Not listed	
	West African Pied Hornbill	<i>Lophoceros semifasciatus</i>	LC	Not listed	
	Spur-winged lapwing	<i>Vanellus spinosus</i>	LC	Not listed	
Columbiformes	Laughing Dove	<i>Spilopelia senegalensis</i>	LC	II	
	Red-Eyed Dove	<i>Streptopelia semitorquata</i>	LC	II	
Cuculiformes	Levaillant's cuckoo	<i>Clamator levaillantii</i>	LC	Not listed	
	Senegal Coucal	<i>Centropus senegalensis</i>	LC	Not listed	
Galliformes	Double-spurred Spurfowl	<i>Pternistis bicalcaratus</i>	LC	II	
	Stone Partridge	<i>Ptilopachus petrosus</i>	LC	II	
	Western Grey Plantain-eater	<i>Crinifer piscator</i>	LC	Not listed	
Passeriformes	African Blue Flycatcher	<i>Elminia longicauda</i>	LC	Not listed	
	African Pied Wagtail	<i>Motacilla aguimp</i>	LC	Not listed	
	Black-crowned Tchagra	<i>Tchagra senegalus</i>	LC	Not listed	
	Bronze Mannikin	<i>Permethes cucullata</i>	LC	Not listed	
	Common Bulbul	<i>Pycnonotus barbatus</i>	LC	Not listed	
	Long-tailed Glossy Starling	<i>Lamprolornis caudatus</i>			
	Long-tailed nightjar	<i>Caprimulgus climacurus</i>	LC	Not listed	
	Melodious Warbler	<i>Hippolais polyglotta</i>			
	Northern Grey-headed Sparrow	<i>Passer griseus</i>	LC	Not listed	

Order	Name		Conservation Significance		Abundance Status
	Common	Species	IUCN	National	
	Orange-Cheeked Waxbill	<i>Estrilda melpoda</i>	LC	Not listed	
	Red-breasted swallow	<i>Cecropis semirufa</i>	LC	Not listed	
	Village Weaver	<i>Ploceus cucullatus</i>	LC	Not listed	
	White-fronted Black Chat	<i>Oenanthe albifrons</i>	LC	Not listed	
Pelecaniformes	Cattle Egret	<i>Bubulcus ibis</i>	LC	I	

(SAL Consult, 2025)

Conclusions

The results of the survey indicate that the project area is human modified habitat. Cultivation, Livestock grazing and bushfires in the project area have led to a decline in the quality of vegetation and loss of flora and faunal species diversity. Isolated cases of *Vitellaria paradoxa* (shea tree) were recorded on the project site which are not of biodiversity and economic significance because they are commonly found in other areas of the municipality. The project will have no significant impact on the biodiversity of the project site.

5.2.5 Socio-economic Environment – Project site (Nandom Kpee Community)

Demography

Sixteen (16) households were sampled for the survey in both the Nandom Kpee and Nandom Ko communities of which sixteen (16) were males (100%) and 0 were females (0%) household heads/members. This indicates a predominantly male respondent sample.

The ages of the 16 respondents ranged from 33 to 69 years, with an average age of approximately 48.8 years. The largest group of respondents (44%) falls within the 31-50 years age bracket, followed closely by those aged 51 years and above (38%). Younger adults, aged 18-30 years, were not represented in this sample, with the youngest respondent being 33 years old (see **Figure 5-17**).

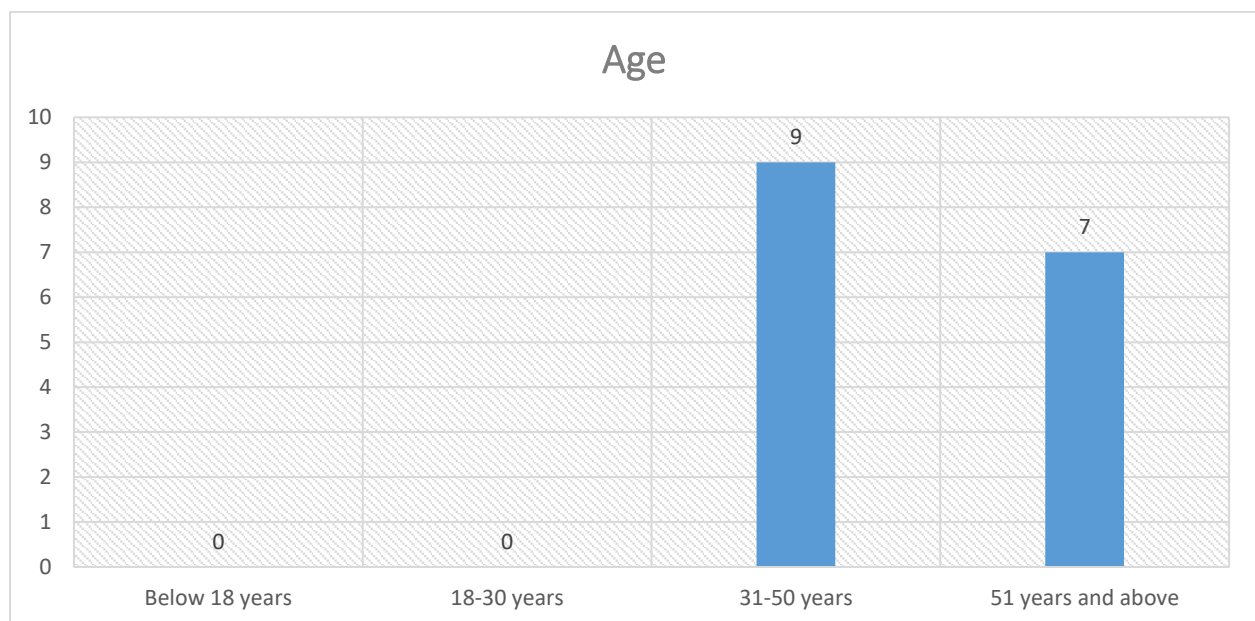


Figure 5-17: Age range of respondents

The 16 households comprise a total of 97 individuals, with an average household size of approximately 6.1 persons. Household sizes range from a minimum of 4 to a maximum of 10 members.

Overall, within these 16 households, there are 48 males (49%) and 49 females (51%), indicating a very balanced gender composition. On average, households have about 3.00 males and 3.06 females.

The distribution of household sizes shows that households with 4-6 members are the most common (63%). Households with 7-9 members account for 31% of the sample. One household had 10 members.

Two out of 16 households (12%) reported having at least one member with a form of disability. The types mentioned include Mental Disability and Blindness (see **Figure 5-18**).

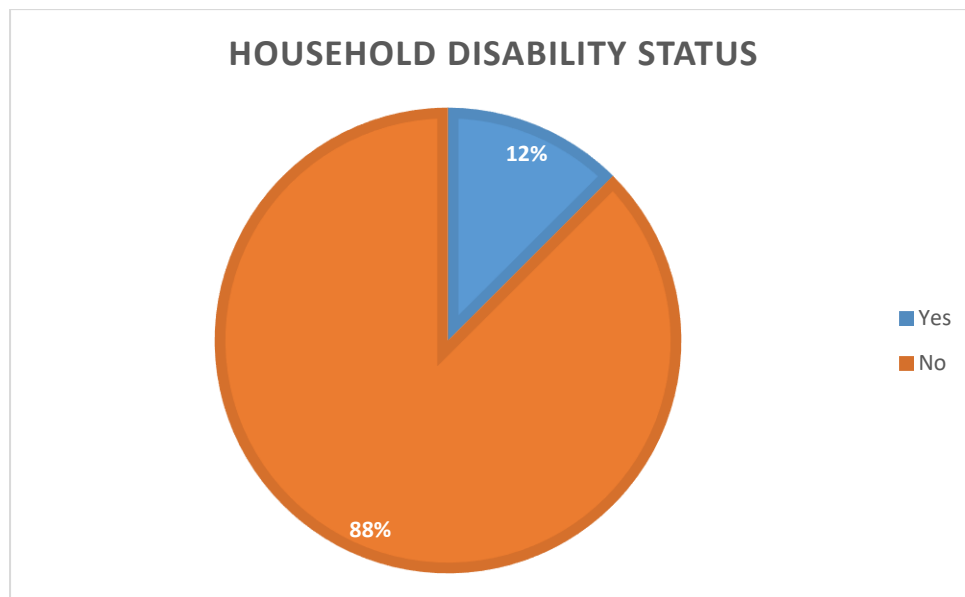


Figure 5-18: A pie chart Showing Disability status of households

Ethnicity and Religion

All 16 respondents (100%) identified their ethnicity as "Other," with further specification as Dagaare, Dagaaba, or Dagara. This indicates that while grouped under "Other" in a primary category, they belong to closely related Dagaari-speaking groups. The majority of respondents, 15 out of 16 (94%), identified their religion as Christianity. One respondent (6%) identified as Moslem.

Education and Literacy

Nine out of 16 respondents (56%) reported having no formal education. Four respondents (25%) had completed University, three (19%) had completed Primary School.

Educational Level	Count	Percentage (%)
None (No formal Ed.)	9	56
Completed Primary School	3	19
University	4	25

Economic Activities

The primary source of income for the majority of households (13 out of 16, or 81%) is Farming. Two households (13%) reported Office Work, and one (6%) reported Small Business/Trade as their primary income source.

Livestock rearing was the most common secondary income source, reported by 6 respondents (38%). Farming (as a secondary activity) was mentioned by 3 respondents (19%). Small Business/Trade and Fishing were each mentioned by 1 respondent (6% each). Five respondents (31%) did not specify a

secondary income source or indicated none. **Figure 5-19** gives a graphical representation of the secondary source of income for respondents.

Most respondents, 10 out of 16 (63%), identified as Self-Employed. Four respondents (25.0%) reported being Unemployed, and two (12%) were in Full-time employment.

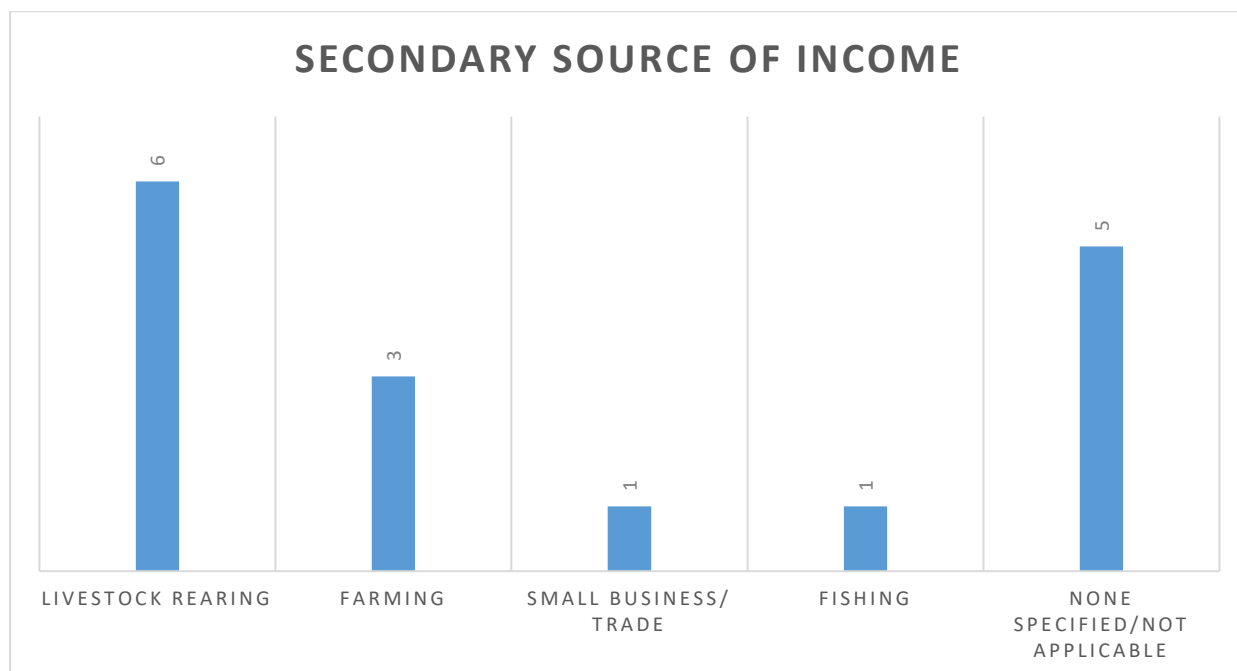


Figure 5-19: Secondary source of income for respondents

Utilities and Services

Source of Drinking Water

The primary source of drinking water for all 16 households (100%) is a Borehole. One household also mentioned GWCL (Ghana Water Company Ltd.). Distances to water sources are generally short, often within 0.5 km.

Sanitation Facility

The majority of households (13 out of 16, or 82%) use a Pit Latrine with slab. Two households (12%) use a KVIP (Kumasi Ventilated Improved Pit) latrine, and one (6%) uses a Bucket Latrine.

Sanitation Facility	Count	Percentage (%)
Pit Latrine with slab	13	82
KVIP	2	12
Bucket Latrine	1	6

Main Source of Energy for Cooking

Charcoal is the primary source of energy for cooking for 8 households (50%), and Firewood is used by the other 8 households (50%).

Main Source of Energy for Lighting

All 16 households (100%) use Electricity (NEDCO) as their main source of energy for lighting.

Health

Malaria is by far the most common health condition, reported by 86% of households. Fever was also frequently mentioned (39%), followed by ulcers (31%), diarrhoea (14%), and high blood pressure (10%). This highlights a significant burden of infectious diseases, particularly malaria.

Common Health Condition	Households Reporting	Percentage (%)
Malaria	15	94
Ulcer	8	50
Diarrhoea	4	25
Fever	4	25
High blood pressure	1	6

Public hospitals are the most preferred medical service provider, chosen by all 16 respondents (100%). Traditional medicine is also a significant option for 8 respondents (50.00%). Pharmacist/Chemist services were chosen by 50.00%, and Community Health Center/Post by 31%. Private hospitals were less frequently cited (12%). Respondents could select multiple providers.

Preferred Medical Service Provider	Count	Percentage (%)
Public Hospital	16	100
Traditional Medicine	8	50
Pharmacist/Chemist	8	50
Community health center/post	5	31
Private hospital	2	13

5.3 Characteristics of the Project site (Nandom Ko valley)

The immediate beneficiary community, i.e. the Nandom Ko community has been identified based on the availability of vast land for commercial farming. This section describes the environmental and social conditions in the community and project vicinity. **Plate 5-7** below show a photo of the Nandom Ko valley.



Plate 5-7: Nandom Ko Rice Valley

(SAL Consult, 2025)

5.3.1 Air Quality

Active air quality monitoring was carried out between 7th and 10th April 2025 at the proposed project site, that is within the Nandom Ko valley and the sampling was done in compliance with the requirements of GS 1236:2019 as shown in **Table 5-14**.

Table 5-14: Environment and Health Protection- Requirements for Ambient Air Quality and Point Sources/Stack Emissions (GS 1236:2019).

S/N	Air Quality Parameter	Maximum Limits	Averaging Time
1	Carbon monoxide, mg/m ³	10	8 hours
2	Sulphur dioxide (SO ₂), µg/m ³	50	24hours
3	Nitrogen oxides (measured as NO ₂), µg/m ³	150	24hours
4	PM ₁₀ , µg/m ³	70	24hours
5	PM _{2.5} , µg/m ³	35	24hours

Particulate Matter

The sampling and analysis of ambient particulate matter concentrations was done according to the ASTM Test Method D4096-17. Particulate matter (PM_{2.5} and PM₁₀) was sampled at the Nandom Ko valley and its nearest receptor (household) for 24 hours using ARA N-FRM Air Sampler set to a flow rate of 16.7 L/min drawing air through the inlet onto a 47mm quartz filter for analysis. **Plate 5-8** shows the mounted equipment at the Nandom Ko valley and its nearest sensitive receptor (household).



Plate 5-8: ARA N-FRM Setup for PM_{2.5} and PM₁₀ sampling at the proposed Ko rice valley and nearest sensitive receptor (household)

(SAL Consult, 2025)

Results

The Particulate Matter (PM_{2.5}) concentrations monitored at the proposed Nandom Ko Rice Valley was 13 µg/m³. This value was within the Ghana Standard (GS 1239:2019) permissible value of 35 (µg/m³) and the WHO 2021 limit of 15 µg/m³. The relatively low PM_{2.5} level reflects the absence of significant combustion sources and vehicular traffic. This indicates that the ambient air quality at the proposed agricultural site is safe for human exposure with minimal health risks.

The Particulate Matter (PM_{2.5}) concentrations monitored at the nearest sensitive receptor (household) was 143 µg/m³. The value far exceeded both the Ghana Standard (GS 1239:2019) permissible value of 35 (µg/m³) and the WHO 2021 limit of 15 µg/m³. This could be as a result of the presence of localized pollution sources, possibly including indoor biomass burning, charcoal stoves, open waste burning, or poorly ventilated cooking areas. The environment here poses a high risk of respiratory and cardiovascular complications, warranting intervention through community education, clean energy promotion, and improved ventilation and waste handling practices.

The Particulate Matter (PM₁₀) concentrations monitored at the nearest sensitive receptor (household) was 775 µg/m³. This way exceeded the Ghana Standard (GS 1239:2019) permissible value of 70 (µg/m³) and the WHO 2021 limit of 45 µg/m³. This pollution level could be linked to persistent dust, open burning, poor waste disposal practices, and possibly proximity to unpaved roads or bare lands with wind directed towards this location. The exposure risk here is extremely high, with potential impacts including chronic coughing, eye and throat irritation, and exacerbation of asthma or bronchitis.

Figure 5-20 below shows the graphical representation of each particulate matter type sampled and analysed at the proposed rice valley and nearest sensitive receptors respectively.

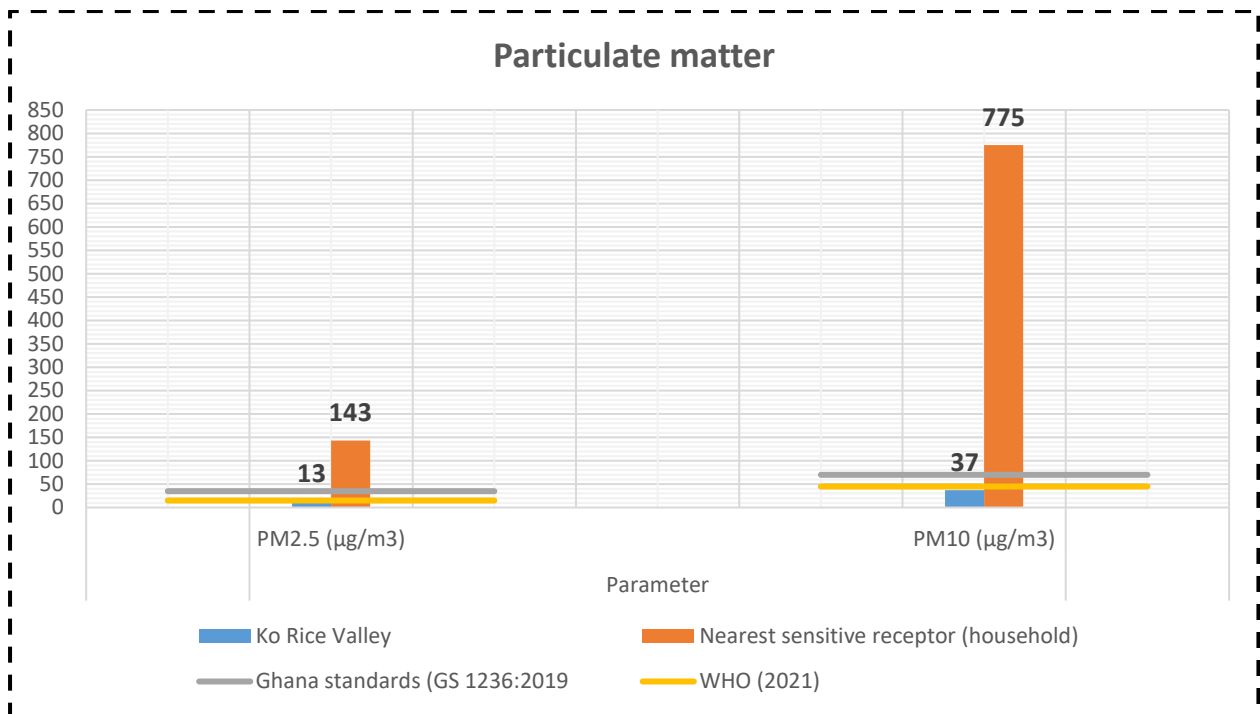


Figure 5-20: Graph showing compliance and or exceedance of particulates to GSA/WHO Standards
(SAL Consult, 2025)

Gases (NO_2 , SO_2 and CO)

The Aeroqual Series 500(A-S500) Gas Meter, a high rated device that enables accurate real time surveying of common indoor and outdoor air pollutants, was used to determine the concentration levels of NO_2 , SO_2 and CO (**Plate 5-9**). The ambient concentrations were recorded for every minute, from which hourly concentrations were calculated and mean concentrations determined.



Plate 5-9: Gases monitoring at the proposed Nandom Ko rice valley (left above) and nearest sensitive receptor (household)

(SAL Consult, 2025)

Results

The SO₂ and CO values recorded at the valley were both below the minimum detection limit of 0.06 mg/m³ at the time of sampling. This suggested that both gases were significantly below both the Ghana Standard and the WHO guidelines and indicate that the area is currently free from major combustion sources such as heavy traffic, industrial activity, or burning of biomass.

The NO₂ value recorded was significantly below both the Ghana Standard of 150 µg/m³ and the WHO guideline of 25 µg/m³. This indicates an environment with no significant combustion sources such as vehicles, generators, or industrial activity. The air quality is satisfactory for outdoor work and is fully compatible with agricultural development and human exposure.

The Sulphur Dioxide (SO₂) and Carbon monoxide (CO) values for the nearest sensitive receptor (household) were both below the minimum detection limit of 0.06 mg/m³ at the time of sampling indicating an environment with no significant combustion sources such as vehicles, generators, or industrial activity. The air quality was satisfactory for outdoor work and is fully compatible with agricultural development and human exposure.

The NO₂ value of 0.100 µg/m³ recorded was significantly below both the Ghana Standard of 150 µg/m³ and the WHO guideline of 25 µg/m³. Although slightly higher than the rice valley measurement, it remains insignificant from a health perspective. This suggested that no major combustion-related pollution was present at the household, though minor domestic sources (e.g., charcoal stoves) may contribute minimally. Air quality here is suitable for residential living.

Table 5-15 below shows the results of each gas monitored at the proposed rice valley and nearest sensitive receptor.

Table 5-15: NO₂, SO₂ and CO results measured at the valley compared to GSA and WHO standards

S/N	Sampling Point	Concentration		
		NO ₂ (µg/m ³)	SO ₂ (µg/m ³)	CO (mg/m ³)
1	Ko Rice valley	0.100	<0.06	<0.06
2	Nearest sensitive receptor(household)	0.400	<0.06	<0.06
Ghana Standards (GS 1236:2019)		150	50	10
WHO (2021)		25	40	4

***Values in red shows exceedance whiles values in green shows compliance with standards**

NB: Readings reported as "< (value)" indicate the concentration was below the instrument's Minimum Detection Limit (MDL). The MDLs are based on manufacturer specifications for the Aeroqual sensor heads used: 9.4 µg/m³ for Nitrogen Dioxide (NO₂), 26.2 µg/m³ for Sulfur Dioxide (SO₂), and 0.06 mg/m³ for Carbon Monoxide (CO).

5.3.2 Ambient Noise

For the purposes of establishing the existing ambient noise levels in the proposed project area, a noise assessment was undertaken between 7th and 10th April 2025.

Noise measurements/recordings were taken with a High Precision TSI Quest Sound Level Meter, Model Type 1. The sound level meter has an in-built calibrator and was calibrated before each

measurement/recordings were taken. The noise meter was calibrated at 114 dB (A) prior to the measurement. The following statistical indices were computed L_{Aeq} , L_{max} , L_{min} and L_{peak} .

The ambient noise levels (L_{EQ} values) recorded at the Nandom Ko rice valley was compared to the Ghana Standard (GS 1222:2018) and IFC guideline values. **Plate 5-10** shows the photograph of the daytime noise monitoring at the project site and its nearest sensitive receptor.



Plate 5-10: Ambient Noise monitoring at the proposed valley and nearest sensitive receptors
(SAL Consult, 2025)

Results

The equivalent continuous sound level (L_{Aeq}) recorded at the project site was 54.1 dB(A), with a maximum noise level (L_{max}) of 62.1 dB(A), a minimum noise level (L_{min}) of 43.2 dB(A) and a peak (L_{peak}) of 79.0 dB(A).

The recorded L_{max} and L_{peak} are indicative of occasional transient events—possibly the passage of motorcycles, nearby mechanized farming activity, or intermittent local traffic. These spikes are not sustained but may reflect human or mechanical interventions such as the operation of small-scale machinery. The L_{min} value further supports the conclusion that there are periods of low background noise, reinforcing the site's overall calm acoustic profile.

In summary, the Ko Rice Valley currently presents a sound environment compatible with agricultural development, but careful noise management will be essential, particularly during construction and peak operational periods, to prevent regulatory exceedances and potential nuisance to nearby communities.

The equivalent continuous sound level (L_{Aeq}) recorded at the nearest sensitive receptor (household) to was 50.4 dB(A), with a maximum noise level (L_{max}) of 51.9 dB(A), a minimum noise level (L_{min}) of 45.6 dB(A) and a peak (L_{peak}) of 81.0 dB(A).

The L_{peak} of 81.0 dB(A)—notably higher than that recorded at the project site suggests that the household occasionally experiences sharp or sudden noise events. Possible sources include passing motorbikes, loud household items (e.g., radios or metal implements). These events, while not frequent enough to influence

the LA_{eq} significantly, could affect residents' momentary comfort or concentration, especially if such peaks coincide with resting periods.

The L_{min} of 45.6 dB(A) further illustrates the quietness of the area during inactivity, highlighting the need to preserve the peace during project activities, particularly at night or during early morning hours.

Figure 5-21 shows the ambient noise levels measured at the proposed Rice Valley and the nearest sensitive receptor (Household).

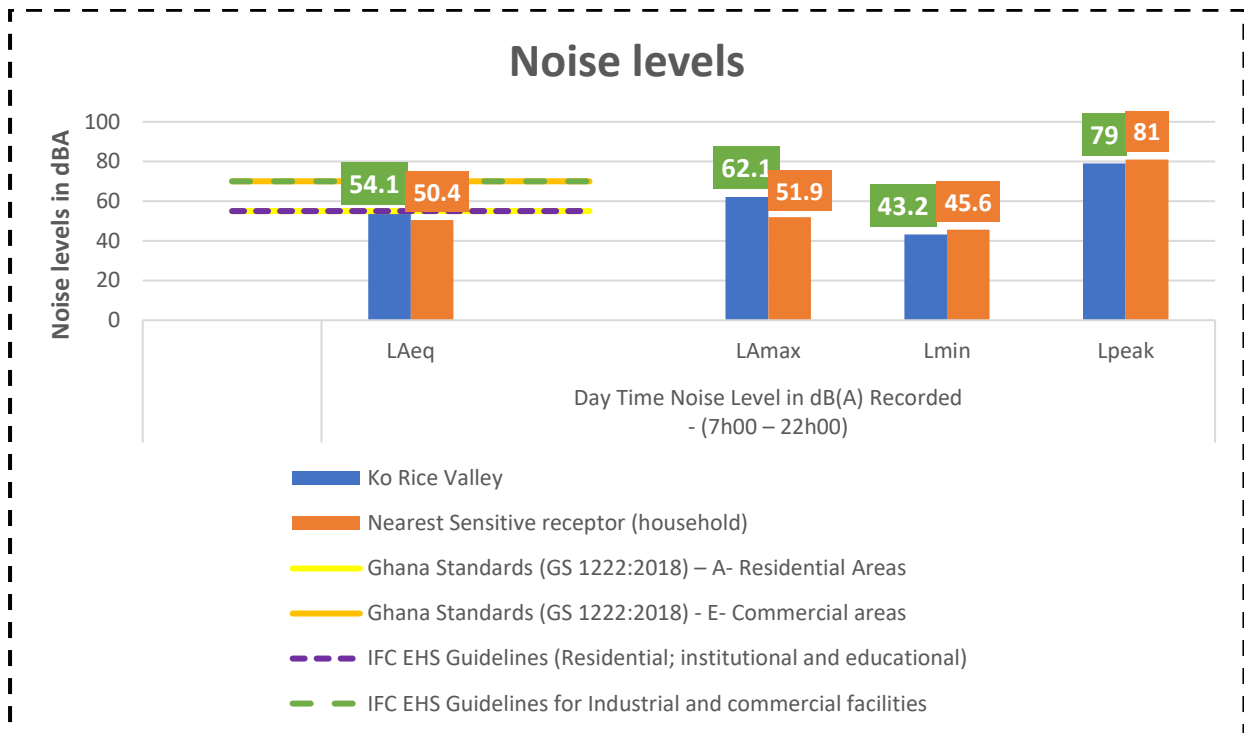


Figure 5-21: Daytime Ambient noise levels measured at the Valley and nearest sensitive receptors
(SAL Consult, 2025)

5.3.3 Water Resources

The Northern Region is located within the Volta Basin. The major sub-basins of the Volta include the Black and White Volta Rivers, the Oti River and the Lower Volta, including Lake Volta.

Groundwater

There was no groundwater available for sampling at the project area at the time of visit. The closest borehole to the project site is about 2.5 km away.

Surface Water

The Gbafiong River, a tributary of the Volta River which drains the project area is a vital water source for many communities who use it for drinking, washing, cooking and farming.

Water Quality

Water was sampled and test for pH, Conductivity, TSS, TDS, Turbidity and Chloride using the Hanna multipara meter on the adjoining Gbafiong River at the proposed Rice Valley.

Plate 5-11 shows the sampling and in-situ testing at the Gbafiong River.



Plate 5-11: Sampling and in-situ testing of the Gbafiong River

Results

Table 5-16 below shows the in-situ and laboratory analysis results of the Gbafiong River.

Table 5-16: In-situ and laboratory analysis results

S/N	Parameter		Gbafiong River	GS 175:2017 5th Edition	WHO 4th edition (2011)
In-situ results					
1	Temperature	[°C]	31.58	*25 - 30	NG
2	pH	[pH units]	8.86	6.5 – 8.5	6.5 – 8.5
3	Electrical Conductivity	[µS/cm]	44.62	*2000	NG
4	Total Dissolved Solids	[mg/L]	22.40	500	NG
5	Dissolved Oxygen	[mg/L]	3.05	NG	NG
6	Turbidity	[NTU]	299.55	5	5
Laboratory analysis results					
7	Total Suspended Solids	[mg/L]	23.0	0	NG
8	Ammonia	[mg/L]	0.532	NG	NG
9	Nitrate	[mg/L]	0.073	50	50
10	Nitrite	[mg/L]	<0.001	3	3
11	Phosphate	[mg/L]	0.103	NG	NG
12	Sulphate	[mg/L]	9.63	250	NG
13	Chloride	[mg/L]	3.08	250	NG
14	BOD	[mg/L]	6.88	NG	NG
15	Oil and Grease	[mg/L]	<1.00	NG	NG
16	Iron	[mg/L]	0.272	0.3	0.2
17	Manganese	[mg/L]	0.028	0.4	0.08

*denotes GS 175 – 1:2013 drinking water guideline

NG denotes no guideline available for comparison. Red denotes exceedance while green denotes compliance to the applicable guideline.

Temperature

The temperature of the Gbafiong River was measured at 31.58 °C, which is above the Ghana Standards Authority (GS 175:2017) guideline range of 25°C to 30°C. Although the World Health Organization (WHO, 2011) does not specify a strict temperature limit for drinking water, elevated temperatures can negatively influence water quality by decreasing dissolved oxygen levels and promoting microbial growth. It is recommended that riparian vegetation be restored to provide shade.

pH

The pH of the river at the time of in-situ testing was 8.86, which was above the upper threshold of 8.5 as set by both GS 175:2017 and WHO. This slight alkalinity, while not acutely harmful, could interfere with chlorination processes and affect the solubility of certain metals. For drinking, this means that treatment systems may need to adjust pH to enhance disinfection. In irrigation use, water with a pH near 9 can, over time, influence soil chemistry, potentially leading to reduced availability of micronutrients such as iron and manganese, particularly in already alkaline soils.

Electrical Conductivity

A key indicator of overall water salinity, *electrical conductivity (EC)*, was very low, suggesting minimal dissolved ions in the river. This is a positive indicator for both drinking and irrigation. Low EC values correspond with low salinity hazards, making the water particularly suitable for irrigating a wide range of crops, even those sensitive to salt.

Total Dissolved Solids

Total dissolved solids (TDS) measured (22.4) were well within permissible limits for drinking and pose no restrictions on irrigation. Water with such low TDS is often considered excellent for both human consumption and long-term agricultural use.

Dissolved Oxygen

The dissolved oxygen (DO) content was found to be relatively low, indicating potential oxygen depletion—possibly due to the presence of organic matter or reduced aeration in slow-moving sections of the river. While DO is not directly regulated for drinking water, low levels may indicate biological activity or decay processes that increase the risk of microbial contamination. This makes it important to ensure thorough disinfection prior to consumption. For irrigation, DO has less direct impact, though it can reflect ecosystem health and water quality stability.

Turbidity

Turbidity recorded was 299.55 NTU which greatly exceeds both the GS 175:2017 and WHO guideline limits of 5 NTU. Such high turbidity is usually indicative of suspended sediments, erosion, or organic pollution and can significantly reduce the effectiveness of disinfection. This water is clearly not suitable for direct human consumption without robust treatment, including filtration and clarification. In irrigation, high turbidity can pose challenges by clogging irrigation lines and delivering fine sediments to the field, which may affect soil structure if not managed properly.

Total Suspended Solids

The total suspended solids (TSS) measurement recorded exceeded the zero-tolerance guideline for potable water. Suspended particles may harbor pathogens or act as carriers for other contaminants, reinforcing the need for adequate sediment removal before use as drinking water. For irrigation, such solids are less of a health concern but could still interfere with the efficiency of sprinkler or drip systems, depending on how the water is applied.

Nutrients and anions

The presence of *ammonia*, although not specifically regulated, can be a marker of organic pollution or upstream contamination sources, such as decaying vegetation, sewage inputs, or agricultural runoff. While the detected level was not dangerously high, it could compromise chlorination efficiency and increase the formation of disinfection byproducts. However, for irrigation, ammonia can serve as a useful nitrogen source for plants, and its presence at the recorded level is not problematic.

Low concentrations of *nitrate and nitrite* were observed, both of which fall well below the drinking water standards of Ghana and WHO. This indicates that the river is not currently impacted by excessive fertilizer application or sewage contamination. These levels are safe for both drinking and irrigation, with no significant risk to human health or plant productivity.

Similarly, *phosphate* concentrations were modest and do not suggest any imminent eutrophication risk. While phosphates are not regulated for drinking water, excessive levels can promote algal blooms. The current levels are, however, unlikely to pose such a threat and may offer some fertilization benefit for crops.

The *sulphate and chloride* concentrations were both low, well below the respective drinking water thresholds. This indicates the absence of saline or industrial intrusion and confirms the water's suitability for both human consumption and crop irrigation. Such values are particularly favorable for long-term agricultural use, as they pose no risk of soil salinization or toxicity.

In terms of organic pollution, the river exhibited a moderately elevated *biological oxygen demand (BOD)*, suggesting the presence of biodegradable organic matter, possibly from natural sources or mild anthropogenic activity. Although BOD is not directly regulated for drinking water, elevated levels typically necessitate treatment to avoid microbial proliferation. For irrigation, BOD at the recorded level does not pose an immediate problem but may influence microbial dynamics in soils and open water storage systems.

Oil and Grease

The test for *oil and grease* showed concentrations below 1.00 mg/L, indicating minimal hydrocarbon pollution. While not specifically regulated, the presence of oil and grease at low levels does not usually present significant health risks but could create taste and odour issues in drinking water if not removed. In irrigation, such low levels are unlikely to affect crops or soil conditions.

Metals

The concentration of *iron* was slightly above the WHO aesthetic guideline of 0.2 mg/L but below the Ghana Standard limit of 0.3 mg/L. While not harmful to health, elevated iron can cause discoloration, staining, and affect taste. For irrigation, this level is acceptable and may even contribute beneficially as a micronutrient, though excessive iron over time could lead to scaling in pipes or emitters. Likewise,

manganese levels were well within both national and WHO standards, posing no concern for drinking or irrigation use.

5.3.4 Soil, Vegetation and Biodiversity

Soil

Soil Characteristics for both Nandom Kpee and Nandom Ko are the same as such, the analysis already described in **section 5.2.4** under soil reflects the characteristics of the Nandom Ko community.

Vegetation

The Nandom Ko project site is also an admixture of farmlands (predominantly rice fields) and grassland with isolated trees. Rice cultivation and cattle grazing as well as wildfires have led to a loss of the typical tree and shrub strata of the Guinea savanna vegetation (see **Plate 5-12**). Some of the tree species found on the site are *Vitellaria paradoxa*, *Parkia biglobosa*, *Tectona grandis*, *Azadirachta indica*, and *Diospyros mespiliformis*.



Plate 5-12: Nandom Ko Valley Site with isolated trees

(Sal Consult, 2025)

Floral Survey

A flora survey was conducted in April 2025 with an initial reconnaissance survey done within the project site and external boundaries to obtain an overview of the extent, topography and complexity of the vegetation. Sample quadrats of size 20 m x 20 m were studied in the proposed site and a total of 3 vegetation samples were taken during the survey. The locations of the samples were recorded with a Garmin 64s GPS. **Table 5-17** shows the sample location coordinates and their associated vegetation types.

The ecological significance and national conservation status of the species encountered were defined using the ecological guild and star rating system (see **Table 5-18**) adopted in the Forest of Ghana Geographic Information Exhibitor manual (Hawthorne, 1993). The Global conservation status (**Table 5-19**)

of each species was determined using the International Union of Conservation of Nature (IUCN) red list of threatened species (IUCN, 2024).

Table 5-17: Coordinates of sampling locations and associated vegetation types

Site	Lat (N)	Long (W)	Description
Nandom Ko (Dam Site)	N 10.79613	W 002.75450	Seasonally flooded grassland with isolated trees/ Rice field
Nandon Ko (Site 2)	N 10.79653	W 002.75054	Grassland with isolated trees
Nandon Ko (Site 3)	N 10.79570	W 002.74249	Rice field/grass land with isolated trees

(SAL Consult, 2025)

Table 5-18: Star Rating system

Rating	Description
Black Star species	Species rare internationally and at least uncommon in Ghana; urgent attention to conservation of populations needed
Gold Star species	Fairly rare internationally and/or locally
Blue star species	Widespread internationally but rare in Ghana or vice-versa
Scarlet star species	Common, but under serious pressure from heavy exploitation
Red Star species	Common, but under pressure from exploitation
Pink Star species	Common and moderately exploited. Also, non-abundant species of high potential value
Green Star species	No particular conservation concern, common in Ghana

Table 5-19: IUCN Red List categories

Category	Description
Extinct (EX)	A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.
Extinct in the Wild (EW)	A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed Extinct in the Wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.
Critically Endangered (CR)	A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered, and it is therefore considered to be facing an extremely high risk of extinction in the wild.
Endangered (EN)	A taxon is endangered when the best available evidence indicates that it meets any of the criteria for Endangered, and it is therefore considered to be facing a very high risk of extinction in the wild.

Category	Description
Vulnerable (VU)	A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria for Vulnerable, and it is therefore considered to be facing a high risk of extinction in the wild.
Near Threatened (NT)	A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.
Least Concern (LC)	A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category
Data Deficient (DD)	A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking.
Not Assessed (NA)	A taxon is Not yet Assessed when it is has not yet been evaluated against the criteria

(IUCN, 2024)

Results and Floral Analysis

The species lists for the 3 samples analysed are presented in **Table 5-20** while the floristic analysis of the project site is presented in **Table 5-21**. The sampling recorded a total of 17 species in 16 genera belonging to 11 flowering plant families. The families with high species representation were the *Fabaceae* (3) and the *Anacardiaceae* (3). These 2 families (out of total of 11) accounted for 55% of the species recorded. The rest of the families were poorly represented with 2 or less than 1 species. The diversity of species on the site is low. This is not surprising since most of the herbs and shrubs have been destroyed by cultivation, bush fires and cattle grazing.

Table 5-20: Sample profiles and species composition of Valley

Seasonally flooded grassland with isolated trees/ Rice field	Grassland with isolated trees	Rice field/grass land with isolated trees
N 10.79613	N 10.79653	N 10.79570
W 002.75450	W 002.75054	W 002.74249
Elev. 282m	Elev. 277m	Elev. 287m
Species	Species	Species
<i>Daniellia oliveri</i>	<i>Acacia senegal</i>	<i>Mitragyna inermis</i>
<i>Mangifera indica</i>	<i>Azadirachta indica</i>	<i>Azadirachta indica</i>
<i>Mitragyna inermis</i>	<i>Diospyros mespiliformis</i>	<i>Acacia senegal</i>
<i>Diospyros mespiliformis</i>	<i>Balanites aegyptiaca</i>	<i>Lannea acida</i>
<i>Azadirachta indica</i>	<i>Parkia biglobosa</i>	<i>Diospyros mespiliformis</i>
<i>Acacia senegal</i>	<i>Combretum nigricans</i>	<i>Tectona grandis</i>
<i>Hyparrhenia rufa</i>	<i>Ziziphus mauritiana</i>	<i>Vitellaria paradoxa</i>
<i>Balanites aegyptiaca</i>	<i>Andropogon gayanus</i>	
<i>Anogeissus leiocarpus</i>	<i>Hannoa undulata</i>	
<i>Parkia biglobosa</i>	<i>Vitellaria paradoxa</i>	
	<i>Combretum adenogonium</i>	

(SAL Consult, 2025)

Table 5-21: Floristic Analysis of Valley

Species	Family	Life Form	Guild	Star Rating	IUCN
<i>Acacia senegal</i>	Fabaceae	Tree	Non forest Savana/planted	NE	NE
<i>Andropogon gayanus</i>	Poaceae	Herb	Non forest Savana/planted	NE	NE
<i>Azadirachta indica</i>	Meliaceae	Tree	Non forest Savana/planted	NE	LC
<i>Balanites aegyptiaca</i>	Zygophyllaceae	Tree	Non forest Savana/planted	NE	LC
<i>Combretum adenogonium</i>	Combretaceae	Tree	Non forest Savana/planted	NE	LC
<i>Combretum nigricans</i>	Combretaceae	Tree	NE	NE	NE
<i>Daniellia oliveri</i>	Fabaceae	Tree	Non forest Savana/planted	NE	LC
<i>Diospyros mespiliformis</i>	Ebenaceae	Tree	NE	Green	NE
<i>Hyparrhenia rufa</i>	Poaceae	Herb	NE	NE	NE
<i>Hannoa undulata</i>	Anacardiaceae	Tree	Non forest Savana/planted	NE	NE
<i>Lannea acida</i>	Anacardiaceae	Tree	Non forest Savana/planted	NE	LC
<i>Mangifera indica</i>	Anacardiaceae	Tree	Non forest Savana/planted	NE	DD
<i>Mitragyna inermis</i>	Rubiaceae	Tree	Non forest Savana/planted	NE	LC
<i>Parkia biglobosa</i>	Fabaceae	Tree	Non forest Savana/planted	NE	LC
<i>Tectona grandis</i>	Lamiaceae	Tree	Non forest Savana/planted	NE	NE
<i>Vitellaria paradoxa</i>	Sapotaceae	Tree	Pioneer	NE	VU
<i>Ziziphus mauritiana</i>	Rhamnaceae	Tree	Non forest Savana/planted	NE	LC

(SAL Consult, 2025)

The Life form composition of the flora (**Table 5-22**) showed a dominance of the Tree Life form (about 88%) followed by the Herbs (12%). No records were recorded for Climber and shrub. The open nature of the vegetation, due to land cultivation, wildfires and grazing, could explain the observed low diversity of life forms.

Table 5-22: Life Form Composition of the Flora

Life form	No.	%
Climber	-	-

Herb	2	12
Shrub	-	-
Tree	15	88
Total	17	100

(SAL Consult, 2025)

The ecological guilds of the species, which gives an indication of the developmental/successional stage of the vegetation, shows a predominance of savanna and species of waste places and depicts typical savanna woodland vegetation, which is undergoing regeneration after disturbance as seen in **Table 5-23**. The regeneration here is actually a regrowth of the plants left behind during cultivation.

Table 5-23: Ecological Guilds of the Flora

Guild	No.	%
NPLD	-	-
Pioneer	1	6
NE	3	18
Non Forest Savanna/Planted	13	76
Total	17	100

Legend: NE: Not evaluated; NFS/P: Non-Forest Savanna/Planted species; NPLD: Non-Pioneer Light Demander

(SAL Consult, 2025)

Species of National Conservation Concern

Inspection of **Table 5-21** reveals only 1 Vulnerable species (*Vitellaria paradoxa*), which is a tree of economic importance to the local people of the project area was recorded on the project site. The rest of the species were either Least Concern, Data Deficient or Not Evaluated and do not merit conservation action globally.

Species of Global Conservation Concern

Table 5-24 shows that only 1 Vulnerable species (*Vitellaria paradoxa*) were recorded on the project site. The rest of the species (94%) were either Data Deficient, Least Concern or Not Evaluated and do not merit conservation action globally.

Table 5-24: IUCN Red List Status Composition of the Flora

IUCN Red list Status	Number (No.)	Percentage (%)
DD	1	6
LC	8	47
NE	7	41
VU	1	6
Total	17	100

(SAL Consult, 2025)

Fauna of the project site

The Faunal assessment shows that both Nandom Kpee and Nandom Ko valleys have the same faunal species due to their proximity. As such, the analysis already described in the faunal section of **section 5.2.4** for Nandom Kpee reflects the characteristics for Nandom Ko.

Conclusions

The results of the survey indicate that none of the floral and faunal species recorded are of conservation concern due to the project area being an extensively modified habitat. Isolated cases of *Vitellaria paradoxa* (shea tree) were recorded on the project site which are not of biodiversity and economic significance because they are commonly found in many other areas of the municipality.

The project will therefore have no significant impact on the existing vegetation and fauna as well as their habitat.

5.3.5 Socio-economic Environment – Project site (Nandom Ko Community)

Respondents sampled for the socio-economic data comprised of individuals from both Nandom Kpee and Nandom Ko communities. As such, the analysis already described in **section 5.2.5** reflects the characteristics of the Nandom Ko community.

6.0 STAKEHOLDER CONSULTATIONS

The ESIA preparation included preliminary stakeholder identification, some initial consultations and analysis of the requirements with key stakeholders. The key project stakeholders identified for consultations included government and non-governmental organizations. Stakeholder consultation is a process and should continue through the design stage of the project implementation phase.

6.1 Objectives of the consultations

The main objective of consultations with stakeholders is to discuss and provide relevant information on the project. Specifically, to achieve the following objectives:

- Provide some information about the proposed project;
- Provide opportunities for stakeholders to discuss their opinions and concerns;
- Provide and discuss with stakeholders, alternatives considered to reduce anticipated impacts;
- Identify and verify significance of environmental, social and health impacts; and
- Inform the process of developing appropriate mitigation and management guidelines.

6.2 Stakeholders consulted and concerns raised

The project was presented and explained to all stakeholders and were encouraged to share their concerns and perceived risks. The stakeholders were generally enthused about the project and indicated their readiness to lend their support for the successful implementation of the project.

Below are the key environmental and social issues discussed with the stakeholders.

- Employment and Livelihoods
 - The project will generate short- and long-term job opportunities for skilled and unskilled local labour, including women. However, unmet expectations regarding opportunities could result in social agitation or unrest.
 - Labour and employment issues such as delayed wages, discriminatory practices, or exclusion of women and youth could undermine project credibility.
 - Transparent, inclusive recruitment and training plans must be clearly communicated and coordinated with local stakeholders.
- Food Security, Economic Growth and Market Development
 - Project benefits such as food security, and improved access to mechanization and input services which will raise agricultural productivity and income for value chain actors must be shared with stakeholders to obtain their buy-in for a smooth project implementation.
 - The project will stimulate local commerce and attract new investments in processing, marketing, and quality control services.
 - Increased agricultural output will reduce rice imports and help Ghana conserve foreign exchange.
- Knowledge, Capacity Building, and Technology Transfer
 - Training of farmers and stakeholders in good agricultural practices will promote climate-smart farming, reduce losses, and improve resilience.
 - Introduction of modern technologies and digital tools (e.g. RiceAdvice, pest control methods) will enhance productivity and efficiency in farming.

- Land Access, Tenure, and Use
 - Farmers and landowners may be either physically or economically displaced by the project and should be engaged extensively on the impacts and mitigation measures including compensation.
 - Improper land acquisition or voluntary land donations which are not transparent and inclusive may lead to disputes and restrict access to traditional lands and resources.
 - Tenant farmers and informal land users may be overlooked in consultation or compensation processes if stakeholder mapping is not comprehensive.
- Water Use and Resource Consumption
 - Water-intensive rice cultivation may increase pressure on local water resources, especially during dry periods.
 - Inclusive planning and monitoring involving local communities and water user associations are essential to ensure fair and sustainable water use.
- Environmental Degradation
 - Site clearing and infrastructure development may result in loss of vegetation and some trees.
 - Soil degradation and erosion may occur due to land preparation, bare farmlands, and construction activities.
 - Dust, emissions, and fumes from construction and operations may degrade local air quality, especially on untarred roads.
 - Runoff, domestic waste, chemicals, and effluent may pollute surface and groundwater, affecting aquatic life and users.
 - Operation of machinery and vehicle movement will generate noise and vibration, causing nuisance to nearby communities.
- Pesticide and Agrochemical Use
 - The application of synthetic fertilizers and pesticides poses risks of water pollution, biodiversity loss, and adverse health impacts on farmers and surrounding communities.
 - Capacity building is needed for smallholder farmers on Integrated Pest Management (IPM), safe handling practices, and the use of environmentally safer alternatives.
- Health, Safety, and Labour Conditions
 - Workers face risks of injuries, accidents, insect/animal bites, agrochemical exposure, dust-inhalation and equipment-related injuries during construction and operation.
 - Poor labour conditions, including lack of contracts and inadequate welfare facilities, may expose workers to exploitation and health risks.
 - Fires from negligence or improper burning could cause property loss and injuries.
- Social Risks and Community Impacts
 - Presence of workers may increase incidents of gender-based violence, rape, and defilement in host communities.
 - Pollution and unsafe practices may lead to spread of communicable diseases, including HIV/AIDS and cholera.
 - Rising social tensions, theft, confrontations, and conflicts may emerge between workers and locals over cultural, financial, or sexual issues.
 - Increased road traffic may cause congestion and accidents due to broken-down or poorly parked haulage vehicles.
 - Local communities must be made aware of potential risks and emergency response protocols must be clearly established.
- Gender-Based Violence, Sexual Exploitation and Abuse, and Child Labour

- Labour influx during construction and agro-industrial operations may increase the risk of GBV, SEA, and child labour.
- Without strong safeguards, women, girls, and persons with disabilities may face heightened vulnerabilities.
- Community engagement is crucial to raise awareness, strengthen prevention mechanisms, and ensure access to referral and support services.
- **Grievance Redress**
 - The project must implement a well-functioning and accessible Grievance Redress Mechanism (GRM) that all stakeholders can use.
 - Existing community grievance structures should be formally recognized and integrated into the broader project-level redress system.

The stakeholders identified and consulted are given in **Annex 5** which provides details of the engagement including locations, dates, stakeholders who participated, pictures, the main concerns raised by participants, responses and commitments of MOFA. **Annex 6** gives the attendance sheet of the stakeholders engaged.

A summary of the outcome of the consultations for key stakeholders is provided in **Table 6-1**. These are mostly concerns and suggestions/interventions from government institutions, community based business entities, farmer-based organizations, and affected communities.

Table 6-1: Details of stakeholders identified and consulted

Group of stakeholders	Stakeholders	Issues/Concerns	Proposed Solution/ Responses
Project Implementer	Ministry of Food and Agriculture (Nandom Municipal)	● The department is aware that land has been acquired for the project. ● The farmers rely on rain-fed agriculture which make farming less reliable and profitable. ● The Department must be well-resourced (finance/logistics) for monitoring/supervision of the project. ● Farmers should be supported with farm inputs and machinery for land preparation and crop harvesting to reduce post-harvest losses through farmer service centers. ● Main agriculture problem in the area is lack of irrigation	● The issues raised were acknowledged and the MoFA team referred to the project documents for relevant information. E.g. The SEP provides the focal area of engagements for participants ● The project is expected to have a positive impact on community members where it is expected to create jobs in the rice value chain thereby reducing rural migration.

Group of stakeholders	Stakeholders	Issues/Concerns	Proposed Solution/ Responses
		therefore this should be factored into the project planning. - The project is expected to have a positive impact on community members where it is expected to create jobs in the rice value chain thereby reducing rural migration. - All relevant stakeholders should be involved in the project. - There should be ready markets for the rice that will be produced. - The road network in the area should be improved to enhance mobility of people and goods.	
Regulatory Institution	Environmental Protection Authority	- Compensation issues will arise if there are PAPs in the valley. - Compensation should be addressed through comprehensive RAP. - There must be valuation of properties if any, as well as compensation for any form of displacement. - Environmental permit is required for the project. - Biodiversity conservation should be a consideration in the project implementation. - If there are RAP issues, it should be handled properly in order not to impoverish persons involved. - There will be field visits by the EPA team to monitor environmental compliance during implementation.	Assurance was given to the EPA that the project will follow all EPA guidelines and that the EPA will be involved in providing monitoring and support for the implementation of the project. Additionally, budget will be provided for their role.

Group of stakeholders	Stakeholders	Issues/Concerns	Proposed Solution/ Responses
Other Government Institutions	Water Resources Commission	Education on agrochemicals use for farmers to avoid pollution of local water bodies.	Concerns of the WRC were noted and that they will be consulted to participate in the project implementation when the need arises.
	Nandom Municipal Assembly	- The assembly is willing to provide support to any project that will improve the productivity of farmers in the community. - Compensation issues are important to the assembly and must be comprehensively addressed. - A grievance mechanism should be established to assist the PIU to resolve complaints and grievances in a timely, effective and efficient manner. - Main agricultural challenges in the area are the lack of mechanization and the high cost of agricultural input. - There is concern about the inadequate road network and the roads are mostly in poor condition. - Assembly members and the beneficiary community leadership should be particularly well sensitized about the project to ensure smooth implementation.	- All the relevant stakeholders will be engaged and the ESIA will provide mitigation measures especially for farmers who will be directly affected by the project implementation. - The Assembly will assist in any grievance mechanism measures implemented in the project.
	National Disaster Management Organization, Nandom	- Seasonal floods occur regularly during the rainy season leading to loss of farmlands and food insecurity. - Drought is also experienced during the dry season leading to bushfires.	- The challenges of the NADMO were noted as well as their importance to the project. - Budget will be allocated for the - training of fire fighters and community volunteers to handle bush fires as well

Group of stakeholders	Stakeholders	Issues/Concerns	Proposed Solution/ Responses
		- NADMO is concerned that communities farm close to waterways. - Project should ensure improved drainage and proper construction within the valley to avoid flooding.	provide education on the effects of bush fires on the project.
	Ghana National Fire Service	- The project should put measures in place to preserve existing water bodies as this serves as farm boundaries and also helps to curb bush fires. - The GNFS should be adequately resourced to train fire volunteers from the farming communities. - Fire incidents have minimized in recent times due to continuous education of the public. - Main causes of fire is the indiscriminate burning of bushes (i.e. deliberate, post-harvest). - Most fire occurrence happen between the months of November and January. - The adverse effects of fire outbreaks are loss of income, soil fertility, lives and properties. - The closest Fire station is about 10km which is minimally equipped. - The local Fire service station will be on hand to assist the project when/ if required including involvement in community education	- The challenges of the GNFS were noted as well as their importance to the project. - As part of the ESMP, resources will be provided to support the training of participants as well as community volunteers.
Community based business entities	Small Holder Farmer	Common crops cultivated include soybean, maize, rice,	The Challenges of participants were noted and they were assured of the

Group of stakeholders	Stakeholders	Issues/Concerns	Proposed Solution/ Responses
		sorghum, yam, cassava and groundnut. - Urgent needs include tractor service, access to agrochemicals including fertilizers. - Concerns about the poor road network need to be addressed. - Inputs and credit support will be required for the beneficiaries on the project. - Drought and pest resistant seed varieties should be provided for production. - Ready market for produce is key to encourage more people to get involved. - Land preparation support is required before planting. - Existing farmers on the proposed project site must be compensated if they are to move out. - Gender bias/political influences should be avoided in the project implementation. - Farmers should be trained on sustainable farm practices by extension officers. - The road in the project area should be improved especially during the rainy season.	benefits that the project will offer them. - Existing farmer's fears were allayed as they were promised compensation if they got affected by the project. - Roads leading to project sites will be improved to enhance transportation.
	Aggregators	- Low purchasing power of farmers. - High transportation cost due to poor road network. - Lack of access to finance. - Inadequate storage infrastructure.	Concerns were well noted and participants were assured of benefits that the project will bring to them with the main focus of booming their business.

Group of stakeholders	Stakeholders	Issues/Concerns	Proposed Solution/ Responses
		- There are no formal agreements between aggregators and farmers. - Aggregators carry out limited processing of the rice such as cleaning and drying prior to transporting to local markets.	
	Agro Input Dealers	- Main business activities include trading of fertilizers, seeds, chemicals, tools and equipment, sourced from local distributors. - Customers are mostly small-holder farmers. - Peak season is between March and June of the year. - They offer technical advice/training to farmers. - Some concerns include difficulty in connecting to suppliers, inadequate storage facilities, high transport cost and lack of access to finance. - The agro input dealers mostly source their goods from local distributors on cash and carry basis. They are hardly out of stock. All transactions are manual.	Participants were advised to intensify their efforts in educating the farmers including the proper disposal of empty containers of agrochemicals and fertilizers by licensed waste management company.
Civil Society Organizations (CSO)	Farmer Based Organization (FBO)	- The project should avoid political bias. - Vulnerable groups should be given special consideration during project implementation - Traditional authorities are important for the success of the project. - Agricultural inputs should be subsidized to ensure affordability to farmers. - Extensive consultation should be conducted to	Participants were assured that the REWARD project was a non-partisan one and that the project will require their support in providing advocacy and training.

Group of stakeholders	Stakeholders	Issues/Concerns	Proposed Solution/ Responses
		comprehensively address any land reallocation issues. - The use of agro-chemicals and the management of waste from organic fertilizers should be properly managed to prevent the contamination of water bodies flowing through the valleys. - The herdsmen cattle feeding on waste/plants especially in the dry season can also help in waste management. - Farmers are in urgent need of easy access to affordable finance. - A close cooperation is required between farmers and suppliers, credit/financial services etc. A cooperative arrangement among farmers facilitated by CSOs/ NGOs will be useful - Initiatives by the Rural Enterprise Programme to provide financial support to farmers is a good one which includes business advisory services. - The REP is challenged by high illiteracy levels, difficulty in loan repayment by programme beneficiaries and inadequate finance.	
Community stakeholders	Traditional Authority	- Land is predominantly owned by the traditional authorities and mostly used for farming and livestock. - Some concerns include conflicts with herdsmen, compensation for displaced farmers, fairness in selection	- The project was explained to participants to make them understand the benefits of the project to the project communities. - Participants assistance were sought to ensure cooperation from affected farmers. The leaders were thanked for

Group of stakeholders	Stakeholders	Issues/Concerns	Proposed Solution/ Responses
		of project beneficiary farmers. • They recommend timely supply of seeds and agro-chemicals, and improvement in the road network. • Incidences of gender-based violence, sexual exploitation or abuse cases are uncommon in the project area. • There are usual petty quarrels between members of the opposite sex but these are settled amicably by family heads/parents or traditional authority depending on which is readily available and accessible.	donating their lands for the project. The LEAP will be implemented to support vulnerable persons who may be affected by the project e.g. bicycles will be given to farmers to aide in transportation to their farms. • The Grievance redress mechanism will be put in place to ensure farmers benefit rather than suffer from the project implementation.
	Womens' Group	• Women are mostly vulnerable and will require special assistance from the project. • Concerns include difficulty in accessing ready market for farm produce, lack of processing facilities. • Local groups include VSLA which provide some financial support to the women. • Vulnerable households mostly receive support from Livelihood Empowerment Against Poverty (LEAP).	• The womens' value to the community was acknowledged and as such, the project has been designed to benefit women and encourage full participation from them. • There will be no room for sexual harassment and in the likely event of that happening, the case should be reported to the needed authorities.
	Men's Group	• Main source of livelihood is farming and rearing of livestock. • Deforestation has contributed to unreliable rainfall patterns and has affected the planting (June – December). • Their top concerns are the poor road network, lack of access to potable drinking water and financial support.	• Participants concerns were acknowledged and they were assured of job opportunities that will arise from the project. • In addition, local persons will be considered first for any job role associated with the project. • Participants were referred to follow the grievance redress

Group of stakeholders	Stakeholders	Issues/Concerns	Proposed Solution/ Responses
		- They have confidence in the extension support service and that must be made more effective. - Processing facilities are needed to support their farming activities.	process to address any concerns from them.
	Youth group	- The youth are willing and available to participate in the project as this will help to reduce unemployment and alleviate poverty. - Ready markets for the rice produce will be required to ensure reliable flow of income. - Irrigation is necessary to make the project more effective and sustainable. - Extension officers should play a major role in the implementation of the project.	- Concerns of participants were acknowledged and they were assured of job opportunities that will arise from the project. - In addition, local persons will be considered first for any job role associated with the project. - Participants were referred to follow the grievance redress process to address any concerns from them.

6.3 Public disclosure

AfDB requires that environmental reports for projects are made available to project affected groups, local NGOs, and the public at large. Public disclosure of EIA documents or environmental reports is also a requirement of the Ghana EIA procedures (**Annex 1**). The report should be disclosed to all relevant stakeholders to make inputs or comments. Public notice in the media should be served for that purpose.

6.4 Grievance Redress Mechanism

The activities of the project may generate grievances arising from the interaction between project and local authorities/community, workers and the host community etc. Some potential grievances identified and likely to occur during project implementation include:

- Complaints from the local community on the conduct of workers, especially sexual harassment and other gender-based offenses;
- Complaints related to noise, dust, traffic incidents; and
- Restriction of access to persons who otherwise were using portions of land e.g. for grazing
- Failure to consider the recruitment of local man-labour;
- Non-respect of the habits and customs of the host community by the actors of the site;
- Non-compliance with the measures or provisions contained in the ESMP.

In managing grievances, the REWARD project proposed measures for resolution of grievances that may arise due to project implementation. This is a three-tier grievance redress structure which are:

- Community level structures (1st Tier) – These includes; a Grievance Redress Committee and Site-level Grievance Redress Mechanism.
- District level structure (2nd Tier) - Municipal Grievance Redress Committee
- Project-wide level structure (3rd Tier) – Project Grievance Redress Committee

Community Level (1st Tier):

- Includes Community Grievance Redress Committees (GRCs) and site-level Grievance Redress Mechanisms (GRMs).
- Handles initial complaints from individuals or communities related to agricultural or infrastructure activities.
- Site-level GRMs are managed by contractors and report monthly to the project team; oversight is provided by Environmental and Social Safeguard Specialists.

District Level (2nd Tier):

- Municipal Grievance Redress Committees (Municipal GRCs) address unresolved complaints from the community level or cases where community GRCs fail to act within 30 days.
- They meet quarterly or as needed for urgent matters.

Project Level (3rd Tier):

- Project Grievance Redress Committee led by the Project Coordinator or Social Safeguard Specialist.
- Handles cases escalated from the district level, especially if not resolved in 30 days or if the complainant is dissatisfied with the resolution.

Each level functions progressively, allowing for escalation of unresolved or unsatisfactorily resolved issues. The composition of the Grievance Redress Committees/Structures at the various levels in the **Table 6-2** below.

Table 6-2: Composition of Grievance Redress Committees / Structures

Membership of Committees / Structures			
Community Grievance Redress Committee	Site-level Grievance Redress Mechanism	Municipal Grievance Redress Committee	Project Grievance Redress Committee
Assembly member for the community	Site Environmental Officer	Municipal Director of Agriculture /Rep	Project Coordinator
Chief	Representatives of site workers	Municipal Planning Officer	Social Safeguard Specialist
Agriculture Extension Agent (AEA) in charge of the community	PAP representative	Municipal Land Officer	Environmental Safeguard Specialist

PAP representative		Municipal Community Development Officer (formerly Social Welfare Officer)	Any other project Specialist who would be required
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- Setting up of a Grievance Redress Committee (GRC) at the community level and the district level to receive and address grievances from stakeholders.
 - At the community level, the GRC will be made up of the Assemblyman, the Chief, Agriculture Extension Agent (AEA), and a representative of the project affected persons (PAPs). The Assemblyman will be responsible for receiving grievances and subsequently liaise with the other members of the GRC to have the issue resolved.
 - At the district level, the GRC will be made up of the Municipal Director of Agriculture, the Municipal Planning Officer, Municipal Land Officer and the Municipal Community Development Officer.
 - At the Project level, the GRC will be made up of the Project coordinator, Social Safeguard Specialist, Environmental Safeguard Specialist and any other project Specialist who would be required.
- 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 Assemblymen to ensure they can engage the communities, record and ensure grievances are resolved.

Grievances are expected to be communicated either verbally (in a language of choice) or in writing to the GRC. Upon receipt of complaints, timely responses are expected to be given. It is expected that if grievances cannot be resolved locally, then these will be referred quickly to the Municipal Council GRC for resolution.

Actions to be taken to address the grievance will be agreed upon by the GRC, and progress of implementation of agreed measures reported to the Local community, Municipal Assembly, PIU and Ministry of Food and Agriculture on a weekly and monthly basis.

A grievance management procedure indicating activities and timeframe for resolution of issues is shown in **Figure 6-1**.

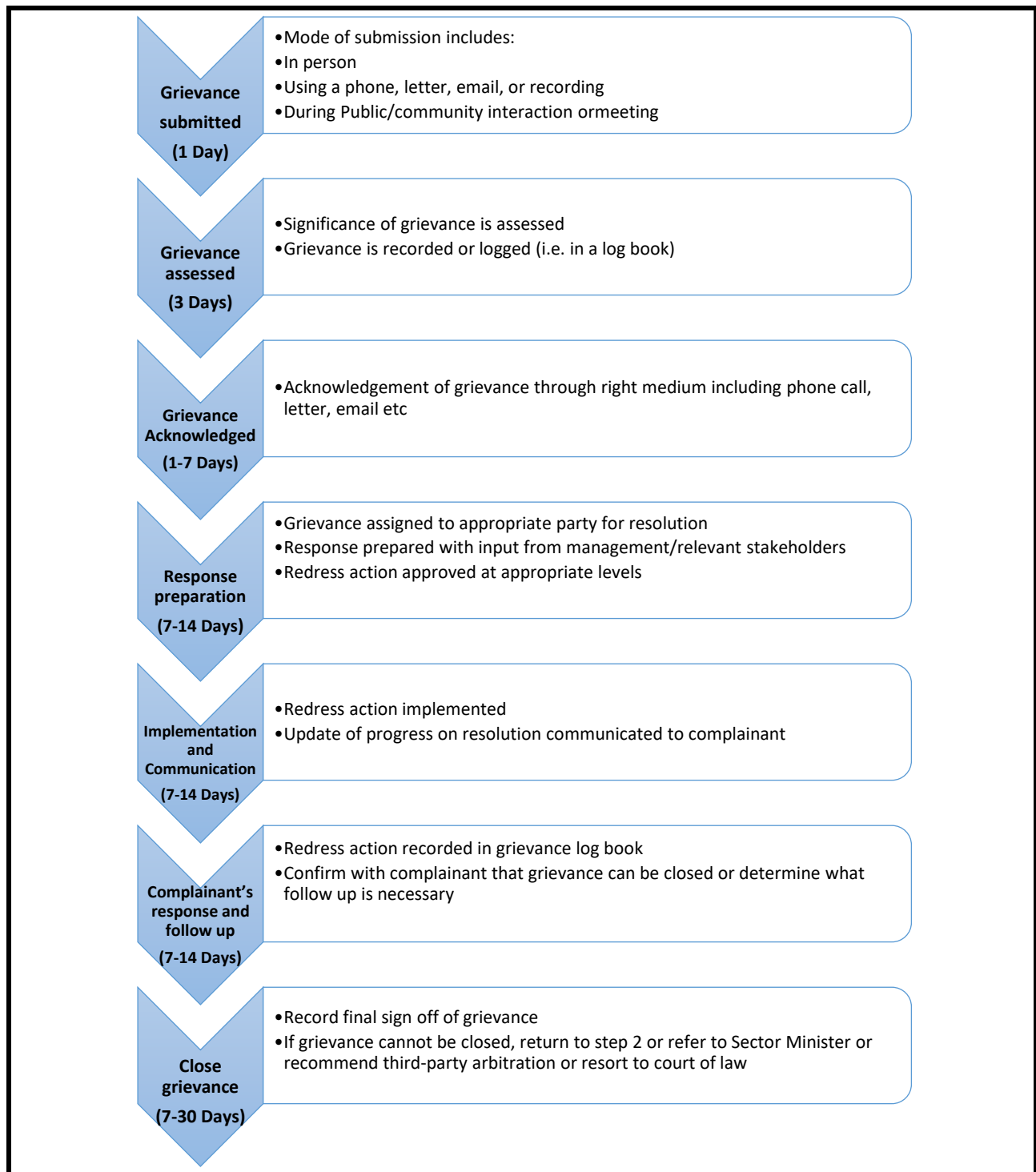


Figure 6-1: Procedure for Grievance Redress

GRM operating budget

Table 6-3 presents the operating budget of the GRM. This budget is estimated at USD 79,000.

Table 6-3: GRM Implementation Budget Summary

Headings	Unit	Quantity	Unit cost (USD)	Total cost (USD)
Reproduction and distribution of forms	Lump sum	1	5,000	5,000
Organization of GRM awareness and public campaigns in local communities	Session	20	2,000	40,000
Training of members of the two (02) committees on the GRM (community level and municipal level)	Session	2	2,000	4,000
Support for the operating of complaints management committees (communities and district)	Monthly	60	500	30,000
Total cost of the implementation of GRM				79,000

7.0 POTENTIAL ENVIRONMENTAL AND SOCIAL ISSUES AND IMPACTS

The Impact Assessment methodology provided in this Chapter sets out the approach used to characterize and evaluate the potential environmental and social effects associated with the REWARD Project.

The entire EIA process can be described as a systematic approach to identifying, describing and evaluating the potential environmental and social effects, and developing measures that will be implemented to manage these effects. These measures include ones that avoid or reduce the significance of adverse effects to an acceptable level and enhancing beneficial effects of the project.

The typical EIA process, including Impact Assessment stages, is indicated in **Figure 7-1** below.

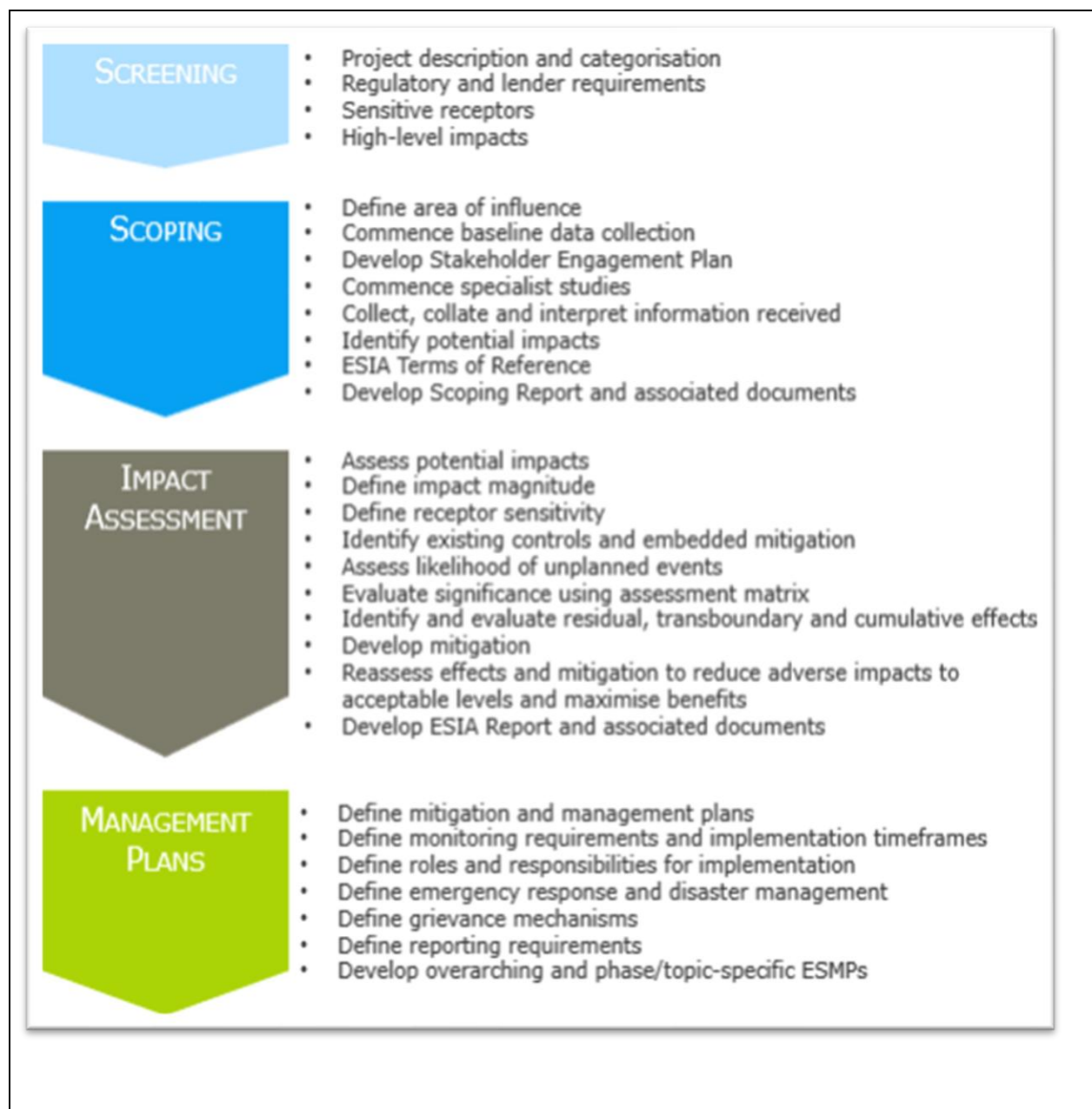


Figure 7-1: EIA Process

7.1 Impact Assessment

In undertaking the assessment of impacts, the consultant has drawn upon, among others:

- Its knowledge of sources of potential impacts associated with the REWARD Project;
- An identification of the main environmental and social resources and receptors from the baseline data collection; and
- The results of the various stakeholder engagements.

The assessment methods described below present the criteria for determining receptor sensitivity, impact magnitude and impact significance. The impact assessment for this study includes:

- Identification of Potential Environmental and Social Issues and Impacts; and
- Evaluation and interpretation of impacts.

The Impact mitigation and control strategy is present in the ensuing chapter.

7.1.1 Identification of Potential Environmental and Social Issues and Impacts

The potential environmental and social impacts of the proposed project have been identified and assessed as positive/beneficial or negative/adverse comprehensively. These have been described for the various phases of the Project consisting of:

1. Construction phase activities;
2. Operational phase activities; and
3. Decommissioning phase activities

7.1.2 Evaluation and Interpretation of Impacts

The significance of each impact has been evaluated and compared with national, international as well as applicable industry standards. The methodology for evaluating an impact is outlined below:

Impact Identification and Characterization

Impacts are described in terms of their characteristics, including the impact's type and the impact's spatial and temporal features (namely extent, duration, scale and frequency). The definitions of the terms used are described in **Table 7-1**.

Table 7-1: Impact Characteristics

Characteristic	Definition	Terms
Type	A descriptor indicating the relationship of the impact to the Project (in terms of cause and effect).	Direct - Impacts that result from a direct interaction between the Project and a resource/receptor (e.g., between occupation of a plot of land and the habitats which are affected). Indirect - Impacts that follow on from the direct interactions between the Project and its environment as a result of subsequent interactions within the environment (e.g., viability of a species population

Characteristic	Definition	Terms
		resulting from loss of part of a habitat as a result of the Project occupying a plot of land). Cumulative - Impacts that result from the incremental impacts of one action/activity when added to past, present, and reasonably foreseeable future actions/activities.
Duration	The time period over which a resource / receptor is affected.	Temporary - (associated with the notion of reversibility). Can be short, medium and long term: Short term – typically lasts from days to months. Medium-Long term – typically lasts from one to many years. Permanent – (i.e. irreversible)
Extent	The reach of the impact (i.e. physical distance an impact will extend to).	On-site - impacts that are limited to the Project site. Local - impacts that are limited to the Project site and adjacent area. Regional - impacts that are experienced at a regional scale, i.e. beyond adjacent properties, covering the metropolis and beyond National - impacts that are experienced at a national scale. Trans-boundary/International - impacts that are experienced outside of Ghana
Scale	Quantitative measure of the impact (e.g. the size of the area damaged or impacted, the fraction of a resource that is lost or affected, etc.). or the professional viewpoint of the measure of impact.	Quantitative measures as applicable for the feature or resources affected/ professional viewpoint of expert as applicable for the feature or resource in terms of severity of impact measure (i.e. minor, moderate, severe)
Frequency	Measure of the constancy or periodicity of the impact.	No fixed designations; intended to be a numerical value or a qualitative description.
Likelihood	Characteristic that pertains to unplanned events determined either qualitatively or quantitatively estimated on the basis of experience and/or evidence that such an outcome has previously occurred.	Unlikely – The event is unlikely but may occur at some time during normal operating conditions. Possible – The event is likely to occur at some time during normal operating conditions. Likely - The event will occur during normal operating conditions (i.e., it is essentially inevitable).

Determining Impact Magnitude

Once an impact's characteristics are defined, the next step is to estimate impact's "magnitude". Magnitude is typically a function of the following impact characteristics (as applicable):

1. extent;
2. duration;
3. scale; and
4. frequency.

Magnitude (from small to large) is in practice a continuum, and evaluation along the spectrum requires the exercise of professional judgement and experience. Each impact is evaluated on a case-by-case basis, and the rationale for each determination is noted. The universal magnitude designations, for negative effects, are: negligible, small, medium and large. The magnitude designations themselves are universally consistent, but the definition for the designations varies by issue. In the case of a positive impact, no magnitude designation has been assigned as it is considered sufficient for the purpose of the impact assessment to indicate that the Project is expected to result in a positive impact.

Determining Receptor Sensitivity

The other principal step necessary to assign significance for a given impact is to define the sensitivity of affected receptor. The importance and sensitivity of environmental (physical and biological) and socio-economic receptors within will be determined based on:

1. Relevant legislative or policy standards or guidelines;
2. The relative importance/value assigned to existing socio-economic or environmental features/receptor;
3. The capacity of the receptor to absorb change; and
4. The recoverability of the receptor.

Table 7-2 provides a general definition of sensitivity ranking for environmental and socio-economic receptors, which are then tailored by technical subject matter experts.

Table 7-2: Sensitivity Criteria

	Low	Medium	High
Biological and Physical Receptors - Sensitivity Criteria			
Criteria	Ecosystem Value: An area or species which has local or no value Capacity for Change and Recovery: The receptor is not sensitive to changes in the surrounding environment and has a natural ability (i.e. without human enhancement) for a rapid rate of recovery to pre-impacted status within few days/months.	Ecosystem Value: An area or species which are recognized as being of <i>regional importance</i> ; and/or Capacity for Change and Recovery: The receptor is relatively sensitive to changes in the surrounding environment and has moderate capacity to absorb change without significantly	Ecosystem Value: An area or species which is recognized as being of <i>international and national importance and/or is legally protected</i> ; and/or Capacity for Change and Recovery: The receptor is highly sensitive to changes in the surrounding environment and has no / low capacity to absorb change without significantly altering its present

	Low	Medium	High
		altering its present character; natural recovery possible after one year.	character; no / slow natural recovery.
Socio-Economic Receptors - Sensitivity Criteria			
Criteria	Socioeconomic Value: A socio-economic activity of limited local or no value; and /or Capacity for Change and Recovery: The receptor is not sensitive to changes in the surrounding environment and has a natural ability (i.e. without human enhancement) for a rapid rate of recovery to pre-impacted status within days/weeks.	Socioeconomic Value: A socio-economic activity which is recognized as being of <i>regional importance</i> ; and/or Capacity for Change and Recovery: A socio-economic activity which has the capacity to recover after one year.	Socioeconomic Value: A socio-economic activity which is recognized as being of <i>international / national importance and/or a resource or area which is legally protected</i> ; and/or Capacity for Change and Recovery: The receptor has no / low capacity to absorb change without significantly altering its present character; no / slow natural recovery.

Assessing Impact Significance

Once magnitude of impact and sensitivity of a receptor have been ranked, the significance can be determined for each impact. The impact significance rating was determined, using the matrix provided in **Table 7-3**, and impact significance definitions as presented in **Table 7-4**, which ensure a consistent approach throughout the impact assessment. The significance matrix provides basic guidance for the determination of impact significance. However, the resulting significance level is also interpreted based on professional judgement and expertise, and adjusted if necessary.

The impact ratings are categorised as follows:

- Minor significance;
- Moderate significance; and
- Major significance.

Table 7-3 : Impact Significance

	Sensitivity		
Magnitude	Low [1]	Medium [2]	High [3]
Negligible [0]	Negligible [0]	Negligible [0]	Negligible [0]
Small [1]	Negligible [1]	Minor [2]	Moderate [3]
Medium [2]	Minor [2]	Moderate [4]	Major [6]
Large [3]	Moderate [3]	Major [6]	Major [9]

Key: Negligible – 0 to 1, Minor – 2, Moderate – 3 to 4, Major – 6 to 9

Table 7-4: Impact significance definitions

Significance of Impact

Major	Significant. Impacts with a “ Major ” significance are likely to have damaging and lasting changes to the functioning of a receptor, and may have broader consequences (e.g. on function of the ecosystem or on community well-being). These impacts are a priority for mitigation in order to avoid or reduce their significance.
Moderate	Significant. Impacts with a “ Moderate ” significance are likely to be noticeable and result in lasting changes to baseline conditions, which may cause hardship to or degradation of the receptor. Broader consequences for the ecosystem or community are not anticipated. These impacts are a priority for mitigation in order to avoid or reduce their significance.
Minor	Detectable but Not Significant. Impacts with a “ Minor ” significance are expected to be noticeable changes to baseline conditions, beyond what would naturally occur, but are not expected to cause hardship or degradation. These impacts in most cases do not require mitigation and are not a concern of the decision-making process.
Negligible	Impacts with a “ Negligible ” significance are expected to be almost unnoticeable in terms of affecting the baseline conditions. These impacts do not require mitigation and are not a concern of the decision-making process.

The matrix and significance definitions will be used to assess adverse impacts of the Project. Significance rankings will not be determined for beneficial impacts; instead, these will be described in qualitative terms and, where applicable, measures to maximize benefits will also be described.

For all Significant impacts (Moderate or Major) identified by the assessment, additional mitigation measures will be proposed aimed at reducing their residual significance to as low as reasonably practicable (ALARP). For Not Significant impacts (Minor and Negligible), all design/control measures should be adhered to with monitoring and reporting implemented as required.

7.1.3 Mitigation and Control

All significant impacts identified will be subject to mitigation and control through preventive, reductive and offset measures as well as optimizing the viability and potential benefits that the project may generate. The selection of mitigation measures will consider a standard mitigation hierarchy, whereby preference is given to avoiding impacts altogether and subsequently to minimizing the impact, repairing its effects, and/ or offsetting the impact through actions in other areas as illustrated in **Figure 7-2**. Where the effectiveness of mitigation measures is uncertain, or depends on assumptions about operational procedures, monitoring programmes and/or operations/management procedures will define the required practice.

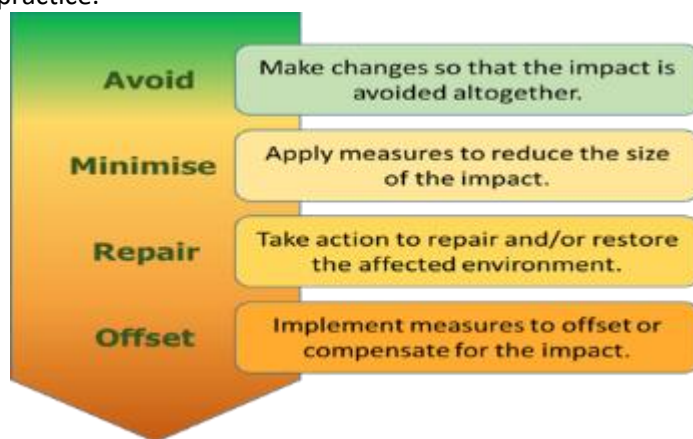


Figure 7-2: Mitigation Hierarchy

The environmental and social management plan (ESMP) framework will be developed for the project and its facilities in accordance with Environmental Assessment Regulations 2025, LI 2504 and the AfDB OS standards. The ESMP framework will present a programme for the implementation of mitigating measures and the identified impacts of the project during the construction and operation phases.

7.2 Potential Environmental Risks and Social Issues

Potential impacts of the REWARD Project on the physical, biological and social environments have been identified and are discussed below in this section.

7.3 Project Area of Influence (Aoi)

The ESIA gives an identification, qualitative assessment and classification of potential environmental and social impacts and their respective management options based on the general project design concepts. The REWARD Project will have both positive and negative social, economic and environmental impacts at different levels.

There are two (2) Aols: i.e. Area of Direct Influence (ADI) and Area of Indirect Influence (All) for the REAWARD Project. These have been defined to properly identify environmental and social impacts and risks associated with the project in the sections below.

7.3.1 Environmental Area of Influence

The Area of Direct Influence (ADI) for the project includes the physical and biological components such as the vegetation, fauna, surface/groundwater resources, soils etc. at the project area and the community (i.e. Nandom Kpee and Nandom Ko) around the project area.

The area of indirect influence (All) is the territory where indirect or induced environmental impacts; i.e. those that occur at a different site from where the action causing the environmental impact occurs and at a different time compared with the time when the action causing the environmental impact occurred.

The All for the project includes 1-10 km zone around ADI (depending on the affected receptors, for example for groundwater it can be broader than for biodiversity), the transit routes for materials and personnel or workers.

7.3.2 Social Area of Influence

For social impacts, the ADI will include the households and the community that will be impacted by the Project due to:

- ✓ their location within or in close proximity to the Project footprint (including footprint of associated facilities);
- ✓ their location within the Area(s) of Influence for environmental resources, such as air or water quality, noise and vibration, visual and landscape, etc.;
- ✓ impacts on livelihood resources that will be affected by the Project (agricultural or grazing land, forest resources, fishing); or
- ✓ their connection to cultural, social or health resources that will be impacted by the Project.

The Area of Indirect Influence will also include populations that will experience indirect or induced impacts that may not be within the direct control of the Project, such as:

- ✓ economic opportunities associated with employment and economic spend;
- ✓ interaction with the workforce;
- ✓ use of services by the workforce; and
- ✓ in-migration.

7.4 Community influence and vulnerable groups

Construction activities may impact adversely on local communities especially those which are located in close proximity to these activities.

Vulnerable groups are those at risk of becoming more vulnerable due to impacts from project implementation. These vulnerable people include, but not limited to:

- Disabled persons, whether mentally or physically challenged;

- Elderly, usually from 70 years and above;
- Very sick and or physically weak individuals;
- People without formal land rights;
- Migrants/settlers;
- Women; and
- Children.

7.5 Institutional Influence

The major institutions to be influenced or involved in the proposed project include:

- Ministry of Food and Agriculture;
- Project Implementation Unit;
- Water Resources Commission;
- Lands Commission;
- Forestry Commission
- Environmental Protection Authority;
- Regional Coordinating Council;
- Municipal Assembly;
- Fire Service; and
- NADMO.

7.6 Potential Positive Impacts

The significant positive impacts of the proposed project are outlined as follows:

- Creation of job opportunities;
- Increased commerce and boost to local economy;
- Food security;
- Adoption of good agricultural practices;
- Technology transfer
- Save the Government of Ghana from importing rice and thereby save foreign exchange for Ghana

7.6.1 Creation of job opportunities

Job opportunities for skilled, semi-skilled and unskilled labour will be created at the construction and operation phases as locals, including women, will be recruited for short-term and long-term jobs. During construction of various agricultural value chain support infrastructure (assembly/construction of semi-industrial units, construction of warehouses etc.), labourers and piece workers will be engaged. The presence of workers will create an opportunity for food vendors, shop owners and other business operators in the communities to make some income. At the operation phase, there will be increase in the number of agricultural jobs leading to income generation and poverty reduction.

7.6.2 Increased commerce and boost to local economy

Agricultural productivity will increase quantitatively due to increased access to mechanization services by rice farmers. This will result in higher revenue for players within the value chain such as farmers, input suppliers, transport operators, feed millers etc. Also, the project will improve and facilitate establishment

of local services for marketing, processing, quality control services and development of new investment opportunities.

7.6.3 Food security

Increase in production capacity coupled with availability of storage facilities will make produce available all year round and improve reliance on local agricultural produce and product. This will reduce the importation of agricultural produce across borders and improve food security.

7.6.4 Adoption of good agricultural practices

The proposed project will involve the community and the local stakeholders throughout the project cycle equipping them with knowledge and skills in agricultural practices. The project will present the local stakeholders with a learning opportunity on good practices, such as climate smart agriculture, efficient water management, fertilizer application, among others leading to reduction in losses and better pest and disease management.

7.6.5 Technology transfer

Farmers will be exposed to new technologies for geomapping, crop management, pest and disease management, processing, etc. that were otherwise not known to them. For instance, applications such as the RiceAdvice decision support; will provide farmers guidelines for specific field conditions via smart phones. For pest and disease control, technologies that counter threats from parasitic striga, health-threatening aflatoxins and the invasion by Fall Army Worm will be made available to farmers. Facilitation of farmer access to mechanical and motorized shellers, threshers, improved seed variety and breeds will all increase productivity of farmers and increase their savings.

7.7 Moderate and Major Negative Impacts

The environmental impacts of the project have been grouped as moderate and major impacts based on their significance. Also, impacts have been considered at the various phases of the project, i.e., preparatory, construction and operation. The moderate and major adverse impacts are described below and in **Table 7-5, Table 7-6, Table 7-7** and **Table 7-8** for Preparatory, Construction, Operational and Decommissioning Phases respectively.

Preparatory phase

- **Land related disputes** - Acquisition of lands by farmers without following due process could result in land-related disputes
- **Impact on livelihoods** - The project activities could restrict locals access to lands that were otherwise used as pasture areas.
- **Destruction of vegetation** - Site clearing will lead to the destruction of some common vegetation and a few trees.

Construction phase

- **Soil degradation** – Levelling, as part of land preparation, and excavation for foundation of structures such as sheds and warehouses could lead to soil erosion and creation of gullies through runoff

especially in the rainy season. Also, oil spillages from the maintenance of construction equipment and vehicles could contaminate soils and affect flora and soil fauna

- **Air pollution** – Levelling of land and transport of materials on untarred roads will lead to emission of particulate matter i.e. dust and fumes and adversely affect air quality, especially in the dry season.
- **Water pollution** – Disposal of domestic waste from construction workers and food vendors and deposition of sediment, waste oil etc. via runoff into nearby water bodies. i.e. the Gbafiong river and other water collected in the valleys.
- **Noise and vibration** – Generation of noise and vibration beyond acceptable limits from operation of construction equipment, movement of haulage vehicles and tooting of horns could be a nuisance to residents of nearby communities and other sensitize organisms.
- **Waste generation and disposal** - Clearance of vegetation and levelling of land at project site will generate vegetative waste and excavated spoil. Other wastes such as construction debris, pieces of steel/metal, packaging materials, plastic pieces, human waste etc. if not disposed properly could clog drains, produce foul smell and facilitate the outbreak of sanitary related diseases such as cholera
- **Inefficient waste management** - Inefficient waste management during construction, operation and maintenance leading to excess consumption of materials, generation of wastes/emissions, pollution of soils and water.
- **Occupational health and safety** – Construction workers could be exposed to workplace and traffic-related accidents/incidents as well as animal/insect threat/bites during land preparation, civil works and transportation of materials or persons.
- **Poor labour working conditions** - Lack of employment contracts could lead to workers being paid rates below the stipulated national minimum wage or work under poor conditions. Also, the absence of welfare facilities like toilets, sheds could affect their health or lead to indiscriminate defecation.
- **Traffic management** - Transport of materials and equipment to and from the project site through communities and towns raises traffic/public safety concerns. Broken-down, inappropriately parked or slow-moving haulage/construction trucks could lead to road accidents and traffic congestion especially on busy roads.
- **Visual intrusion** - Presence of construction machinery, material stockpiles, temporary work camps; Vegetation clearance, earthworks (bare ground); dust plumes, may intrude on the visual sensitivity of the Kpee and Ko communities.
- **Fire outbreak** - Fire outbreaks from negligence of workers or the public burning refuse, game hunting and workers not properly extinguishing stubs of cigarette. These fires could spread causing injuries to persons and destruction of property.
- **Gender based violence** - Presence of workers and increase in incidents of rape, defilement and GBV
- **Public health issues** - Pollution of local water bodies will adversely affect the health of users. Sexual relations between workers and locals may bring about increase in sexually transmitted diseases including HIV/AIDs.
- **Risk of Drowning** - Burrow or dug-out pits created as a result of excavation of construction materials can accumulate water when it rains.
- **Security concerns** - Violent behaviour and confrontations between workers and locals. Workers who are deemed to be financially sound could be victims of theft and burglary. Potential conflict over sexual affairs, child labour, drunk driving, accidents and destruction of property.

Operation phase

- **Soil erosion** - Leaving farmlands bare especially after harvesting could expose the soil to wind erosion from the strong winds in the dry season
- **Air Pollution** – Operation of equipment and vehicles will generate fumes that adversely affect the air quality. In addition, haulage of products and inputs such as fertilizers, pesticides, seeds especially on untarred routes to and from farms or agricultural establishments will generate dust and fumes.
- **Pollution of Soils and Water** – Wastes, workforce sewage effluent, as well as runoff from cultivated land (containing fertilizers, pesticides and herbicides etc.) could pollute surface water, reduce its quality and make it unsuitable for use.
- **Odours** - Odours associated with waste may have nuisance value for nearby receptors.
- **Noise and Vibration** - Noise and vibration from operation of processing equipment, equipment maintenance, movement of haulage vehicles, tooting of horns could be a nuisance to persons within the project community or nearby communities
- **Waste generation and disposal** - Improper disposal of vegetative waste from weeding, harvests, domestic waste from workers and effluent from installations could create unsightly scenes and aid in the production of vermin. Also, it could serve as breeding grounds for disease causing vectors like mosquitoes, houseflies etc.
- **Inefficient waste management** - Inefficient waste management during operation and maintenance leading to excess consumption of materials, generation of wastes/emissions, pollution of soils and water.
- **Occupational health and safety** - Workplace and traffic accidents/incidents and animal/insect threat/bites.
- **Poor labour working conditions** - Lack of employment contracts could lead to workers being paid rates below the stipulated national minimum wage or work under poor conditions.
- **Traffic management** - Haulage of produce, inputs and equipment to and from farms through communities raises traffic/public safety concerns. Broken-down, inappropriately parked or slow moving haulage trucks could lead to road accidents and traffic congestion especially on busy roads.
- **Fire outbreak** - Fire outbreaks from negligence of workers or the public burning refuse, game hunting and not properly extinguishing stubs of cigarette. These fires could spread causing injuries to persons and destruction of property.
- **Gender based violence** - Presence of workers and increase in incidents of rape, defilement and GBV.
- **Risk of Drowning** - Burrow or dug-out pits created as a result of excavation of construction materials can accumulate water when it rains.
- **Public health issues** - Pollution of local water bodies will adversely affect the health of users. Sexual relations between workers and locals may bring about increase in sexually transmitted diseases including HIV/AIDs.
- **Snake bite risks** – Farm workers on rice fields are likely to be exposed to snake bites which may result in hospitalization or fatality.
- **Security concerns** - Violent behaviour and confrontations between workers and locals as a result of sexual affairs, child labour, drunk driving, accidents and destruction of property. Workers who are deemed to be financially sound could be victims of theft and burglary.
- **Flooding** - The project implementation could be adversely affected by events of flood from torrential rainfall in the wet season especially in low-lying areas affecting properties and lives.

Decommissioning phase

- **Occupational health and safety** - Workplace and traffic accidents/incidents and animal/insect threat/bites.
- **Inefficient waste management** - Inefficient waste management during decommissioning leading to excess consumption of materials, generation of wastes/emissions, pollution of soils and water.
- **Waste generation and disposal** - Improper disposal of waste from dismantling of machine parts could create unsightly scenes. Also, it could serve as breeding grounds for disease causing vectors like mosquitoes etc.
- **Traffic management** - Transport of materials and equipment to and from the project site through communities and towns raises traffic/public safety concerns. Broken-down, inappropriately parked or slow-moving haulage/construction trucks could lead to road accidents and traffic congestion especially on busy roads.

7.7.1 Preparatory Phase: Moderate and Major adverse impacts

The preparatory phase moderate and major adverse impacts are provided in **Table 7-5**.

Table 7-5: Preparatory Phase Potential Adverse Impacts

AfDB No.	AfDB OS Description	Potential Impact	Receptor(s)	Sources of Impact	Sensitivity					Magnitude	Significance
					Likelihood	Nature	Duration	Extent	Sensitivity Score		
OS1	Environmental and Social Assessment	Poor assessment study of environmental and social risks and impacts	Project proponent (MoFA), environment, community	Unidentified risks and impacts could prevent or stall project implementation. Selection of unqualified persons for assessment studies	Unlikely	Direct	Permanent	Regional	High [3]	Large [3]	Major [9]
OS5	Involuntary resettlement, land acquisition, population displacement and compensation	Land related disputes	Farmers	Proposed site which covers an area of 350 Ha is purportedly owned by Chiefs of the Nandom Kpe and Ko communities with no known land disputes over the land at the proposed site.	Unlikely	Direct	Temporary	Local	Medium [2]	Medium [2]	Moderate [4]
		Impact on livelihoods (Economic displacement)	Farmers	The project activities could restrict thirty nine (39) farmers access to lands that were otherwise used for farming.	Likely	Direct	Permanent	Local	Medium [2]	Medium [2]	Moderate [4]

AfDB No.	AfDB OS Description	Potential Impact	Receptor(s)	Sources of Impact	Sensitivity					Magnitude	Significance
					Likelihood	Nature	Duration	Extent	Sensitivity Score		
		Impact on livelihoods (Physical displacement)	Farmers	There will be no physical movement of properties from the project site during project implementation.	Unlikely	Direct	Temporary	Local	High [3]	Negligible [0]	Negligible [0]
OS6	Biodiversity, renewable resources and ecosystem services	Destruction of vegetation and displacement of wildlife	Flora and Fauna	The project site is an already disturbed area due to previous human activities such as farming. The floristic analysis conducted indicates that none of the species identified at the site are of conservation concern according to the Forest Reserves of Ghana Information Exhibitor (FROGGIE) data base. Site clearing will not lead to any major destruction of biodiversity of significant importance, only a few trees and destruction of the habitats of some animals.	Likely	Direct	Permanent	Local	Small [1]	Medium [2]	Minor [2]

7.7.2 Construction Phase: Moderate and major adverse impacts

The Construction phase moderate and major adverse impacts are provided in **Table 7-6** below.

Table 7-6: Construction Phase Potential Adverse Impacts

AfDB No.	AfDB OS Description	Risk/Potential Impact	Receptor(s)	Sources of Impact	Sensitivity					Magnitude	Significance
					Likelihood	Nature	Duration	Extent	Sensitivity Score		
OS2	Labour conditions, health and safety	Workplace incidents/accidents	All Project workforce, Vulnerable categories of workers, Women	Project site accidents/incidents and animal/insect threat/bites. Ghana has recorded over 59,000 snake bite cases between 2015 and 2020 with an average 9,900 cases reported annually. The Savannah Region has a relatively high incidence of snakes bites as per the Ghana Health Service (2020).	Likely	Direct	Short-term	On-site	High [3]	Medium [2]	Major [6]
		Poor labour working conditions	All Project workforce, Vulnerable categories of workers, Women	Lack of employment contracts could lead to workers being paid rates below the stipulated national minimum wage or work under poor conditions. Workers could face issues of discrimination, forced labour, child labour, freedom of association and collective bargaining, lack of or ineffective worker grievance redress mechanisms.	Likely	Direct	Short-term	On-site	High [3]	Medium [2]	Major [6]
		Sexual Harassment (SH) and Gender Based Violence (GBV)	Women, Children	Presence of workers and increase in incidents of rape, defilement, child molestation and GBV. Culturally, women and children have limited rights compared to men in northern Ghana making GBV issues relatively pronounced in the project areas.	Likely	Direct	Short-term	Local	High [3]	Medium [2]	Major [6]

AfDB No.	AfDB OS Description	Risk/Potential Impact	Receptor(s)	Sources of Impact	Sensitivity					Magnitude	Significance
					Likelihood	Nature	Duration	Extent	Sensitivity Score		
OS3	Pollution prevention and control, hazardous materials and resource efficiency	Soil erosion and contamination	Soil	Excavation for foundation of structures could lead to soil erosion and creation of gullies through runoff especially in the rainy season. The project area due to its sparse vegetation cover is highly susceptible to erosion especially in low-lying areas like the valleys. Soil contamination could also occur from inappropriate disposal of waste oil, spilled oil during machinery operation and maintenance as well as fuel storage sites and leaks from vehicle refuelling.	Likely	Direct	Short-term	Local	Medium [2]	Medium [2]	Moderate [4]
		Air Pollution	Health of workers and members of the surrounding communities	Emission of fumes and dust from transport of materials especially on untarred routes to project site. Baseline air quality data for Nandom Kpee i.e. PM _{2.5} – 40.7µg/m ³ , PM ₁₀ – 152µg/m ³ , NO ₂ and CO were all below the minimum detection limit of 0.06 mg/m ³ whiles SO ₂ recorded a value of 400µg/m ³ at the time of sampling. the time of sampling. Baseline air quality data for Nandom Ko i.e. PM _{2.5} – 13µg/m ³ , PM ₁₀ – 37µg/m ³ , SO ₂ and CO were all below the minimum detection limit of 0.06 mg/m ³ whiles NO ₂ recorded a value of 0.100µg/m ³ at the time of sampling.	Likely	Direct	Temporary	Local	Medium [2]	Medium [2]	Moderate [4]

AfDB No.	AfDB OS Description	Risk/Potential Impact	Receptor(s)	Sources of Impact	Sensitivity					Magnitude	Significance
					Likelihood	Nature	Duration	Extent	Sensitivity Score		
				The slight variations in some of the parameters against the GSA and WHO standards may suggest a minimal contribution from fine particulate sources such as vehicle exhaust, dust from nearby unpaved road, motorist and nearby activities around the valleys. The undetected levels of gases suggest that current sources of combustion—either vehicular, industrial, or domestic—are minimal or absent in the area.							
		Water Pollution	Pools of water in the valley.	Sediment and waste oil transport into the Gbafiong river and nearby waterbodies could exacerbate the already turbid conditions especially in the rainy season. The baseline turbidity reading of 299.55 NTU is about 60 times higher than the threshold of 5 NTU.	Likely	Direct	Short-term	Local	Medium [2]	Medium [2]	Moderate [4]
				There will be domestic and other waste from the construction workers and food vendors. For an average of 20 workers at the construction phase, a total of 10 kg/day domestic solid waste will be generated per day using a per capita generation of 0.5 kg/day Also, a total BOD load of 0.8 kg/day will be generated assuming a per capita production of 40g/day.	Likely	Direct	Short-term	Local	Medium [2]	Medium [2]	Moderate [4]

AfDB No.	AfDB OS Description	Risk/Potential Impact	Receptor(s)	Sources of Impact	Sensitivity					Magnitude	Significance															
					Likelihood	Nature	Duration	Extent	Sensitivity Score																	
		Noise and Vibration	Health of project workforce and members of the surrounding communities	Operation of construction equipment, movement of haulage vehicles and tooting of horns will generate noise as shown below. <table><tr><th>Equipment type</th><th>Sound pressure level at 15m (dB)</th><th>Sound pressure level at 600m (dB)</th></tr><tr><td>Backhoe</td><td>80</td><td>47.96</td></tr><tr><td>Grader</td><td>85</td><td>52.96</td></tr><tr><td>Loader</td><td>85</td><td>52.96</td></tr><tr><td>Truck</td><td>88</td><td>55.96</td></tr></table> <i>Source: Generated from WKC Group Formula (2015)</i> Movement of haulage vehicles/trucks and tooting of horns will at all times expose receptors to noise, albeit transient. However, at night, the impact of noise is likely to be higher. Exposure to elevated levels of noise can cause nuisance, disturbance and even lead to hearing impairment under certain conditions. Workers are expected to be exposed to intermittent noise and vibration for the construction period which will be one dry season (approx. 4 months).	Equipment type	Sound pressure level at 15m (dB)	Sound pressure level at 600m (dB)	Backhoe	80	47.96	Grader	85	52.96	Loader	85	52.96	Truck	88	55.96	Likely	Direct	Short-term	Local	Medium [2]	Medium [2]	Moderate [4]
	Equipment type	Sound pressure level at 15m (dB)	Sound pressure level at 600m (dB)																							
Backhoe	80	47.96																								
Grader	85	52.96																								
Loader	85	52.96																								
Truck	88	55.96																								
		Waste generation and disposal	Health of project workforce and members of	Clearance of vegetation at project site, construction debris, pieces of steel/metal, packaging materials, plastic pieces, human waste etc. if not disposed properly could clog drains and facilitate the	Likely	Direct	Short-term	Local	Medium [2]	Medium [2]	Moderate [4]															

AfDB No.	AfDB OS Description	Risk/Potential Impact	Receptor(s)	Sources of Impact	Sensitivity					Magnitude	Significance
					Likelihood	Nature	Duration	Extent	Sensitivity Score		
			the Local communities within the project area	outbreak of sanitary related diseases such as cholera. Domestic and waste from the construction workers and food vendors to the construction crew. For an average of 20 workers at the construction phase, a total of 10 kg/day domestic solid waste will be generated per day using a per capita generation of 0.5 kg/day Also, a total BOD load of 0.8 kg/day will be generated assuming a per capita production of 40g/day.							
OS4	Community Health, Safety and Security	Traffic management	Local communities near the project area of influence	Transport of materials and equipment through communities and townships raises traffic/public safety concerns. Broken-down, inappropriately parked or slow-moving haulage/construction trucks could lead to road accidents and traffic congestion especially on busy roads. Locals may not be used to truck traffic as the popular mode of transportation is bicycles, motorcycles and tricycles.	Likely	Direct	Short-term	Local	Medium [2]	Medium [2]	Moderate [4]
		Fire outbreak	Vegetation, Project workforce and Local communities near the	Fire outbreaks from negligence of workers or the community burning refuse, game hunting and workers not properly extinguishing stubs of cigarette. These fires could spread causing injuries to persons and destruction of property. A major constraint faced by the people within the fragile Savannah ecology is the issue of bushfire.	Likely	Direct	Temporary	Local	Medium [2]	Medium [2]	Moderate [4]

AfDB No.	AfDB OS Description	Risk/Potential Impact	Receptor(s)	Sources of Impact	Sensitivity					Magnitude	Significance
					Likelihood	Nature	Duration	Extent	Sensitivity Score		
			project area of influence	Most of the vegetation cover is consumed every year by wild fire. This menace does not only affect the density and diversity of the vegetation in the Savannah ecosystem but has lowered the productivity of the land and the general agricultural output.							
		Visual / Aesthetic Impacts	Local communities (Ko and Kpee) and commuters	Presence of construction machinery, material stockpiles, temporary work camps; Vegetation clearance, earthworks (bare ground); Dust plumes. Landscape is already agricultural.	Likely	Direct	Temporary	Local	Medium [2]	Medium [2]	Moderate [4]
		Public health issues	Local communities near the project area of influence	Pollution of local water bodies (Gbafiong river) will adversely affect the health of users	Likely	Direct	Short-term	Local	High [3]	Small [1]	Moderate [3]
				Sexual relations between workers and locals may bring about increase in sexually transmitted diseases including HIV/AIDs.	Likely	Local	Long-term	Local	High [3]	Small [1]	Moderate [3]
		Security concerns		Violent behaviour and confrontations between workers and locals. Workers who are deemed to be financially sound could be victims of theft and burglary Potential conflict over illicit sexual affairs, child labour, drunk driving, accidents and destruction of property.	Likely	Local	Temporary	Local	Medium [2]	Small [1]	Minor [2]

AfDB No.	AfDB OS Description	Risk/Potential Impact	Receptor(s)	Sources of Impact	Sensitivity					Magnitude	Significance
					Likelihood	Nature	Duration	Extent	Sensitivity Score		
		Risk of Drowning	Project Workforce and Local community members	Any borrow or dug-out pits created as a result of excavation of construction materials can accumulate water when it rains. This can pose the risk of drowning for workers especially contract staff who aren't use to the terrain. Children who may play around the sites and unsuspecting community members may also be at risk of drowning especially when it rains and the place get flooded.	Likely	Local	Long-Term	Local	Medium [2]	Medium [2]	Moderate [4]

7.7.3 Operation Phase: Moderate and Major adverse impacts

The Operation phase moderate and major adverse impacts are provided in **Table 7-7**.

Table 7-7: Operation Phase Potential Adverse Impacts

AfDB No.	AfDB OS Description	Risk/Potential Impact	Receptor(s)	Sources of Impact	Sensitivity					Magnitude	Significance
					Likelihood	Nature	Duration	Extent	Sensitivity Score		
OS2	Labour conditions, health and safety	Occupational health and safety	Farm workers including Vulnerable categories .e.g Women	Farm accidents/incidents and animal/insect threat/bites. Ghana has recorded over 59,000 snake bite cases between 2015 and 2020 with an average 9,900 cases reported annually. The Savannah Region has a relatively high	Likely	Direct	Long-term	On-site	High [3]	Medium [2]	Major [6]

AfDB No.	AfDB OS Description	Risk/Potential Impact	Receptor(s)	Sources of Impact	Sensitivity					Magnitude	Significance
					Likelihood	Nature	Duration	Extent	Sensitivity Score		
				incidence of snakes bites as per the Ghana Health Service (2020). Exposure of workers/farmers to agro-chemicals could lead to health challenges such as chemical burns, respiratory diseases from inhalation, and poisoning.							
		Poor labour working conditions	Farm workers including Vulnerable categories .e.g Women	Lack of employment contracts could lead to farm workers being paid rates below the stipulated national minimum wage or work under poor conditions. Farm workers could face issues of discrimination, forced and child labour, restriction of freedom of association and collective bargaining, non-existent or ineffective farm worker grievance redress mechanism.	Likely	Direct	Long-term	On-site	High [3]	Medium [2]	Major [6]
		Sexual Harassment (SH) and Gender Based Violence (GBV)	Women and Children	Presence of migrant farm workers could lead to increase in incidents of rape, defilement, child molestation and GBV. Culturally, women and children have limited rights compared to men in northern Ghana making GBV issues relatively pronounced in the project areas.	Likely	Direct	Long-term	Local	High [3]	Medium [2]	Major [6]
		Child Labour	Children	Employment and deployment of Children under the working age at the expense of their education and their exposure to hazards that endanger their health and	Likely	Direct	Long-term	Local	High [3]	Medium [2]	Major [6]

AfDB No.	AfDB OS Description	Risk/Potential Impact	Receptor(s)	Sources of Impact	Sensitivity					Magnitude	Significance
					Likelihood	Nature	Duration	Extent	Sensitivity Score		
				well-being. In Ghana, children's work is mostly split between the three main areas: the agriculture, services, and industry sectors. The agricultural sector has the highest percentage of working children in the country, with 79.2% of working children between ages 5 and 14 employed in this sector (Child Labour and Forced Labour Reports, 2021). The Northern parts of Ghana has the lowest level of school attendance of children of primary school age at just 59.4 per cent of children due to child labour with most found in the agriculture and forestry sector. Children are vulnerable to snake and scorpion bites and suffer frequent accidents with poorly handled machetes while they are engaged in work in the bush. Boys tend cattle and girls collect water and firewood. (Child Protection Baseline Research Report, 2015).							
OS3	Pollution prevention and control, hazardous	Soil erosion and degradation	Soil	Abuse of fertilizer use could lead to soil degradation. Leaving farmlands bare especially after harvesting could expose the soil to erosion.	Likely	Direct	Long-term	Local	Medium [2]	Medium [2]	Moderate [4]

AfDB No.	AfDB OS Description	Risk/Potential Impact	Receptor(s)	Sources of Impact	Sensitivity					Magnitude	Significance
					Likelihood	Nature	Duration	Extent	Sensitivity Score		
	<i>materials and resource efficiency</i>			Soil degradation could also occur from inappropriate application of fertilizers and other agro-chemicals.							
		Air Pollution	Health of farm workers and surrounding community members.	Use of farm machinery, clearing of dry lands and emission of fumes/dust from tricycles or motorcycles conveying farmers and farm produce especially on untarred routes from farms are some of the activities that have the potential of affecting the air quality within the project area. Stubble burning to prepare the field for the next planting season can also affect the air quality within the project area. Baseline air quality data for Nandom Kpee i.e. PM _{2.5} – 40.7µg/m ³ , PM ₁₀ – 152µg/m ³ , NO ₂ and CO were all below the minimum detection limit of 0.06 mg/m ³ while SO ₂ recorded a value of 400µg/m ³ at the time of sampling. the time of sampling. Baseline air quality data for Nandom Ko i.e. PM _{2.5} – 13µg/m ³ , PM ₁₀ – 37µg/m ³ , SO ₂ and CO were all below the minimum detection limit of 0.06 mg/m ³ while NO ₂ recorded a value of 0.100µg/m ³ at the time of sampling.	Likely	Direct	Long-term	Local	Medium [2]	Medium [2]	Moderate [4]

AfDB No.	AfDB OS Description	Risk/Potential Impact	Receptor(s)	Sources of Impact	Sensitivity					Magnitude	Significance
					Likelihood	Nature	Duration	Extent	Sensitivity Score		
				The slight variations in some of the parameters against the GSA and WHO standards may suggest a minimal contribution from fine particulate sources such as vehicle exhaust, dust from nearby unpaved road, motorist and nearby activities around the valleys. The undetected levels of gases suggest that current sources of combustion—either vehicular, industrial, or domestic—are minimal or absent in the area.							
		Water Pollution	River water quality including water which has gathered as ponds in the valley.	Sediment laden with excess fertilizers and other agrochemicals and waste oil transport into nearby water bodies especially in the rainy season. Pollution of watercourses caused by wastes generated by farm workers as well as runoff from land used for growing rice (containing fertilisers, pesticides and herbicides etc.). The baseline turbidity of the Gbafiong river reading of 299.55 NTU is about 60 times higher than the threshold of 5 NTU.	Likely	Direct	Long-term	Local	Medium [2]	Medium [2]	Moderate [4]
		Noise and Vibration	Health and wellbeing of farm workers	Farm workers are expected to be exposed to intermittent noise from activities like tilling of the land for the next planting	Likely	Direct	Long-term	Local	Medium [2]	Medium [2]	Moderate [4]

AfDB No.	AfDB OS Description	Risk/Potential Impact	Receptor(s)	Sources of Impact	Sensitivity					Magnitude	Significance
					Likelihood	Nature	Duration	Extent	Sensitivity Score		
			and members of communities close to the project area	season, threshing the rice after cultivating and screaming sounds from farmers or labourers to scare away birds can all generate noise. Tricycles and motorbikes conveying farmers and farm produce to the milling factories or markets could also generate some noise including the sounds from tooting horns.							
		Solid waste generation and disposal	Health of farm workers and members of the Local communities within the project area	Improper disposal of waste, i.e. empty containers of agrochemicals and fertilizers which can serve as breeding grounds for mosquitoes. Threshing will produce rice husk that may pile up to form heaps of waste. Domestic waste can also be generated from farm workers. For an average of 10 workers at the construction phase, a total of 5 kg/day domestic solid waste will be generated per day using a per capita generation of 0.5 kg/day. Also, a total BOD load of 0.4 kg/day will be generated assuming a per capita production of 20g/day.	Likely	Direct	Long-term	Local	Medium [2]	Medium [2]	Moderate [4]
OS4	Community Health, Safety and Security	Polluted Waterbodies	Farm workers and Local communities	Pollution of the Gbafiong river and water gathered as ponds from contaminated sediments generated by activities of farm	Likely	Direct	Local	Local	Medium [2]	Medium [2]	Moderate [4]

AfDB No.	AfDB OS Description	Risk/Potential Impact	Receptor(s)	Sources of Impact	Sensitivity					Magnitude	Significance
					Likelihood	Nature	Duration	Extent	Sensitivity Score		
				workers as well as runoff from land used for growing rice (containing fertilisers, pesticides and herbicides etc.) will adversely affect the health of community members. The baseline turbidity of the Gbafiong river reading of 299.55 NTU is about 60 times higher than the threshold of 5 NTU.							
		Sexual Transmitted Diseases		Sexual relations between migrant farm workers and locals may bring about increase in sexually transmitted diseases including HIV/AIDs.	Likely	Direct and Indirect	Long-term	Local and Regional	Medium [2]	Medium [2]	Moderate [4]
		Security concerns		Violent behaviour and confrontations between migrant farm workers and locals. Farm workers who are deemed to be financially sound could be victims of theft and burglary Potential conflict over sexual affairs, child labour, drunk driving, accidents and destruction of property.	Likely	Direct	Long-term	Local	Medium [2]	Small [1]	Minor [2]
		Flooding	Community members, Farmers, Flora and Fauna	The project implementation could be adversely affected by events of flood from torrential rainfall in the wet season especially in low-lying areas affecting properties and lives.	Likely	Direct	Temporary	Regional	High [3]	Medium [2]	Major [6]

AfDB No.	AfDB OS Description	Risk/Potential Impact	Receptor(s)	Sources of Impact	Sensitivity					Magnitude	Significance
					Likelihood	Nature	Duration	Extent	Sensitivity Score		
		Traffic management	Local communities	Transportation of farmers and farm produce through communities raises traffic/public safety concerns.	Likely	Direct	Long-term	Local	Medium [2]	Small [1]	Minor [2]
		Fire outbreak	Rice farms, nearby vegetation, farm workers and local community.	Fire outbreaks from negligence of farm workers and community members, burning refuse, game hunting, cooking and not properly extinguishing stubs of cigarette. These fires could spread to adjoining farms causing injuries to persons and destruction of property. A major constraint faced by the people within the fragile Savannah ecology is the issue of bushfire. Most of the vegetation cover is consumed every year by wild fire. This menace does not only affect the density and diversity of the vegetation in the Savannah ecosystem but has lowered the productivity of the land and the general agricultural output.	Likely	Direct	Long-term	Local	Medium [2]	Medium [2]	Moderate [4]
		Risk of Drowning	Farmers and Local community members	Any borrow or dug-out pits created as a result of excavation of construction materials can accumulate water when it rains. These pits may be left for communities as a water source and may pose the risk of drowning especially for children.	Likely	Local	Long-Term	Local	Medium [2]	Medium [2]	Moderate [4]

7.7.4 Decommissioning Phase: Moderate and major adverse impacts

The Decommissioning phase moderate and major adverse impacts are provided in **Table 7-8**.

Table 7-8: Decommissioning Phase Potential Adverse Impacts

AfDB No.	AfDB OS Description	Risk/Potential Impact	Receptor(s)	Sources of Impact	Sensitivity					Magnitude	Significance
					Likelihood	Nature	Duration	Extent	Sensitivity Score		
OS2	Labour conditions, health and safety	Workplace incidents/accidents	All Project workforce, Vulnerable categories of workers, Women	Project site accidents/incidents and animal/insect threat/bites. Ghana has recorded over 59,000 snake bite cases between 2015 and 2020 with an average 9,900 cases reported annually. The Northern Region has a relatively high incidence of snakes bites as per the Ghana Health Service (2020).	Likely	Direct	Short-term	On-site	High [3]	Medium [2]	Major [6]
OS3	Pollution prevention and control, hazardous materials and resource efficiency	Waste generation and disposal	Health of project workforce and members of the Local communities within the project area	Clearance of vegetation at project site, construction debris, pieces of steel/metal, packaging materials, plastic pieces, human waste etc. if not disposed properly could clog drains and facilitate the outbreak of sanitary related diseases such as cholera. Domestic and waste from the construction workers and food vendors to the construction crew. For an average of 20 workers at the construction phase, a total of 10 kg/day domestic solid waste will be generated per day using a per capita generation of 0.5 kg/day Also, a total BOD load of 0.8 kg/day will	Likely	Direct	Short-term	Local	Medium [2]	Medium [2]	Moderate [4]

AfDB No.	AfDB OS Description	Risk/Potential Impact	Receptor(s)	Sources of Impact	Sensitivity					Magnitude	Significance
					Likelihood	Nature	Duration	Extent	Sensitivity Score		
				be generated assuming a per capita production of 40g/day.							
OS4	Community Health, Safety and Security	Traffic management	Local communities near the project area of influence	Transport of materials and equipment through communities and townships raises traffic/public safety concerns. Broken-down, inappropriately parked or slow-moving haulage/construction trucks could lead to road accidents and traffic congestion especially on busy roads. Locals may not be used to truck traffic as the popular mode of transportation is bicycles, motorcycles and tricycles.	Likely	Direct	Short-term	Local	Medium [2]	Medium [2]	Moderate [4]

7.7.5 Cumulative Negative Impacts of the Project

The REWARD Project seeks to enhance climate resilience, agricultural productivity, and rural infrastructure within the Nandom Municipality. Given the area's agrarian economy and limited industrialization, interventions occur under low development pressure (Nandom MTDP, 2022–2025). This cumulative impact assessment (CIA) examines combined environmental and social effects of REWARD alongside existing and planned developments, focusing on additive and synergistic interactions.

Natural resources such as soils, rivers, forests, and pasturelands experience moderate pressure from bush burning, overgrazing, and illegal tree felling. However, large-scale agriculture and infrastructure remain minimal, constrained by low urbanization and limited funding. The municipality's cumulative environmental footprint is modest, with localized land degradation but overall stable ecological conditions, providing a sound baseline for REWARD implementation.

Key Development Drivers and Interactions

Agriculture

Agriculture dominates livelihoods in the district. Expansion of cultivation, especially under projects promoting improved irrigation and mechanization, presents potential cumulative pressures on soils and water resources. However, the majority of farms remain small-scale with rain-fed systems, and existing agro-processing uses low-technology, small-scale operations. Planned interventions by the Assembly emphasize sustainable agri-business and capacity building of smallholder farmers, which align with REWARD's objectives. Consequently, the cumulative interaction between REWARD's agricultural support and ongoing local programs is expected to be positive, enhancing productivity while promoting soil conservation and climate-smart practices.

Infrastructure

Infrastructure remains basic, with unpaved, often impassable rural roads. The Medium-Term Development Plan highlights underinvestment in transport, education, and health infrastructure. Planned works focus on minor road upgrades, market improvements, and small-scale public facilities, as shown in the table below. REWARD's support for feeder roads will complement municipal efforts, enhancing connectivity and market access without adding significant ecological stress.

Community Issue	Policy Objective	Development Needs and Aspiration
Unpredictable rainfall pattern.	To ensure all year farming	Building and rehabilitating of irrigation infrastructure including formal schemes, dams and dugouts (SDG Targets 2.4, 17.17, Targets 1.1, 1.4, 1.5, 1.a, 2.a, 17.3)
Inadequate health infrastructure	Ensure accessible, and quality Universal Health Coverage (UHC) for all	Expand, upgrade and equip health facilities with private sector involvement (SDG Targets 3.8, 3.c)
- Inadequate Infrastructure. school buildings, toilets, urinals - Inadequate accommodation to keep teachers in deprived communities	Enhance equitable access to, and participation in quality education at all levels	Expand infrastructure and facilities at all levels (SDG Target 4.a, 4.c) by constructing classroom blocks with office and store, teachers' bungalows, KVIP and Urinals
- Poor road network	Improve efficiency and effectiveness of road transport infrastructure and services	Expand and maintain the national road network Support the routine maintenance, reshaping and creation of access roads
Lack of access to potable water and electricity	Improve access to safe and reliable water supply as well as electricity for all	Provide mechanized boreholes and small-town water systems Expand electricity infrastructure

Assessment of Cumulative Effects

Physical Environment

Potential cumulative effects on land, soil, and water are expected to be minor and localized. The district's limited industrial and infrastructural footprint reduces the risk of significant additive degradation. The introduction of REWARD's agricultural and water management interventions may lead to incremental land conversion and short-term sediment generation during construction. However, these are mitigated by the project's design emphasis on climate-smart practices and erosion control. Considering the absence of heavy industrial or mining activities, the cumulative impacts on air quality, hydrology, and noise environment are negligible.

Biological Environment

Cumulative effects on vegetation and biodiversity are minor. Although existing pressures include bush burning and charcoal production, these are diffused and community-driven. REWARD's interventions will likely reduce rather than exacerbate ecological strain by promoting sustainable land management under community-based planning. The incremental habitat modification from road and irrigation works is expected to be limited to disturbed lands and agricultural corridors.

Socio-economic Environment

At the social level, the additive impacts of REWARD and municipal initiatives are overwhelmingly beneficial. Improved agricultural productivity, employment during construction, and enhanced road access will raise local incomes and food security. Given that industrial activity remains low, competition

for land and labour is minimal, reducing risks of social displacement. Potential negative cumulative effects, such as increased migration, gender disparities, or localized resource conflicts, are expected to be minor and manageable through participatory planning and equitable benefit distribution.

Future Development Scenarios

Nandom is unlikely to face rapid industrialization or urban expansion soon. Future projects remain small-scale, emphasizing basic infrastructure and agriculture rather than extractive industries. Consequently, cumulative development pressures will remain low. REWARD, aligned with municipal sustainability goals, contributes positively to the overall environmental profile and demonstrates integrated, climate-resilient rural development.

Conclusion

The cumulative impact of the REWARD Project is minor and not significant. With few large-scale developments in the area, REWARD's synergy with local initiatives will deliver net positive outcomes including stronger livelihoods, improved land management, and enhanced infrastructure without exceeding environmental thresholds. Overall, the project is environmentally sustainable and socially beneficial within Nandom's developmental context.

8.0 MITIGATION MEASURES

Mitigation and enhancement measures for the potential adverse impacts have been proposed in this section to ensure that the project impacts are managed within reasonable and acceptable limits. The general rules followed in designing the mitigation measures are listed below:

- Avoidance of major impacts: major impacts are impacts where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resources/receptors;
- Reduction of major and moderate impacts: moderate impacts are impacts within accepted limits and standards. Moderate impacts may cover a broad range, from a threshold below which the impact is minor, up to a level that might be just short of breaching an established (legal) limit; and
- Minor impacts occur where effects are experienced, but the impact magnitudes are sufficiently small and well within accepted standards, and/or the receptors are of low sensitivity/value.

The potential adverse impacts associated with the project will be managed using the mitigation hierarchy (**Section 7.1.3, Figure 7-2**), giving priority to avoidance whenever possible before minimization, repair and offset. Some mitigation measures have been considered as part of the project design, however, risks and impacts not mitigated through design can be mitigated to the barest minimum using the proposed measures below. Residual impacts are expected to be low or negligible post-mitigation and monitoring programmes will be instituted for confirmation.

8.1 Recommended Mitigation Measures for Identified Impacts

Table 8-1 provides a summary of the significant impacts, as per the evaluation. The application of the mitigation measures is expected to reduce both moderate and major adverse impacts identified to either negligible or minor residual impacts.

Table 8-1: Proposed Mitigation and Management Measures for Identified Impacts

AfDB OS#	AfDB OS	Risk/Potential Impact	Receptor(s)	Potential Impact Significance	Proposed Mitigation and Management Measures
Preparatory phase					
OS1	<i>Environmental and Social Assessment</i>	Poor assessment study of environmental and social risks and impacts	Project proponent (MoFA), environment, community	Major [9]	- The project will carry out detailed assessment of environmental and social risks and propose mitigation measures for identified moderate to major adverse impacts. - The Project will select a qualified consultant to undertake the assessment studies.
OS5	<i>Involuntary resettlement, land acquisition, population displacement and compensation</i>	Land related disputes	Farmers	Moderate [4]	Lands will not be acquired for the project as they have been donated by the chiefs of the Nandom Kpee and Nandom Ko community. The chiefs are to sign the VLD forms.
		Impact on livelihoods		Moderate [4]	- The Resettlement Action Plan (RAP) will provide an understanding of what impact subprojects will have on the thirty nine (39) project affected farmers. - The RAP will propose changes that aim at avoiding or minimizing livelihood disruption and involuntary resettlement impacts for the affected farmers. - The RAP will ensure the impacts are properly assessed and all Project-Affected-farmers (PAFs) are identified and their assets that are affected are recorded and valued for adequate compensation. - The RAP will ensure identified PAFs and valued affected assets, are provided with adequate compensation packages whether in cash or kind based on the extent of displacement. - The RAP will provide opportunity to address grievances, and provide support for resolution of grievances.

AfDB OS#	AfDB OS	Risk/Potential Impact	Receptor(s)	Potential Impact Significance	Proposed Mitigation and Management Measures
OS6	Biodiversity, renewable resources and ecosystem services	Destruction of vegetation and displacement of wildlife	Flora and Fauna	Moderate [2]	- Clear only area required for the project - Stray animals that are observed at or around project sites should be given safe passage to nearby bush and not killed. - Hunting and or killing of wildlife/animals in bushes around project site by construction/other workers should be prohibited and made punishable.
Construction phase					
OS2	Occupational health and safety (OHS) impacts and risks	Project Site incidents/accidents	All Project workforce, Vulnerable categories of workers, Women	Major [6]	- Good housekeeping around work area must be ensured to prevent slips, trips & falls. - Only trained and competent workers should be allowed to carry out work and must be well briefed on safe working procedures. - Appropriate work platforms and PPE must be used for specific tasks such as work at height. - Mandatory and basic PPE including hardhat, hand gloves, safety goggles, HiVis and safety boots must be worn. - Have accident and incident reporting form available to record accidents and near-misses - The Project Contractor will implement and maintain an OHS management system taking into account specific risks associated with the project, legal requirements and duty of care. - The Project Contractor will be responsible for ensuring that all affiliated sub-contractors comply with the OHS management system. The OHS management system will be in-line with recognized international best practice.
		Poor labour working conditions	All Project workforce, Vulnerable categories of workers, Women	Major [6]	Provide all workers with signed contracted that are consistent with national labour laws

AfDB OS#	AfDB OS	Risk/Potential Impact	Receptor(s)	Potential Impact Significance	Proposed Mitigation and Management Measures
					• Provide welfare facilities such as potable drinking water, shades, restrooms etc. for workers. • Encourage frequent breaks and job-rotation to reduce impact of the weather on workers. • Require workers to sign Code of Conduct and provide adequate training to both the workers and the communities • Develop policies against discrimination, forced and child labour, sexual harassment and all forms of abuse including restriction of right to unionize or freedom of speech. • Establish an effective worker grievance redress mechanism.
		Sexual Harassment (SH) and Gender Based Violence (GBV)	Women, Children	Major [6]	• Include in works contract clauses on mandatory and regular training for workers on required lawful conduct and legal consequences for failure to comply with laws on non-discrimination and GBV. • Insert clause requiring contractors and consultants to cooperate with law enforcement agencies investigating cases of gender-based violence. • A minimum requirement of female employment should be indicated in contract documents. • Clauses prohibiting rape, defilement and other Gender based Violence as well as child and forced labour should be inserted into works contracts. • Contact numbers of representative on the Grievance Redress Committee and GBV Service Providers should be pasted around the project site and within the immediate project zone • Discuss issues of Gender Based Violence at daily Toolbox meetings • Display on site posters prohibiting sexual exploitation and harassment.

AfDB OS#	AfDB OS	Risk/Potential Impact	Receptor(s)	Potential Impact Significance	Proposed Mitigation and Management Measures
OS3	Resource Efficiency and Pollution Prevention and Management	Soil erosion and contamination	Soil	Moderate [4]	- Landscape should be reinstated or regenerated to reflect its original general view before the project. - All excavations and trenches should immediately be backfilled and compacted to its original state. - Not undertake site clearance, piling, excavation and access road construction during the raining season to minimize erosion and run-off. - Ensure that construction activities are restricted to designated work areas to avoid damage and disturbance outside of the site. - In case of accidental/unintended spillage, immediately collect contaminated soil and stored as hazardous waste. - Make available on site, all equipment and materials required to execute a clean-up. - Utilize existing roads to access the site. - Ensure that activities are confined to designated construction areas, limiting soil exposure and disturbance to the construction site only.
		Air Pollution	Health of workers and members of the surrounding communities	Moderate [4]	- Trucks and heavy machinery with a valid emission test pass certificate should only be allowed on the project site. - Dust pollution must be reduced by ensuring that drivers do not speed especially on untarred roads. - Suppress dust by watering dusty construction areas. - Ensure the use of nose mask in dusty environment.
		Water Pollution	Water quality of the Gbafiong river and water collected as	Moderate [4]	- Conduct regular maintenance on trucks to prevent oil leakages that could be washed together with sediment into nearby waterbodies - Manage leaked oil by placing trays under trucks to collect leaked oil.

AfDB OS#	AfDB OS	Risk/Potential Impact	Receptor(s)	Potential Impact Significance	Proposed Mitigation and Management Measures
			ponds in the project area.		• Provide impervious storage area, especially for fuel and lubricant, hazardous waste, etc. • Not store hazardous materials near natural drainage channels. • Ensure that any temporary refuelling tanks are bunded. • Have available on site, all equipment and materials necessary to execute clean up. • Maintain logbook for water consumption. • Progressively adopt less water consuming module cleaning methods. • Adhere to agreed arrangements for the disposal of aqueous effluents. • Proper handling of materials and wastes to prevent transport into water bodies. • Avoid extensive land clearing, excavation, trenching etc. activities during heavy rainfall events to prevent runoff carrying contaminants to surface water (ponds in the project area) • Obtaining water permits for ground water usage as required by Ghanaian law, WRC Act 522 (1996). • Clean construction equipment away from surface waters. • Monitor and record the volume of water used. • Ensure water usage and disposal align with national legislation and, where applicable, international best practices, and track any deviations from the estimated water use. • Develop and implement a groundwater quality monitoring program to closely monitor changes in aquifer water levels, groundwater quality, and availability.
		Noise and Vibration	Health and wellbeing of workers and	Moderate [4]	• Unnecessary tooting of horn by truck drivers must be avoided.

AfDB OS#	AfDB OS	Risk/Potential Impact	Receptor(s)	Potential Impact Significance	Proposed Mitigation and Management Measures
			members of communities close to the project area		- A noise assessment must be carried out for all heavy machinery prior to use at the site to ensure noise levels are in compliance with EPA's guidelines values. - Noise should be kept to a minimum with hearing protection used as deemed necessary for workers. Earmuffs or earplugs are recommended for ear protection. The level of noise must be continuously assessed to keep it within acceptable limits. - All equipment and tools must be checked for suitability for the task. - All construction equipment and hand tools should be operated by trained, experienced and competent persons, and where required persons must produce operator's license upon request. - Ensure the use of well serviced/maintained vehicles and other equipment with acceptable noise emission levels. - Provide silencers on all noise generating equipment.
		Waste generation and Disposal	Health of members of the Local communities within the project area	Moderate [4]	- Ensure that contractor develops and implements a detailed Construction Waste Management Plan. - Ensure that construction debris are collected from work sites to avoid blocking of drains and waterways. - Waste bins must be provided and well labelled for waste segregation and disposal. - Only licensed waste management companies must be engaged to collect and dispose of waste collected from the site. - Regular briefing or training on waste management must be provided to workers at the site. - Have SOPs for managing hazardous and non-hazardous waste.

AfDB OS#	AfDB OS	Risk/Potential Impact	Receptor(s)	Potential Impact Significance	Proposed Mitigation and Management Measures
OS4	Community Health, Safety and Security	Traffic Management	Local communities near the project area of influence	Moderate [4]	- The Highway Code must be strictly followed. Driver training must be provided as part of induction training and permit to drive and transportation of materials to project site issued. - Trained flagmen (to slow down traffic) or trained stop-go men (to halt traffic) must be used to ensure safety when trucks are leaving the project site. - Stop-go men and flagmen must also wear high visibility vests and use approved stop-go signs or flags. - Vehicles to be used on the project must provide maintenance records, and must also be inspected by a competent person before allowed on the project. - Have checklists available to manage vehicle and equipment maintenance and management - Arrangements must be made for truck drivers to ensure peak times are avoided for haulage of materials to site. - Ensure that all trucks used are serviced regularly to maintain optimal performance and ensure safety. - Identify safe parking areas off main roads to allow for unloading and long-term parking of vehicles. - Have accident and incident reporting form to record accidents and near-misses.
		Fire Outbreak	Vegetation, Project workforce and Local communities near the project area of influence	Moderate [4]	- Clear zones of land around the project site and other infrastructure should be created to prevent fires from spreading. These can be created by clearing vegetation or planting fire-resistant vegetation. - There should be regular clearing of areas with dry vegetation to reduce the amount of flammable material available for a fire.

AfDB OS#	AfDB OS	Risk/Potential Impact	Receptor(s)	Potential Impact Significance	Proposed Mitigation and Management Measures
					- Workers should designate areas for cooking and possible smoking to prevent fire from spreading in the likelihood of it happening. - Access to water and other fire suppression equipment should be ensured, and workers should be trained on effective fire suppression techniques. - Local communities should be educated about the dangers of bushfires, the importance of safe disposal of debris, and the role of fire prevention in maintaining healthy ecosystem.
		Visual / Aesthetic Impacts	Local communities (Kpee and Ko) and commuters	Moderate [4]	- Maintain tidy construction sites (good housekeeping). - Minimize area of land clearance beyond essential footprint. - Locate temporary facilities at unobtrusive areas to reduce visibility. - Promptly rehabilitate disturbed areas post-construction. (grading, seeding). - Ensure permanent structures (patios, sheds) use materials/colours that blend reasonably with the surroundings.
		Public health issues	Local communities near the project area of influence	Moderate [4]	- Potable water tanks or containers could be used on the project site to keep water for drinking. - Sexual harassment or violence on the project site will not be tolerated and project contractor should be made aware of such incidences to ensure that any complaints are addressed in accordance with the law. - Undertake sexual health education programs for workers and also ensure they desist from irresponsible sexual behaviour during project implementation. - Encourage handwashing after work and if possible provide hand sanitizers to workers. - Encourage workers to get vaccinated.

AfDB OS#	AfDB OS	Risk/Potential Impact	Receptor(s)	Potential Impact Significance	Proposed Mitigation and Management Measures
					• Provide information, instructions and trainings on STDs, drug abuse etc. to the workers to create awareness. • Provide female and male condoms to the community and workers.
		Security Concerns	Local communities near the project area of influence	Minor [2]	• Sensitize local community on cultural tolerance and grievance mechanisms to prevent confrontations • Migrant workers should be made aware of the community’s cultural and traditional values/beliefs so they may not go against them. • The contractor should prioritize employing locals especially the youth who may be unemployed which can ultimately lead to unrest or other social vices.
		Risk of Drowning	Project workforce and Local communities near the project area of influence.	Moderate [4]	• Dug out or borrowed pits should be fenced to prevent unsuspecting community members from falling and drowning in it. • In situations where the burrowed pit will not be in use, it should be reclaimed. • There will be pictorial signages mounted close to the pit to warn the community about the danger of drowning.
Operation phase					
OS2	Occupational health and safety (OHS) impacts and risks	Workplace incidents/accidents	Farm workers, Vulnerable categories of workers, Women	Moderate [4]	• Good housekeeping around farm area must be ensured to prevent slips, trips & falls. • Only trained and competent farm workers should be allowed to carry out work on the farm and must be well briefed on safe working procedures. • Farm owners should ensure they and their farm workers are always in their PPE’s when working on the farm. E.g. wellington boots etc.

AfDB OS#	AfDB OS	Risk/Potential Impact	Receptor(s)	Potential Impact Significance	Proposed Mitigation and Management Measures
					- Potable water tanks or containers could be used on farms to keep water for drinking instead of using empty containers/gallons of fertilizers and agro-chemicals that can pose health risk to farmers. - Develop and ensure implementation of Pest Management Plan (PMP)
		Poor labour working conditions	Farm workers, Vulnerable categories of workers, Women	Moderate [4]	- Safe, clean, and comfortable housing should be provided for migrant farm workers, either on-site or in nearby communities, with consideration for their needs and cultural sensitivities. - Provide all farm workers with signed contracts that are consistent with national labour laws. - Encourage frequent breaks and job-rotation to reduce the impact of the hot weather on farm workers. - Establish an effective farm worker grievance redress mechanism. - Fair wages, working conditions, and contracts that comply with labour laws should be implemented so that labourers can benefit from fair labour practices. - Hiring of locals for labour, skills training for migrant workers, and support for local businesses to create broader economic opportunities should be prioritized.
		Sexual Harassment (SH) and Gender Based Violence (GBV)	Women	Moderate [4]	- Educate farm workers on SH and GBV issues and make them sign code of conduct. - Offenders will be reported to the local law enforcement agencies and if found guilty punished to serve as deterrent to potential offenders. - No discrimination based on gender, marital status, nationality, age, religion, or sexual orientation will be tolerated toward employees or job applicants.

AfDB OS#	AfDB OS	Risk/Potential Impact	Receptor(s)	Potential Impact Significance	Proposed Mitigation and Management Measures
		Child Labour	Children	Moderate [4]	- Children who spend time with their parents on the farm should not be allowed to do so at the expense of their education and well-being. - Children under the working age of 15 should not be engaged in hazardous work on the farms.
OS3	Resource Efficiency and Pollution Prevention and Management	Soil erosion and degradation	Soil	Moderate [4]	- Application of fertilizer will be controlled so that it does not lead to soil degradation. - Education of farmers on proper application of fertilizer and pesticides to prevent abuse. - Develop and ensure implementation of Pest Management Plan (PMP) - After harvesting, crop residue comprising process residue (straw, husks, skins, trimmings, among others) and field residue (stalks and stubble/stems, leaves of crops) will be tilled into the soil to improve the soil structure and soil organic matter content. - Farmers will be sensitised to adopt minimum tillage during planting seasons to reduce the susceptibility of the soil to erosion and hardpan formation associated with continuous ploughing at the same depth. - Farmers will utilise cover crops at erosion-prone areas in sections.
		Air Pollution	Health of farm workers and surrounding community members.	Minor [2]	- Practicing No-till or Low-till methods where crop residues are retained on the field or incorporated into the soil can help decompose the stubble naturally, reducing the need for stubble burning. - Mobile, small-scale threshers can be used in place of manual threshing so as to reduce the amount of dust or rice chuff emitted into the atmosphere. - Minimizing dust generation activities as much as possible especially during windy periods.

AfDB OS#	AfDB OS	Risk/Potential Impact	Receptor(s)	Potential Impact Significance	Proposed Mitigation and Management Measures
					Vehicle speed, particularly on untarred roads transporting farm produce and agric inputs to and from the farm will be strictly controlled to minimize dust generation.
		Water Pollution	Water quality of the Gbafiong river and water which has gathered as ponds in the valley.	Moderate [4]	- There will be proper timing in the application of fertilizers/herbicides and other agrochemicals considering the crop's nutrient needs and soil conditions in order to maximize fertilizer uptake and minimize leaching and runoff. - Develop and ensure implementation of Pest Management Plan (PMP) - Provision of on-site sanitation facilities and encourage the farm workers to use it. - Educate farm workers to avoid open defecation. - Sediments traps will be designed and constructed within the farm lands to contain contaminated sediments which will later be harvested for producing blocks for building.
		Noise and Vibration	Health and wellbeing of workers and members of communities close to the project area	Moderate [4]	- Scare crows should be encouraged instead of the screaming sounds from farmers or labourers to scare away birds. - The use of threshing machines with design specifications and operational adjustments that use soundproofing and vibration damping materials should be utilised during the harvesting periods in order to reduce noise and vibration to its barest minimum level. - Ensure the use of well serviced/maintained vehicles and other equipment with acceptable noise emission levels when transporting farm produce and farmers from the farm. - Provide silencers on all noise generating equipment.

AfDB OS#	AfDB OS	Risk/Potential Impact	Receptor(s)	Potential Impact Significance	Proposed Mitigation and Management Measures
		Solid waste generation and Disposal	Health of farm workers and the Local community.	Moderate [4]	• Rice husk has a high potential for the use as fuel. The project should take steps to identify potential investors that will process the husk to be used as fuel for boilers, in concrete production, or as a material for various industrial application. • Farmers should be educated to use rice husk, straw, and other organic waste for composting which can eventually be used as fertilizer. • There should be provision of adequate waste skips to collect empty containers of agrochemicals and fertilizers for disposal by licenced waste management company. • Develop and ensure implementation of Pest Management Plan (PMP) • Good housekeeping should be encouraged on farms.
OS4	Community Health, Safety and Security	Traffic Management	Local communities	Minor [2]	• Drivers should exercise caution when driving through crowded areas such as markets. • Installation of speed bumps to check speeding vehicles. • Identify safe parking areas off main roads to allow for unloading and long-term parking of vehicles.
		Fire Outbreak	Rice farms, nearby vegetation, farm workers and local community.	Moderate [4]	• Clear zones of land around the rice fields and other infrastructure should be created to prevent fires from spreading. These can be created by clearing vegetation or planting fire-resistant vegetation. • There should be regular clearing of areas with dry vegetation to reduce the amount of flammable material available for a fire. • Farmers should designate areas for cooking and possibly smoking to prevent fire. • Access to water and other fire suppression equipment should be ensured, and farmers should be trained on effective fire suppression techniques.

AfDB OS#	AfDB OS	Risk/Potential Impact	Receptor(s)	Potential Impact Significance	Proposed Mitigation and Management Measures
					The municipal fire service should train community members as fire guards to serve as the first point of contact when there is fire outbreak within the project area.
		Polluted Waterbodies	Farm workers and Local communities	Moderate [4]	- Educate farm workers to avoid open defecation. - Sediments traps will be designed and constructed within the farm lands to contain contaminated sediments which will later be harvested for producing blocks for building. - Potable water tanks or containers could be used on farms to keep water for drinking instead of using empty containers/gallons of fertilizers and agro-chemicals that can pose health risk to farmers.
		Sexual Transmitted Diseases	Farm workers and Local communities	Moderate [4]	- Sexual harassment or violence on farms will not be tolerated and community leaders should be made aware of such incidences to ensure that any complaints are addressed in accordance with the law. - Undertake sexual health education programs for farm workers and also ensure they desist from irresponsible sexual behaviour during project implementation.
		Security Concerns	Farm workers and local communities	Minor [2]	- Sensitize local community on cultural tolerance and grievance mechanisms at community durbars to prevent confrontations - Migrant farm workers should be made aware of the community's cultural and traditional values/beliefs so they may not go against them. Farm owners should prioritize employing locals into their farms especially the youth who may be unemployed which can ultimately lead to unrest or other social vices.
		Risk of Drowning	Farmers and local community members	Moderate [4]	The community has proposed that the rain water collected in the burrow pit may be used as their source of water for watering their

AfDB OS#	AfDB OS	Risk/Potential Impact	Receptor(s)	Potential Impact Significance	Proposed Mitigation and Management Measures
					crops in the dry season. However, dug out or burrowed pits should be fenced to prevent unsuspecting community members from falling and drowning in it. • In situations where the burrowed pit will not be in use, it should be reclaimed. • There will be pictorial signages mounted close to the pit to warn the community about the danger of drowning.
		Flooding	Farmers, Community members, Flora and Fauna	Major [6]	• Educate farmers and community on early warning signs of flood. • Discourage the siting of farms within or close to river beds. • Collaborate with spatial planning and disaster management agencies, using disaster maps and systems, to stay away from flood-prone areas. • Infrastructure for agricultural establishments should be constructed preferably on high grounds. • Provide insurance cover for equipment and personnel
Decommissioning Phase					
OS2	Labour conditions, health and safety	Project Site incidents/accidents	All Project workforce, Vulnerable categories of workers, Women	Major [6]	• Develop and implement an Occupational, Health and Safety Management Plan that covers at a minimum good housekeeping, provision and use of PPE, incident/accident reporting and investigation, emergency response and training.
OS3	Resource Efficiency and Pollution Prevention and Management	Waste generation and Disposal	Health of project workforce and members of the Local communities within the project area	Moderate [4]	• Ensure efficiency in the use of materials. • Reuse materials such as pieces of wood, and metals. • Recycle scrap metal • Ensure collection and proper disposal of construction debris • Provide adequate waste bins for waste collection and segregation • Sensitize workers on waste management • Develop SOPs for managing hazardous and non-hazardous waste.

AfDB OS#	AfDB OS	Risk/Potential Impact	Receptor(s)	Potential Impact Significance	Proposed Mitigation and Management Measures
					Develop and ensure implementation of Pest Management Plan (PMP)
OS4	Community Health, Safety and Security	Traffic Management	Local communities near the project area of influence	Moderate [4]	- Avoid transportation of materials and workers during peak hours - Train drivers on and ensure adherence to the Highway Code - Ensure regular maintenance of vehicles - Use flagmen and designated parking areas for safety onsite.

Table 8-2: Beneficial Impacts of the Project

No.	Beneficial Impact	Details of potential Project Impact
1	Creation of job opportunities	Job opportunities for skilled, semi-skilled and unskilled labour will be created at the construction and operation phases as locals, including women, will be recruited for short-term and long-term jobs.
2	Increased commerce and boost to local economy	Agricultural productivity will increase quantitatively due to increased access to mechanization services by rice farmers.
3	Food Security	Increase in production capacity coupled with availability of storage facilities will make produce available all year round and improve reliance on local agricultural produce and product. This will reduce the importation of agricultural produce across borders and improve food security.
4	Adoption of good agricultural practices	The proposed project will involve the community and the local stakeholders throughout the project cycle equipping them with knowledge and skills in agricultural practices.
5	Technology transfer	Farmers will be exposed to new technologies for geomapping, crop management, pest and disease management, processing, etc. that were otherwise not known to them

9.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

This section presents the Environmental and Social Management Plan (ESMP), **Table 9-1** that is designed to operationalize the environmental and social commitments presented in this ESIA report. The ESMP presents a set of management, mitigation and monitoring measures to be taken at different stages of the project implementation. It sets out record keeping required to ensure that mitigation measures and monitoring are effective and results duly communicated to stakeholders.

Table 9-1: Environmental and Social Management Plan

AfDB No.	AfDB OS Description	Potential Impact/ Issue	Impact description	Receptor(s)	Significance	Proposed Mitigation and Management Measures	Responsibility (implementation/ supervision)	Estimated Cost (GHS/USD)	Monitoring responsibility	Verifiable Monitoring Indicator	Means of Verification	Timetable for Implementation
Preparatory Phase												
OS1	<i>Environmental and Social Assessment</i>	Poor assessment of environmental and social risks and impacts	Unidentified risks and impacts could prevent or stall project implementation. Selection of unqualified persons for assessment studies	Project proponent (MoFA), environment, community	Major [9]	- Detailed and high quality assessment of environmental and social risks - Selection of qualified ESIA consultant - Environmental permit acquisition	PIU	358,000/33,966 35,000/3,321	Lender	Project E&S Instruments (ESIA, RAP, SEP, PMP) EPA Permit	E&S Report Permit	Apr – Sep 2025 31 st Oct 2025
OS5	<i>Involuntary resettlement, land acquisition, population displacement and compensation</i>	Land related disputes	Proposed site is owned by the chief of Nandom Ko and Kpee	Farmers; Community	Moderate [4]	- Acquire signed Voluntary Land Donation (VLD) forms - Provide training on completion of VLD forms	- PIU - ESIA Consultant	2,000/190 2,500/237	Lender	Signed VLD	Signed VLD	Sep 2025
		Impact on livelihoods	The project activities could restrict thirty nine (39) farmers access to lands that were otherwise used for farming.	Project affected Farmers	Moderate [4]	- Develop a Resettlement Action Plan (RAP)/ Livelihood Restoration Plan - Implement the Resettlement Action Plan (RAP)	- RAP Consultant - PIU	80,000/7,590 116,210/11,026	PIU/Lender Lender	RAP Report RAP Implementat ion report	RAP Report RAP Implementat ion audit	Sep 2025 Qtr 1, 2026
						Build PIU’s capacity for RAP implementation	RAP Consultant	20,000/190	PIU/Lender	Training for RAP implementat ion team	Training reports	Qtr 1, 2026
OS6	<i>Biodiversity, renewable resources and ecosystem services</i>	Destruction of vegetation and displacement of wildlife	The project site is an already disturbed area due to previous human activities such as farming. The floristic analysis conducted indicates that none of the species identified at the site are of conservation concern according to the Forest Reserves of Ghana Information Exhibitor (FROGGIE) data base. Site clearing will not lead to any major destruction of biodiversity of significant importance. only a few	Flora and Fauna	Minor [2]	Restrict vegetation clearance to the required area only and prohibit hunting of animals which may stray to the project area by providing temporary fences. This must be included in the contractor’s bill of quantities and code of Conduct.	Contractor	20,000/1,900	PIU	Installation of Fence	Physical inspection	Before construction
						Train contractor’s E&S Officer on ESMP requirements	PIU	10,000/949	Lender	Training for E&S officer	Training reports	Before construction

AfDB No.	AfDB OS Description	Potential Impact/ Issue	Impact description	Receptor(s)	Significance	Proposed Mitigation and Management Measures	Responsibility (implementation/ supervision)	Estimated Cost (GHS/USD)	Monitoring responsibility	Verifiable Monitoring Indicator	Means of Verification	Timetable for Implementation
			trees and destruction of the habitats of some animals.									
Construction Phase												
OS 2	<i>Labour conditions, health and safety</i>	Project Site incidents/accidents	Project site accidents/incidents and animal/insect threat/bites	All Project workforce, Vulnerable categories of workers, Women	Major [6]	Develop and implement an Occupational, Health and Safety Management Plan that covers at a minimum good housekeeping, provision and use of PPE, incident/accident reporting and investigation, emergency response and training	Project Contractor	50,000/4,744	PIU	CESMP Records and purchase of PPEs, training on PPE use, house-keeping, emergency response etc.	Review of CESMP OHS audits	Before construction During construction
		Poor labour working conditions	Lack of employment contracts could lead to workers being paid rates below the stipulated national minimum wage or work under poor conditions. Workers could face issues of discrimination, forced labour, child labour, freedom of association and collective bargaining, lack of or ineffective worker grievance redress mechanisms	All Project workforce, Vulnerable categories of workers, Women	Major [6]	- Adhere to national labour laws as provided in the Labour Act of 2003 (Act 651) and international best practice such as provisions of AfDB ISS (2023) OS 2 on Labour and Working Conditions - Specific considerations should include the following: - Provide all workers with signed contracts - Provide welfare facilities as required. - Encourage frequent breaks and job-rotation to reduce impact of the hot weather on workers.	Project Contractor	120,000/11,385	PIU	Signed contract, welfare facilities, Grievance redress mechanism/ records	E&S audits	During construction

AfDB No.	AfDB OS Description	Potential Impact/ Issue	Impact description	Receptor(s)	Significance	Proposed Mitigation and Management Measures	Responsibility (implementation/ supervision)	Estimated Cost (GHS/USD)	Monitoring responsibility	Verifiable Monitoring Indicator	Means of Verification	Timetable for Implementation
						- Require workers to sign Code of Conduct - Develop policies against discrimination, forced and child labour, sexual harassment and all forms of abuse including restriction of right to unionize or freedom of speech. - Provide adequate training for workers on safety, GBV, SEA/SH, child labour/human rights, social norms. - Establish an effective worker grievance redress mechanism						
		Sexual Harassment (SH) and Gender Based Violence (GBV)	Presence of workers and increase in incidents of rape, defilement, child molestation and GBV.	Women, Children	Major [6]	• Include the requirements of policies on GBV, SEA/SH, Child Labour and Human Rights in the contractor's Code of Conduct • Provide training for workers on required lawful conduct and legal consequences for failure to comply with laws on non-discrimination and GBV • Insert clause requiring contractors and consultants to cooperate with law enforcement agencies investigating cases of gender-based violence • A minimum requirement of female employment should be indicated in contract documents • Contact numbers of representative on the Grievance Redress Committee and GBV Service Providers should be pasted around the project site and within the immediate project zone • Discuss issues of Gender Based Violence at daily Toolbox meetings • Display on site posters prohibiting sexual exploitation and harassment.	Project Contractor	80,000/7,590	PIU	Clauses on GBV, SEA/SH, Child Labour and Human Rights in the contractor's Code of Conduct	Review of contractor's code of conduct	During construction

AfDB No.	AfDB OS Description	Potential Impact/ Issue	Impact description	Receptor(s)	Significance	Proposed Mitigation and Management Measures	Responsibility (implementation/ supervision)	Estimated Cost (GHS/USD)	Monitoring responsibility	Verifiable Monitoring Indicator	Means of Verification	Timetable for Implementation
OS3	Resource Efficiency and Pollution Prevention and Management	Soil erosion and Contamination	Excavation for foundation of structures could lead to soil erosion and creation of gullies through runoff especially in the rainy season Soil contamination could also occur from inappropriate disposal of waste oil, spilled oil during machinery operation and maintenance as well as fuel storage sites and leaks from vehicle refuelling	Soil	Moderate [4]	- Develop an Erosion Management Plan. - Implement the Erosion Management Plan. - Train contractor's E&S Officer on ESMP requirements.	Contractor Contractor PIU	50,000/4,744 100,000/9,488 20,000/1,898	PIU/Lender	Erosion Manage-ment Plan Sediment traps Training on erosion manage-ment	Inspection/ review Inspection Training records	Before construction During construction During construction
		Air Pollution	Emission of fumes and dust from transport of materials especially on untarred routes to project site. Baseline air quality data (PM2.5 – 30µg/m3, PM10 – 109µg/m3, NO2, SO2 and CO were all below the minimum detection limit of 0.06 mg/m3 at the time of sampling. This shows that the project area's airshed is not degraded as all parameters are within the emissions thresholds except for PM10 whose higher value could be attributed to high coarse particulate pollution, likely arising from mechanical disturbances during farming, vehicular movement, and possibly wind-driven dust due to the site's open, dry landscape.	Health of workers and members of the surrounding communities	Moderate [4]	- Trucks and heavy machinery with a valid emission test pass certificate should only be allowed on the project site. - Dust pollution must be reduced by ensuring that drivers do not speed especially on untarred roads. - Suppress dust by watering dusty construction areas. - Ensure the use of nose mask in dusty environment.	Project Contractor	60,000/5,693	PIU/ Supervising Engineer	Valid emission test certificate Speed limit signage Wet road surfaces Complaints/ grievances	Inspection	During construction

AfDB No.	AfDB OS Description	Potential Impact/ Issue	Impact description	Receptor(s)	Significance	Proposed Mitigation and Management Measures	Responsibility (implementation/ supervision)	Estimated Cost (GHS/USD)	Monitoring responsibility	Verifiable Monitoring Indicator	Means of Verification	Timetable for Implementation
		Water Pollution	Sediment and waste oil transport into nearby water bodies. Domestic waste from the construction workers and food vendors providing services to the construction crew.	The Gbafiong river water quality and pools of water in the valley.	Moderate [4]	- Undertake construction in the dry season - Carry out maintenance activities away from water bodies. - Install sediment traps - Educate workers on the importance of waste management.	Project Contractor	60,000/5,693 10,000/949	PIU/ Supervising Engineer	Sediment traps Toolbox exercises	Inspection Toolbox records	During construction
		Noise and Vibration	Operation of construction equipment, movement of haulage vehicles and tooting of horns.	Health of project workforce and members of the surrounding communities	Moderate [4]	- Ensure construction activities are carried out during the day. - Provide and enforce wearing of hearing protection by workers - Sensitize workers on effects of noise pollution - Ensure the use of well serviced/maintained vehicles and other equipment with acceptable noise emission levels.	Project Contractor	20,000/1,898	PIU/ Supervising Engineer	Noise emission levels Complaints/ grievances	Noise monitoring report Records of complaints/ grievances	During construction
		Waste generation and Disposal	Clearance of vegetation at project site, construction debris, pieces of steel/metal, packaging materials, plastic pieces, human waste etc. if not disposed properly could clog drains and facilitate the outbreak of sanitary related diseases such as cholera.	Health of project workforce and members of the Local communities within the project area	Moderate [4]	- Ensure that contractor develops and implements a detailed Construction Waste Management Plan. - Ensure efficiency in the use of materials. - Reuse materials such as pieces of wood, and metals. - Recycle scrap metal - Ensure collection and proper disposal of construction debris - Provide adequate waste bins for waste collection and segregation - Sensitize workers on waste management - Develop SOPs for managing hazardous and non-hazardous waste.	Project Contractor	100,000/9,488	PIU/ Supervising Engineer	Inventory of waste generated/ Disposed of	Inspection/ review of records/ inventory	During construction
OS4	Community Health, Safety and Security	Traffic Management	Transport of materials and equipment to and from the project site through communities and townships raises traffic/public safety	Local communities near the project area of influence	Moderate [4]	- Avoid transportation of materials and workers during peak hours - Train drivers on and ensure adherence to the Highway Code - Ensure regular maintenance of vehicles	Project Contractor	50,000/4,744	PIU/ Supervising Engineer	Records of traffic incident and accidents	Review/ inspection of records	During construction

AfDB No.	AfDB OS Description	Potential Impact/ Issue	Impact description	Receptor(s)	Significance	Proposed Mitigation and Management Measures	Responsibility (implementation/ supervision)	Estimated Cost (GHS/USD)	Monitoring responsibility	Verifiable Monitoring Indicator	Means of Verification	Timetable for Implementation
			concerns. Broken-down, inappropriately parked or slow-moving haulage/construction trucks could lead to road accidents and traffic congestion especially on busy roads.			Use flagmen and designated parking areas for safety onsite				Community complaints/ grievances		
		Fire Outbreak	Fire outbreaks from negligence of workers or the community burning refuse, game hunting and workers not properly extinguishing stubs of cigarette. These fires could spread causing injuries to persons and destruction of property.	Vegetation, Project workforce and Local communities near the project area of influence	Moderate [4]	- Create fire belts to prevent spread of fire into the active working areas. - Sensitize workers and community on the dangers of bushfires - Store flammable materials away from fire sources - Designate cooking and smoking areas onsite. - Provide fire-fighting equipment onsite. - Train workers on fire fighting and where applicable include community fire volunteers	Project Contractor	50,000/4,744	PIU/ Supervising Engineer	Records of fire incidence Training of fire safety and risk	Review/ inspection of records	During construction
		Visual / Aesthetic Impacts	Presence of construction machinery, material stockpiles, temporary work camps; Vegetation clearance, earthworks (bare ground); Dust plumes.	Local communities (Kpee and Ko), commuters.	Moderate [4]	- Maintain tidy construction sites (good housekeeping). - Minimize area of land clearance beyond essential footprint. - Locate temporary facilities at unobtrusive areas to reduce visibility. - Promptly rehabilitate disturbed areas post-construction. (grading, seeding). - Ensure permanent structures (patios, sheds) use materials/colours that blend reasonably with the surroundings.	- Contractor - PIU	20,000/1898	PIU Lender	Site tidiness. Area cleared. Community feedback (via GRM).	Site Inspections, Photographi c records	During construction
		Public Health Issues	Pollution of local water bodies will adversely affect the health of users. Sexual relations between workers and locals may bring about increase in sexually transmitted	Local communities near the project area of influence	Moderate [3]	- Potable water tanks or containers could be used on the project site to keep water for drinking. - Sexual harassment or violence on the project site will not be tolerated and project contractor should be made aware of such	Project Contractor	60,000/5,693	PIU/ Supervising Engineer	Potable water tanks on site Records of sensitization	Physical inspection Review of records	During construction

AfDB No.	AfDB OS Description	Potential Impact/ Issue	Impact description	Receptor(s)	Significance	Proposed Mitigation and Management Measures	Responsibility (implementation/ supervision)	Estimated Cost (GHS/USD)	Monitoring responsibility	Verifiable Monitoring Indicator	Means of Verification	Timetable for Implementation
			diseases including HIV/AIDs.			incidences to ensure that any complaints are addressed in accordance with the law. - Undertake sexual health education programs for workers and also ensure they desist from irresponsible sexual behaviour during project implementation. - Encourage handwashing after work and if possible provide hand sanitizers to workers. - Encourage workers to get vaccinated. - Provide information, instructions and trainings on STDs, drug abuse etc. to the workers to create awareness. - Provide female and male condoms to the community and workers.				of workers on GBV/SH Availability of condoms in washrooms Presence of hand washing sinks/basins and sanitizers on site	Inspection Inspection	
		Security Concerns	Violent behaviour and confrontations between workers and locals. Workers who are deemed to be financially sound could be victims of theft and burglary Potential conflict over illicit sexual affairs, child labour, drunk driving, accidents and destruction of property.	Local communities near the project area of influence	Minor [2]	- Sensitize local community on cultural tolerance and grievance mechanisms to prevent confrontations - Migrant workers should be made aware of the community's cultural and traditional values/beliefs so they may not go against them. - The contractor should prioritize employing locals especially the youth who may be unemployed which can ultimately lead to unrest or other social vices.	Project Contractor	30,000/2,846	PIU	Community meetings Toolbox exercises Number of locally employed workers	Inspection of community meeting minutes Review of toolbox records Inspection of records of locally employed workers	During construction

AfDB No.	AfDB OS Description	Potential Impact/ Issue	Impact description	Receptor(s)	Significance	Proposed Mitigation and Management Measures	Responsibility (implementation/ supervision)	Estimated Cost (GHS/USD)	Monitoring responsibility	Verifiable Monitoring Indicator	Means of Verification	Timetable for Implementation	
		Risk of Drowning	Any borrow or dug-out pits created as a result of excavation of construction materials can accumulate water when it rains. This can pose the risk of drowning for workers especially contract staff who are not familiar with the local terrain. Children who may play around the sites and unsuspecting community members may also be at risk of drowning especially when it rains and the place get flooded.	Project workforce and Local communities near the project area of influence	Moderate [4]	- Fence dug outs or borrow pits to prevent drowning. - Provide warning signage at borrow pit sites. - Sensitize community members on risk of drowning	Project Contractor	100,000/9,488	PIU	Presence of fence and signage Records of drowning incidents/accidents Records of community sensitization programmes	Inspection Review/audits of records	During construction	
Operation Stage													
OS2	Labour conditions, health and safety	Farm incidents/accidents	Farm accidents/incidents and animal/insect threat/bites	All Farm workers, Vulnerable categories of workers, Women	Moderate [4]	- Develop and implement an Occupational, Health and Safety Management Plan that covers at a minimum good housekeeping, provision and use of PPE, incident/accident reporting and investigation, emergency response and training - Training and sensitization of farmers on the use of PPE, farm implements and agro-chemicals	Municipal MoFA/ Assembly	300,000/28,463	Regional MoFA	Records of training on PPE use, house-keeping, emergency response etc.	Review of ESMP OHS audits	During operation	
		Poor labour working conditions	Lack of employment contracts could lead to farm workers being paid rates below the stipulated national minimum wage or work under poor conditions. Farm workers could be exposed to discrimination, forced and child labour, restriction of freedom of association and collective bargaining, non-existent or ineffective farm	All Project workforce, Vulnerable categories of workers, Women	Moderate [4]	- Adhere to national labour laws as provided in the Labour Act of 2003 (Act 651) and international best practice such as provisions of AfDB ISS (2023) OS 2 on Labour and Working Conditions - Specific considerations should include the following: - Provide all workers with signed contracts - Provide welfare facilities as required.	Municipal MoFA / Department of Community Development	200,000/18,975	Regional MoFA	Number of labour related complaints and grievances	Review of the records	During operation	

AfDB No.	AfDB OS Description	Potential Impact/ Issue	Impact description	Receptor(s)	Significance	Proposed Mitigation and Management Measures	Responsibility (implementation/ supervision)	Estimated Cost (GHS/USD)	Monitoring responsibility	Verifiable Monitoring Indicator	Means of Verification	Timetable for Implementation
			worker grievance redress mechanism.			- Encourage frequent breaks and job-rotation to reduce impact of the hot weather on workers. - Require workers to sign Code of Conduct - Develop policies against discrimination, forced and child labour, sexual harassment and all forms of abuse including restriction of right to unionize or freedom of speech. - Provide adequate training for farm workers on safety, GBV, SEA/SH, child labour/human rights, social norms. - Establish an effective grievance redress mechanism for farm workers						
		Sexual Harassment (SH) and Gender Based Violence (GBV)	Presence of migrant farm workers could increase incidents of rape, defilement and GBV.	Women	Moderate [4]	• Provide sensitization and training for farm workers on required lawful conduct, access to GBV service providers and legal consequences for failure to comply with laws on non-discrimination and GBV • Farm owners to be encouraged to employ females as farm workers.	Municipal MoFA/ Department of Community Development	100,000/9,488	Regional MoFA	Number of recorded incidents of GBV/SH cases	Review of records	During operation
		Child Labour	Employment and deployment of Children under the working age at the expense of their education and exposure to hazards that endanger their health and well-being.	Children	Moderate [4]	• Prohibit the employment of children under age 15 on farms. • Ensure children who spend time with their parents on the farm do not do so at the expense of their education and well-being.	Municipal MoFA/ Department of Community Development	50,000/4,744	Regional MoFA	Number of recorded incidents of child labour cases	Review of records	During operation
OS3	Resource Efficiency and Pollution Prevention and Management	Soil erosion and degradation	Abuse of fertilizer use could lead to soil degradation. Leaving farmlands bare especially after harvesting could expose the soil to erosion.	Soil	Moderate [4]	• Provide education to farmers on the MoFA extension guide on soil, water and nutrient management.	Municipal MoFA	100,000/9,488	Regional MoFA	Training of farmers on soil, water and nutrient management	Inspection/ review	During operation

AfDB No.	AfDB OS Description	Potential Impact/ Issue	Impact description	Receptor(s)	Significance	Proposed Mitigation and Management Measures	Responsibility (implementation/ supervision)	Estimated Cost (GHS/USD)	Monitoring responsibility	Verifiable Monitoring Indicator	Means of Verification	Timetable for Implementation
		Air Pollution	Use of farm machinery, clearing of dry lands and emission of fumes/dust from tricycles or motorcycles conveying farmers and farm produce especially on untarred routes from farms are some of the activities that have the potential of affecting the air quality within the project area. Stubble burning to prepare the field for the next planting season can also affect the air quality within the project area. Baseline air quality data i.e. PM2.5 – 30µg/m3, PM10 – 109µg/m3, NO2, SO2 and CO were all below the minimum detection limit of 0.06 mg/m3 at the time of sampling. This shows that the project area's airshed is not degraded as all parameters are within the emissions thresholds except for PM10 whose higher value could be attributed to high coarse particulate pollution, likely arising from mechanical disturbances during farming, vehicular movement, and possibly wind-driven dust due to the site's open, dry landscape. Emissions from farming activities such as tilling, threshing and transportation of farm	Health of farm workers and surrounding community members.	Moderate [4]	- Practicing No-till or Low-till methods where crop residues are retained on the field or incorporated into the soil can help decompose the stubble naturally, reducing the need for stubble burning. - Mobile, small-scale threshers can be used in place of manual threshing so as to reduce the amount of dust or rice chuff emitted into the atmosphere. - Minimizing dust generation activities as much as possible especially during windy periods. - Vehicle speed, particularly on untarred roads transporting farm produce and agric inputs to and from the farm will be strictly controlled to minimize dust generation.	Municipal MoFA	100,000/9,488	Regional MoFA	Training of farmers on good farming practices	Inspection of training records	During Operation

AfDB No.	AfDB OS Description	Potential Impact/ Issue	Impact description	Receptor(s)	Significance	Proposed Mitigation and Management Measures	Responsibility (implementation/ supervision)	Estimated Cost (GHS/USD)	Monitoring responsibility	Verifiable Monitoring Indicator	Means of Verification	Timetable for Implementation
			produce are therefore not expected to result in significant air quality deterioration.									
		Water Pollution	Sediment laden with excess fertilizers and other agrochemicals and waste oil transport into nearby water bodies. Pollution of watercourses caused by wastes generated by farm workers as well as runoff from land used for growing rice (containing fertilisers, pesticides and herbicides etc.).	The Gbafiong River water quality and other water which has gathered as ponds in the valley.	Moderate [4]	- Provide education to farmers on the MoFA extension guide on soil, water and nutrient management. - There will be proper timing in the application of fertilizers/herbicides and other agrochemicals considering the crop's nutrient needs and soil conditions in order to maximize fertilizer uptake and minimize leaching and runoff. - Implement Pest Management Plan (PMP) - Provision of on-site sanitation facilities and encourage the farm workers to use it. - Educate farm workers to avoid open defecation. - Sediments traps will be designed and constructed within the farm lands to contain contaminated sediments which will later be harvested for producing blocks for building.	Municipal MoFA	300,000/28,463	Regional MoFA	Training of farmers on good farming practices	Inspection	During operation
		Noise and Vibration	Noise from activities like tilling the land for the next planting season, threshing the rice after cultivating and screaming sounds from farmers or labourers to scare away birds can all generate noise. Tricycles and motorbikes conveying farmers and farm produce to the milling factories or markets could generate some noise including the sounds from tooting horns.	Health and wellbeing of farm workers and members of communities close to the project area	Moderate [4]	- Scare crows should be encouraged instead of the screaming sounds from farmers or labourers to scare away birds. - Use threshing machines with soundproofing devices	Municipal MoFA	50,000/4,744	Regional MoFA	Sensitization of farmers	MoFA participation in community engagement meetings	Throughout the operational phase

AfDB No.	AfDB OS Description	Potential Impact/ Issue	Impact description	Receptor(s)	Significance	Proposed Mitigation and Management Measures	Responsibility (implementation/ supervision)	Estimated Cost (GHS/USD)	Monitoring responsibility	Verifiable Monitoring Indicator	Means of Verification	Timetable for Implementation
		Solid waste generation and disposal	Improper disposal of waste, i.e. empty containers of agrochemicals and fertilizers which can serve as breeding grounds for mosquitoes. Threshing will produce rice husk that may pile up to form heaps of waste.	Health of farm workers and the Local community.	Moderate [4]	- Provide education to farmers on the MoFA extension guide on compost production using rice husk, straw, and other organic waste. - Provide adequate waste skips to collect empty containers of agrochemicals and fertilizers for disposal by a licenced waste management company. - Good housekeeping should be encouraged on farms. - Implement Pest Management Plan (PMP)	Municipal MoFA	75,000/7,116	Regional MoFA	Sensitization of farmers	MoFA participation in community engagement meetings	Throughout the operational phase
OS4	Community Health Safety and Security	Fire Outbreak	Fire outbreaks from negligence of farm workers and community members, burning refuse, game hunting, cooking and not properly extinguishing stubs of cigarette. These fires could spread to adjoining farms causing injuries to persons and destruction of property.	Rice farms, nearby vegetation, farm workers and local community.	Moderate [4]	- Create fire belts to prevent spread of fire into the active working areas. - Sensitize farm workers and community on the dangers of bushfires - Store flammable materials away from fire sources - Designate cooking and smoking areas on farms. - Provide fire-fighting equipment onsite - Train farm workers on fire fighting and where applicable include community fire volunteers	Municipal MoFA/GNFS/NADMO	100,000/9,488	Regional MoFA	Sensitization of farmers	Participation in community engagement meetings by MoFA/GNFS and NADMO.	Throughout the operational phase
		Traffic Management	Transportation of farmers and farm produce through communities raises traffic/public safety concerns.	Local communities	Minor [2]	- Drivers should exercise caution when driving through crowded areas such as markets. - Installation of speed rumps to check speeding vehicles. - Identify safe parking areas off main roads to allow for unloading and long-term parking of vehicles.	MoFA/Assembly	50,000/4,744	Regional MoFA	Records of traffic incident and accidents Community complaints/grievances	MoFA and Assembly participation in community engagement meetings	Throughout the operational phase
		Security Concern	Violent behaviour and confrontations between migrant farm workers and locals.	Farm workers and Local communities	Minor [2]	Sensitize local community on cultural tolerance and grievance mechanisms at community durbars to prevent confrontations	MoFA/Assembly	30,000/2,846	Regional MoFA	Records of traffic incident and accidents	MoFA and Assembly participation in community	Throughout the operational phase

AfDB No.	AfDB OS Description	Potential Impact/ Issue	Impact description	Receptor(s)	Significance	Proposed Mitigation and Management Measures	Responsibility (implementation/ supervision)	Estimated Cost (GHS/USD)	Monitoring responsibility	Verifiable Monitoring Indicator	Means of Verification	Timetable for Implementation
			Farm workers who are deemed to be financially sound could be victims of theft and burglary Potential conflict over sexual affairs, child labour, drunk driving, accidents and destruction of property.			- Migrant farm workers should be made aware of the community's cultural and traditional values/beliefs so they may not go against them. - Farm owners should prioritize employing locals into their farms especially the youth who may be unemployed which can ultimately lead to unrest or other social vices.				Community complaints/ grievances	engagement meetings	
		Polluted Waterbodies	Pollution of local water bodies from contaminated sediments and run-off will adversely affect the health of community members.	Farm workers and Local communities	Moderate [4]	Provide education to farmers on the MoFA extension guide on soil, water and nutrient management. Educate farm workers to avoid open defecation.	Municipal MoFA	50,000/4,744	Regional MoFA	Sensitization of farmers	MoFA participation in community engagement meetings	Throughout the operational phase
		Sexual Transmitted Diseases	Sexual relations between migrant farm workers and locals may bring about increase in sexually transmitted diseases including HIV/AIDs.	Farm workers and Local communities	Moderate [4]	Undertake sexual health education programs for farm workers to desist from irresponsible sexual behaviour.	Municipal MoFA/ Municipal Health Directorate	50,000/4,744	Regional MoFA	Sensitization of farmers	Participation in community engagement by MoFA and the District Health Directorate.	Throughout the operational phase
		Flooding	The project implementation could be adversely affected by events of flood from torrential rainfall in the wet season especially in low-lying areas affecting properties and lives.	Farmers, Local community, Flora and Fauna	Major [6]	- Educate farmers and community on early warning signs of flood. - Discourage the siting of farms within or close to river beds. - Collaborate with spatial planning and disaster management agencies, using disaster maps and systems, to stay away from flood-prone areas. - Infrastructure for agricultural establishments should be constructed preferably on high grounds. - Sensitive farmers on the benefits of insurance cover for equipment and personnel.	MoFA/Assembly/NA DMO	150,000/14,231	Regional MoFA	Sensitization of farmers	Participation in community engagement by MoFA, the Assembly and NADMO.	Throughout the operational phase

AfDB No.	AfDB OS Description	Potential Impact/ Issue	Impact description	Receptor(s)	Significance	Proposed Mitigation and Management Measures	Responsibility (implementation/ supervision)	Estimated Cost (GHS/USD)	Monitoring responsibility	Verifiable Monitoring Indicator	Means of Verification	Timetable for Implementation
		Risk of Drowning	Any borrow or dug-out pits created as a result of excavation of construction materials can accumulate water when it rains. This can pose the risk of drowning for communities in the project area especially children.	Farmers and Local community members	Moderate [4]	- Maintenance of dug outs or borrow pits fence to prevent drowning. - Provide and replace warning signage at borrow pit sites when necessary. - Sensitize community members on risk of drowning	Municipal MoFA	50,000/4,744	Regional MoFA	Sensitization of community members/ farmers	Participation in community engagement by MoFA.	Throughout the operational phase
Decommissioning Phase												
OS2	Occupational health and safety (OHS) impacts and risks	Project Site incidents/accidents	Project site accidents/incidents and animal/insect threat/bites	All Project workforce, Vulnerable categories of workers, Women	Major [6]	Develop and implement an Occupational, Health and Safety Management Plan that covers at a minimum good housekeeping, provision and use of PPE, incident/accident reporting and investigation, emergency response and training	Project Contractor	50,000/4,744	PIU	ESMP Records and purchase of PPEs, training on PPE use, house-keeping, emergency response etc.	Review of ESMP OHS audits	Immediately after construction
OS3	Resource Efficiency and Pollution Prevention and Management	Waste generation and Disposal	Clearance of vegetation at project site, construction debris, pieces of steel/metal, packaging materials, plastic pieces, human waste etc. if not disposed properly could clog drains and facilitate the outbreak of sanitary related diseases such as cholera.	Health of project workforce and members of the Local communities within the project area	Moderate [4]	- Ensure efficiency in the use of materials. - Reuse materials such as pieces of wood, and metals. - Recycle scrap metal - Ensure collection and proper disposal of construction debris - Provide adequate waste bins for waste collection and segregation - Sensitize workers on waste management - Develop SOPs for managing hazardous and non-hazardous waste. - Develop and ensure implementation of Pest Management Plan (PMP)	Project Contractor	120,000/11,385	PIU	Inventory of waste generated/ Disposed of	Inspection/ review of records/ inventory	Immediately after construction

AfDB No.	AfDB OS Description	Potential Impact/ Issue	Impact description	Receptor(s)	Significance	Proposed Mitigation and Management Measures	Responsibility (implementation/ supervision)	Estimated Cost (GHS/USD)	Monitoring responsibility	Verifiable Monitoring Indicator	Means of Verification	Timetable for Implementati on
OS4	Community Health and Safety	Traffic Management	Transport of materials and equipment to and from the project site through communities and townships raises traffic/public safety concerns. Broken-down, inappropriately parked or slow-moving haulage/construction trucks could lead to road accidents and traffic congestion especially on busy roads.	Local communities near the project area of influence	Moderate [4]	• Avoid transportation of materials and workers during peak hours • Train drivers on and ensure adherence to the Highway Code • Ensure regular maintenance of vehicles • Use flagmen and designated parking areas for safety onsite.	Project Contractor	50,000/4,744	PIU	Records of traffic incident and accidents Community complaints/ grievances	Review/ inspection of records	Immediately after construction

9.1 ESMP Implementation

9.1.1 Institutional Arrangement and Responsibilities

The institutional arrangement identifies the relevant institutions and actors involved with the implementation of the ESMP, their roles and responsibilities. The main institutions or actors concerned with the implementation of the Project and the ESMP related activities are provided in **Table 9-2**. The ESMP implementation activities will be under the overall guidance of the PIU.

Table 9-2: Roles and Responsibilities of Key Actors

Key Actors / Institutions	Description of Key Roles/Responsibilities	Duration	Reporting
PIU	- Responsible for project implementation in general. - Have the overall responsibility to ensure that the project implements the construction phase management and monitoring requirements provided in the ESMP. - Responsible for grievance redress procedure and its functioning and effectiveness of other litigation avoidance measures. - Oversee sensitization and awareness programmes. - Grievance Redress	Throughout project implementation	Monthly
Ministry of Food and Agriculture	- Project planning and design - Payment of compensations to PAPs, if any - Management of contract award - Compliance monitoring - Grievance redress	Preparatory and construction phases	Quarterly
EPA	- Issuing of environmental permit upon review and approval of ESIA - Adhoc monitoring of the sub project to ensure compliance with conditions of the Environmental Permit.	Throughout project implementation	Annually
Nandom Municipal Assembly	- Adhoc monitoring of project during the construction phase - Monitoring facilities during the operational phase of the project to ensure that it is working properly and help resolve operational phase challenges - Grievance Redress	Throughout project implementation	Annually

Key Actors / Institutions	Description of Key Roles/Responsibilities	Duration	Reporting
Project Consultant and Safeguards Specialist	- Ensure that project execution meets specified environmental, social, health and safety guidelines contained in the contract documents and ESMP - Issue site instructions to Contractors to ensure environmental and social mitigation measures are implemented by contractors - Grievance Redress	Duration of the Preparatory and Construction phases	As required
Works Contractors /Sub Contractors	- Contractors for the civil works will be responsible for construction and installations under the project according to project specifications and designs. - Contractors are responsible for reinstatement of all damaged properties. - Contractors are responsible for implementation of the construction phase mitigation measures provided in the ESMP - Responsible for presentation of monthly monitoring report to the PIU - Responsible for remedying defects committed during construction	Construction phase	Monthly
Grievance Redress Committee	To receive and find solutions to grievances	Preparatory and construction phases	Monthly

9.2 Monitoring and Reporting

At the project implementation stage, monitoring will be done to confirm the effectiveness of impact management, including the degree of success in implementing mitigation measures. During construction works, checks, reviews and inspections will be carried out to assess compliance with permit conditions. Monitoring will be done by the relevant institutions, the PIU, Agric Department, EPA, Nandom Municipal Assembly, Fire Service etc. A summary of impacts, mitigation, management and monitoring measures to be implemented is captured in **Table 9-3**.

E&S Monthly monitoring reports will be prepared by the works contractor and submitted to the PIU, EPA and Assembly. The E&S monthly monitoring reports will serve as the basis for EPA's compliance monitoring in line with the permit conditions, and verification of other environmental and social safeguard commitments.

A construction completion report, which is a compilation of outcomes of the monitoring activities, in compliance with EPA's permit conditions and for the records of the Municipal Assembly, will be prepared. The completion report will form the basis for EPA's final monitoring for project completion

and closure. Also, PIU will prepare E&S monthly monitoring reports and share with the lenders to show the extent of compliance with E&S requirements of the EPA and the Bank for the construction period.

9.3 Annual E&S Compliance Audits of the Project and Cost

The Annual Environmental and Social Performance Audit (ESPA) meets AfDB's OSS requirements. The project having a duration of 5 years, 5 audits will be carried out, including one audit per year. These audits will be carried out by an independent consultant who has not carried out any activity under the project. The terms of reference of the Audit as well as each audit report will be submitted to AfDB for review and approval. The PIU will recruit an independent consultant who will be responsible for carrying out annual environmental and social compliance audits of the sub-project.

It should be noted that the annual audit will concern the entire project, therefore the cost as shown below will cover the consideration of the entire project. Also, the cost of an annual audit for both ESIA and RAP is shown in the table below.

Cost of implementing environmental and social compliance audits

	Duration	Materials required for monitoring	No. of audits	Estimated cost of an annual audit (USD)	Total amount (USD)
ESPA	Once a year	Field vehicle	5	10,000	50,000
RAP Completion Audit	Once	Field vehicle	1	7,000	7,000
TOTAL (for 5 years)					57,000

Table 9-3: Environmental and Social Monitoring Plan

No.	Potential Environmental and Social Impacts	Monitoring Indicators/Mean of verification	Monitoring Site	Frequency	Responsibility (Implementation/ Monitoring)	Cost Estimate/ Year GHS (USD)
CONSTRUCTION PHASE						
1	Project site accidents/incidents	- Records of accidents, incidents and near misses. - Records of PPE disbursed - Housekeeping	Nandom Kpee and Nandom Ko valleys	Monthly	PIU Environmental and Social Safeguards Specialists	52,700 (5,000)
2	Poor labour working conditions	- Availability of copies of signed contracts - Human Resource Management Plan/Recruitment Policy - Complaints lodged by workers	Nandom Kpee and Nandom Ko valley construction sites	Quarterly	PIU Environmental and Social Safeguards Specialists	31,620 (3,000)
3	Soil impacts and sediment transport	- Observable change in turbidity of water in drains or water bodies - Observable oil sheen in drain - Observation of rills/gullies	Nandom Kpee and Nandom Ko valley construction sites and Immediate environs	Monthly	PIU Environmental Safeguards Specialist	42,160 (4,000)
4	Air and Noise Pollution	Number of complaints by community members/workers	Nandom Kpee and Nandom Ko valley construction sites and Immediate environs	Monthly	PIU Environmental Safeguards Specialist	52,700 (5,000)
5	Waste generation and inefficient management	- Number of mobile toilets and dustbins provided on site - Cleanliness of site/housekeeping - Odour - Presence of human waste on site	Nandom Kpee and Nandom Ko valley construction sites and Immediate environs	Weekly	PIU Environmental Safeguards Specialist	26,245 (2,490)

No.	Potential Environmental and Social Impacts	Monitoring Indicators/Mean of verification	Monitoring Site	Frequency	Responsibility (Implementation/ Monitoring)	Cost Estimate/ Year GHS (USD)
		Complaints by workers/community members				
6	Traffic accident risks/Public safety concerns	- Grievance records - Traffic related incidents/accidents - Records of accidents, incidents and near misses.	Nandom Kpee and Nandom Ko valley Farms and Immediate environs	Monthly	PIU Environmental and Social Safeguards Specialists	52,700 (5,000)
7	Fire outbreaks	- Fire related incidents/accidents - Records of fire incidents and near misses. - Number of functional fire extinguishers onsite	Nandom Kpee and Nandom Ko valley and Immediate environs	Monthly	PIU Environmental and Social Safeguards Specialists	52,700 (5,000)
8	Visual / Aesthetic Impacts	- Site tidiness. - Area cleared. - Community feedback (via GRM).	Nandom Kpee and Nandom Ko valley and Immediate environs	Monthly	PIU Environmental and Social Safeguards Specialists	5,375 (510)
9	Public health issues	- Number of sensitization campaigns - Number of condoms distributed to Contractor's staff in a month - Number of STD cases reported to local health facilities involving encounters with Contractor's staff	Nandom Kpee and Nandom Ko valleys construction sites and Immediate environs	Monthly	PIU Environmental and Social Safeguards Specialists	47,430 (4,500)

No.	Potential Environmental and Social Impacts	Monitoring Indicators/Mean of verification	Monitoring Site	Frequency	Responsibility (Implementation/ Monitoring)	Cost Estimate/ Year GHS (USD)
10	Security and SH/GBV concerns	- Number of conflicts/cases reported to the Grievance Redress Committee/Community Liaison Officer - Number of conflicts/cases dealt with by the Grievance Redress Committee - Number of crimes such as theft, defilement and rape reported, investigated, and concluded by the police involving the Contractor's workers	Nandom Kpee and Nandom Ko valleys construction sites and Immediate environs	Monthly	PIU Environmental and Social Safeguards Specialists	36,890 (3,500)
Sub Total						400,520 (38,000)
OPERATIONAL PHASE						
1	Farm accidents/incidents	- Records of accidents, incidents and near misses. - Records of PPE disbursed - Housekeeping	Nandom Kpee and Nandom Ko valley Farm	Monthly	Municipal MoFA Extension officers/ Regional MoFA	31,620 (3,000)
2	Poor labour working conditions	- Availability of copies of signed contracts - Complaints lodged by farm hands and other workers	Nandom Kpee and Nandom Ko valley Farms	Monthly	Municipal MoFA Extension officers/ Regional MoFA	42,160 (4,000)
3	Soil impacts and sediment transport	- Observable change in turbidity of water collected in the valley. - Observable oil sheen in the water. - Observation of rills/gullies	Nandom Kpee and Nandom Ko valley Farms and immediate environs	Monthly	Municipal MoFA Extension officers/ Regional MoFA	52,700 (5,000)

No.	Potential Environmental and Social Impacts	Monitoring Indicators/Mean of verification	Monitoring Site	Frequency	Responsibility (Implementation/ Monitoring)	Cost Estimate/ Year GHS (USD)
4	Air and Noise Pollution	Number of complaints by community members/farmhands	Nandom Kpee and Nandom Ko valley Farms and community	Monthly	Municipal MoFA Extension officers/ Regional MoFA	31,620 (3,000)
5	Waste generation and inefficient management	- Presence of toilet facilities and number dustbins provided on site - Cleanliness of site/housekeeping - Odour - Presence of human waste on site - Complaints by farm workers/community members	Nandom Kpee and Nandom Ko valley Farms and immediate environs	Weekly	Municipal MoFA Extension officers/ Regional MoFA	52,700 (5,000)
6	Traffic accident risks/Community safety concerns	- Grievance records - Traffic related incidents/accidents - Records of all accidents, incidents and near misses.	Nandom Kpee and Nandom Ko valley Farms / community and immediate environs	Monthly	Municipal MoFA Extension officers/ Regional MoFA	52,700 (5,000)
7	Fire outbreaks	- Fire related incidents/accidents - Records of fire incidents and near misses. - Number of functional fire extinguishers onsite	Nandom Kpee and Nandom Ko valley Farms and immediate environs	Monthly	Municipal MoFA Extension officers/ Regional MoFA	31,620 (3,000)
8	Community health issues	- Number of sensitization campaigns - Number of condoms distributed to farm workers or placed at convenient places in a month - Prevalence of STD cases reported to local health facilities	Nandom Kpee and Nandom Ko valley Farms / Nandom Kpee and Nandom Ko communities and immediate environs	Monthly	Municipal MoFA Extension officers/ Regional MoFA	47,430 (4,500)

No.	Potential Environmental and Social Impacts	Monitoring Indicators/Mean of verification	Monitoring Site	Frequency	Responsibility (Implementation/ Monitoring)	Cost Estimate/ Year GHS (USD)
9	Security and SH/GBV concerns	- Number of conflicts/cases reported to the Grievance Redress Committee/Community Liaison Officer - Number of conflicts/cases dealt with by the Grievance Redress Committee - Number of crimes such as theft, defilement and rape reported, investigated, and concluded by the police involving workers or patrons	Nandom Kpee and Nandom Ko valley Farms / Nandom Kpee and Nandom Ko communities and immediate environs	Monthly	Municipal MoFA Extension officers/ Regional MoFA	36,890 (3,500)
10	Risk of Drowning	Number of drowning cases reported and investigated involving unsuspecting community members and animals.	Dugout (from the previous sand winning site now used as water source)	Weekly	Municipal MoFA Extension Officers, Municipal Assembly/ Regional MoFA	31,620 (3,000)
Sub-Total						411,060 (39,000)
DECOMMISSIONING PHASE						
1	Project site accidents/incidents	- Records of accidents, incidents and near misses. - Records of PPE disbursed - Housekeeping	Nandom Kpee and Ko valleys	Monthly	PIU Environmental and Social Safeguards Specialists	52,700 (5,000)

No.	Potential Environmental and Social Impacts	Monitoring Indicators/Mean of verification	Monitoring Site	Frequency	Responsibility (Implementation/ Monitoring)	Cost Estimate/ Year GHS (USD)
2	Waste generation and inefficient management	- Number of mobile toilets and dustbins provided on site - Cleanliness of site/housekeeping - Odour - Presence of human waste on site - Complaints by workers/community members	Nandom Kpee and Ko valley construction site and immediate environs	Weekly	PIU Environmental Safeguards Specialist	31,620 (3,000)
3	Traffic accident risks/Public safety concerns	- Grievance records - Traffic related incidents/accidents - Records of accidents, incidents and near misses.	Nandom Kpee and Ko valley construction site and immediate environs	Monthly	PIU Environmental and Social Safeguards Specialists	52,700 (5,000)
Sub-Total						137,020 (13,000)
TOTAL COST FOR MONITORING						948,600 (90,000)

9.4 Needs assessment of the implementing institutions

The ESMP outlines mitigation measures, monitoring indicators, and stakeholder engagement protocols to manage potential impacts on land, water, biodiversity, and local communities. MoFA and its extension officers are the project implementers to operationalize the ESMP, given their role in agricultural oversight. This assessment evaluates their readiness and identifies support mechanisms required for successful implementation.

The assessment was conducted through:

- Review of MoFA's operational structure and extension services in the Nandom Municipality
- Consultations with district-level officers and relevant stakeholders
- Analysis of ESMP requirements and alignment with MoFA's existing mandates; and
- Identification of capacity gaps and resource constraints

9.4.1 Key Institutions

The main institutions to be involved with the implementation of the environmental and social management and monitoring plans include:

- Ministry of Food and Agriculture (MoFA);
- Project Implementation Unit (PIU);
- Environmental Protection Authority (EPA);
- Nandom Municipal Assembly;
- CSIR-Water Research Institute;
- CSIR-Soil Research Institute;
- Ghana National Fire Service (GNFS); and
- National Disaster Management Organization (NADMO).

9.4.2 Institutional Roles, Capacity Gaps and Recommendations

The capacity assessment presented in **Table 9-4** provides a holistic picture of institutional roles, their existing capacities, the gaps that may hinder performance, and actionable recommendations to close these gaps. The responsibility and budget to implement the recommendations have been included in the ESMP budget.

Table 9-4: Institutional Roles, Capacity Gaps and Recommendations

Institution	Role in ESMP Implementation	Capacity Assessment	Capacity Gaps	Recommendations
MoFA (Municipal & Regional)	Lead implementer; coordination, extension, safeguards compliance	Regional/Municipal offices have limited environmental and social safeguards knowledge. However, national divisional office has stronger capacity	Weak safeguards integration at local level; and limited tools for monitoring	Provide intensive training on safeguards compliance; Supply digital data collection tools; Integrate ESMP

Institution	Role in ESMP Implementation	Capacity Assessment	Capacity Gaps	Recommendations
				indicators into MoFA M&E systems
Project Implementation Unit (PIU)	Safeguards oversight and project management	Adequately staffed with environmental and social safeguards officers	Limited operational linkages with district institutions	Strengthen coordination platforms with MoFA, EPA, and District Assembly; and formalize reporting schedules
EPA (Regional Office)	Regulatory oversight; and participation in joint inspections	Strong technical expertise, but logistics constrained (e.g., transport, field equipment)	Inability to conduct regular field inspections due to lack of resources	Engage EPA to improve support at regional level such as vehicles, field logistics, and budget for regular compliance monitoring
Nandom Municipal Assembly	Local governance; grievance redress; community mobilization	Some competence in grievance handling, but limited awareness of safeguards	Weak capacity in grievance redress aligned with ESMP	Provide structured training on grievance mechanisms and safeguards at district/regional levels
CSIR – Water Research Institute	Technical monitoring of water quality	Adequate technical competence and facilities	Underutilized in field implementation	Formalize role in ESMP monitoring with budget and data-sharing mandate
CSIR – Soil Research Institute	Technical monitoring of soil quality	Adequate technical competence and facilities	Underutilized in project-specific monitoring	Formalize role in ESMP monitoring with budget and data-sharing mandate
GNFS (Regional/Municipal)	Fire education, prevention, and response	Strong institutional mandate, but inadequate fire hydrants, tenders, and trained personnel	Limited firefighting equipment; inadequate training capacity	Engage GNFS to improve fire-fighting equipment resources at the district level; build capacity on prevention and community training methods

Institution	Role in ESMP Implementation	Capacity Assessment	Capacity Gaps	Recommendations
NADMO (Municipal Office)	Disaster risk education, preparedness, and response	Active but under-resourced with limited staff and logistics	Staffing and logistical deficits constrain rapid response	Engage district NADMO to recruit additional staff; provide disaster response logistics (vehicles, equipment); and build staff capacity
NGOs/CSOs	Community engagement and sensitization	Active presence but limited technical expertise on safeguards	Weak technical understanding of ESMP safeguards	Provide training in safeguards, participatory monitoring, and technical engagement

MoFA should establish formal coordination mechanisms, including joint monitoring schedules and shared reporting platforms to enhance accountability and synergy across agencies.

9.4.3 Capacity Building Approach and Training Needs

Project institutions must fully understand the ESMP objectives, their statutory roles, and how safeguards compliance strengthens outcomes. Current institutional competence varies, with strengths in technical monitoring (e.g. CSIR, PIU) but weaknesses in safeguards integration, resource availability, and disaster/fire response systems (see **Table 9-4**).

The first step in pursuing capacity building has been to identify the specific capacity building needs of the various stakeholders. Capacity building should be viewed as more than training. It is human resource development and includes the process of equipping individuals with the understanding, skills and access to information, knowledge and training that enables them to perform effectively. It also involves organizational development, the elaboration of relevant management structures, processes and procedures, not only within organizations but also the management of relationships between the different organizations and sectors (public, private and community).

The capacity building will mostly be in the form of training workshops. A training workshop on the E&S Safeguards should be organized for the MoFA district and regional officers and the district assembly and should cover the following.

- Inclusion of environmental mitigation measures and penalties in contract documents of contractor and contractor supervision;
- Environmental screening and monitoring;
- Public/community participation techniques and procedures; and
- Grievance redress mechanism.

For each group, training will be provided at different level of expertise in different areas, and would include:

- In-depth training to a level that allows trainees to go on to train others, including environmental and social procedures where relevant; and
- Sensitization or awareness-raising in which the participants are familiarized with the significance or relevance of the issues, to the extent that they can identify potential or emergent problems and request further assistance as necessary.

9.4.4 Environmental and Social Monitoring

Environmental Monitoring

Indicator	Current Status	Gap	Recommendation
Soil and water quality tracking	Ad hoc, project-specific	Lack of standardized tools and training	Provide portable testing kits and training on sampling protocols OR Engage the CSIR to carry out the monitoring
Agrochemical use monitoring	Basic advisory role	No formal tracking or reporting	Integrate pesticide use logs into extension visits

Social Safeguards

Indicator	Current Status	Gap	Recommendation
Community engagement	Informal, reactive	No structured grievance or feedback system	Develop community liaison protocols and feedback channels
Gender and vulnerability inclusion	Limited	No disaggregated data or targeted support	Train officers on inclusive engagement and social impact monitoring

9.4.5 Technical and Operational Capacity

Training and Capacity Building

- **Environmental Modules:** Soil conservation, water management, biodiversity protection
- **Social Modules:** Stakeholder engagement, grievance redress, labor monitoring
- **Technical Skills:** GIS mapping, mobile data collection (e.g., KoboToolbox), ESMP reporting formats

Tools and Resources

- Field tablets or smartphones for data capture
- Budget allocation for transport, field visits, and community meetings
- Access to baseline environmental and socio-economic data

9.4.6 Coordination and Accountability

To ensure accountability and adaptive management:

- Develop ESMP indicators aligned with MoFA's monitoring and evaluation (M&E) systems
- Schedule quarterly monitoring visits and biannual inter-agency review meetings
- Establish feedback loops with community representatives for transparency

- Integrate ESMP findings into MoFA's agricultural extension dashboard for mainstreaming into daily operations

Recommendations

MoFA and its extension officers play a pivotal role in safeguarding environmental and social outcomes of the proposed project. To fulfil this role effectively, the following actions are recommended:

- **Capacity Building:** Deliver targeted training on ESMP components;
- **Resource Provision:** Equip officers with monitoring tools and digital devices;
- **Institutional Coordination:** Formalize partnerships with EPA, NADMO, GNFS and local authorities;
- **Community Engagement:** Establish inclusive and responsive communication channels;
- **Monitoring Systems:** Integrate ESMP indicators into MoFA's routine operations.

9.5 ESMP Budget to Implement ESMP

The project will require a total of Ghc4,808,170 (US\$455,319) to implement the ESMP as outlined in the table below:

Table 9-5: Estimated budget to implement ESMP

Project Stage	Project Activities	Estimated ESMP Cost (USD)	Estimated ESMP Cost (GHS)
Preconstruction (Preparatory) Phase	- E & S assessment and permit acquisition.	37,287	393,000
	- Training and completion of VLD forms.	427	4,500
	- RAP/LRP Implementation and capacity building for PIU.	13,237	139,520
	- Fencing of site to restrict vegetation clearance	2,841	30,000
	- Training of E&S officers on ESMP.		
- Sub Total		53,792	567,020
Construction Phase	- Development and implementation of an Occupational, Health and safety management plan.	4,735	50,000
	- Labour force management and training on safety, discrimination, GBV, SEA/SH, child labour/human rights and ethical conduct.	18,939	200,000
	- Erosion management and ESMP training for contractor's E&S team	16,098	170,000
	- Air quality deterioration abatement measures and PPE provision	5,682	60,000
	- Water pollution abatement measures	6,629	70,000
	- Noise abatement measures implementation and PPE provision	1,894	20,000
	- Waste management including hazardous and non-hazardous waste	11,364	120,000
	- Traffic management and road safety training for drivers	4,735	50,000
	- Implementation of fire prevention/fighting measures and training for workers and community	4,735	50,000
	- Management of grievances including GBV, SEA/SH, child labour/human rights	5,682	60,000

Project Stage	Project Activities	Estimated ESMP Cost (USD)	Estimated ESMP Cost (GHS)
	- Sensitization of workers and community on cultural tolerance and conflict management	2,841	30,000
	- Management and community sensitization on drowning risks	9,470	100,000
Sub-Total		92,804	980,000
Operation Phase	- Development and implementation of occupational health and safety plan/measures	28,463	300,000
	- Sensitization on good labour practices, rights and ethical conduct.	18,975	200,000
	- GBV sensitization for farm owners/workers	9,569	100,000
	- Child labour sensitization for farm owners	4,744	50,000
	- Education on soil, water and nutrient management for farmers.	9,488	100,000
	- Education of farmers on air quality deterioration abatement measures	9,488	100,000
	- Education on soil, water, and nutrient management, waste management, pollution prevention and PMP Implementation	28,463	300,000
	- Sensitization of farmers on noise abatement measures	4,744	50,000
	- Waste management including provision of skips, collection/disposal and education on composting	7,116	75,000
	- Fire risk management and sensitization of farmers on fire-fighting techniques.	9,488	100,000
	- Education of farmers on soil, water and nutrient management.	4,744	50,000
	- Sexual health education programs for farm workers to promote public health	4,744	50,000
	- Flood risk assessment and management	14,231	150,000
	- Sensitization of workers and community on cultural tolerance, and conflict management	2,841	30,000
	- Traffic management and road safety training for drivers	4,744	50,000
	- Management and community sensitization on drowning risks	4,744	50,000
Sub Total		166,508	1,755,000
Decommissioning Phase	- Development and implementation of an Occupational, Health and safety plan.	4,735	50,000
	- Waste management including hazardous and non-hazardous waste	11,364	120,000
	- Traffic management and road safety training for drivers	4,735	50,000
Sub Total		20,834	220,000
Grievance Redress Mechanism (GRM)		79,000	832,660
Resettlement Action Plan Implementation		11,026	116,210

Project Stage	Project Activities	Estimated ESMP Cost (USD)	Estimated ESMP Cost (GHS)
Environmental & Social Performance Audit		25,000	263,500
RAP Completion Audit		7,000	73,780
Sub Total		122,026	1,286,150
Total		455,319	4,808,170

10.0 DECOMMISSIONING

A Decommissioning and Site Closure Plan (DCP) is required to guard against the remote possibility of abandoning temporary constructed structures. Should such a circumstance arise, the potential would exist for impacts from abandonment of the facility such as aesthetic impacts and potential trespassing and safety concerns. This DCP is being posted to provide a guide on details of the decommissioning activities. The purpose of this conceptual DCP is to describe the general objectives for the post project land use, and the planning processes leading to development of a final DCP.

The specific objectives in managing the decommissioning process will be:

- To ensure that rehabilitation and decommissioning are carried out in a planned sequential manner, consistent with best practice;
- To ensure that agreed post-project land-use outcomes are achieved; and
- To avoid on-going liability.

A Full Decommissioning Report is expected to be prepared in the event of any such activity for approval by the EPA and any other requisite state agencies.

10.1 Pre-Decommissioning Assessment

Prior to any decommissioning, the EPA will be notified and an assessment will be carried out to identify any potential environmental impacts that need to be addressed and mitigated in the decommissioning process.

10.2 Decommissioning Phase Activities

Some of the activities that will be undertaken during the decommissioning phase will mostly be the dismantling and removal of structures and equipment.

10.2.1 *Dismantling and Removal of Structures and Equipment*

During decommissioning activities, the respective Planning Department and the EPA office shall have access to the site, pursuant to reasonable notice, to inspect the results of complete decommissioning.

The removal of installations, structures, and equipment would include a complete inventory of all hardware and capturing of their final operational status. Disposal of the hardware and documentation would be planned, including any environmental concerns that may dictate disposal method.

All decommissioning and restoration activities will be in accordance with all applicable state and local permits and requirements and will include the following specific activities:

- **Hardware retirement:** All power sources would be disconnected from structures and equipment before dismantling commences. Cranes and/or other machinery will be used for the disassembly and removal of structures and associated installations. These will either be transported whole for reconditioning and reuse or disassembled into salvageable, recyclable, or disposable components;

- **Foundation removal:** All foundation materials will be removed as per EPA guidelines or requirements. The remaining excavation will be filled with clean sub-grade material, compacted to a density similar to surrounding sub-grade material, and finished with topsoil;
- **Monitoring:** A monitoring and remediation period of two years immediately following the completion of any decommissioning and restoration activities will be undertaken. If agricultural impacts are identified during this period, follow-up restoration efforts will be implemented; and
- **Area restoration:** Areas where subsurface components are removed will be graded to match adjacent contours, stabilized with an appropriate seed mix, and allowed to re-vegetate naturally. All town roads, impacted by Project decommissioning activity, if any, will be restored to original condition upon completion of decommissioning.

10.2.2 Solid Waste Management

All solid waste resulting from the decommissioning process will be evacuated by handlers commissioned by the Municipal Solid Waste Department.

10.3 Post-Decommissioning Assessment

Removal of machinery, equipment and all other materials related to the project will be completed within one year of decommissioning. At the end of the decommissioning exercise, the EPA will be invited to carry out a post-decommissioning assessment to establish compliance with all regulatory requirements and issue a certificate to that effect. The Decommissioning and Closure Plan will be finalized and submitted to the relevant authorities for approval at least six months prior to closure of the site.

A report describing the performance of the final DCP in working towards its objectives, based on monitoring results, and the extent to which it has been complied with, will be submitted to the EPA. The report will be provided to documented stakeholders and will otherwise be publicly available on request. Files and documents used to collate information regarding closure commitments, licenses, approvals and other information concerning closure will be catalogued and maintained in accordance with standard practices.

11.0 CONCLUSION

The proposed project will be implemented in accordance with relevant national laws and best international practices provided by the applicable Operational Safeguards of the AfDB Integrated Safeguard System.

Stakeholders have been identified and their suggestions and concerns obtained through the consultation and engagement process have been highlighted in the report and addressed. A Stakeholder Engagement Plan (SEP) has been proposed to ensure continued engagement of all stakeholders and the implementation of a grievance redress mechanism to ensure harmony in the project implementation.

The potential adverse impacts of the project have been identified. Adequate mitigation measures have been proposed to manage the moderate to major adverse impacts. Also, management and monitoring plans have been designed to ensure that the proposed mitigation measures are adequately implemented. The institutional capacities have been assessed and gaps identified with recommendations.

The assessments have shown that the project generally has moderate impacts on the environment and the impacts could be further mitigated with the adoption of good environmental, health and safety practices. A Pest Management Plan (PMP) is required to ensure judicious and safe use of agrochemicals as well as safe disposal of obsolete chemicals and empty containers.

The Chiefs of the Nandom Kpee and Nandom Ko communities have donated the land for the project. A Resettlement Action Plan has been proposed to mitigate the livelihood impacts on thirty nine (39) farmers who will vacate their farm lands for use by the project.

The project holds immense benefit for the Nandom Kpee and Nandom Ko communities, the municipal and region regarding food security, job creation, growth of MSMEs, etc. The entire country will benefit from improved food security, increased knowledge and adoption of best agricultural practices for rice production, etc.

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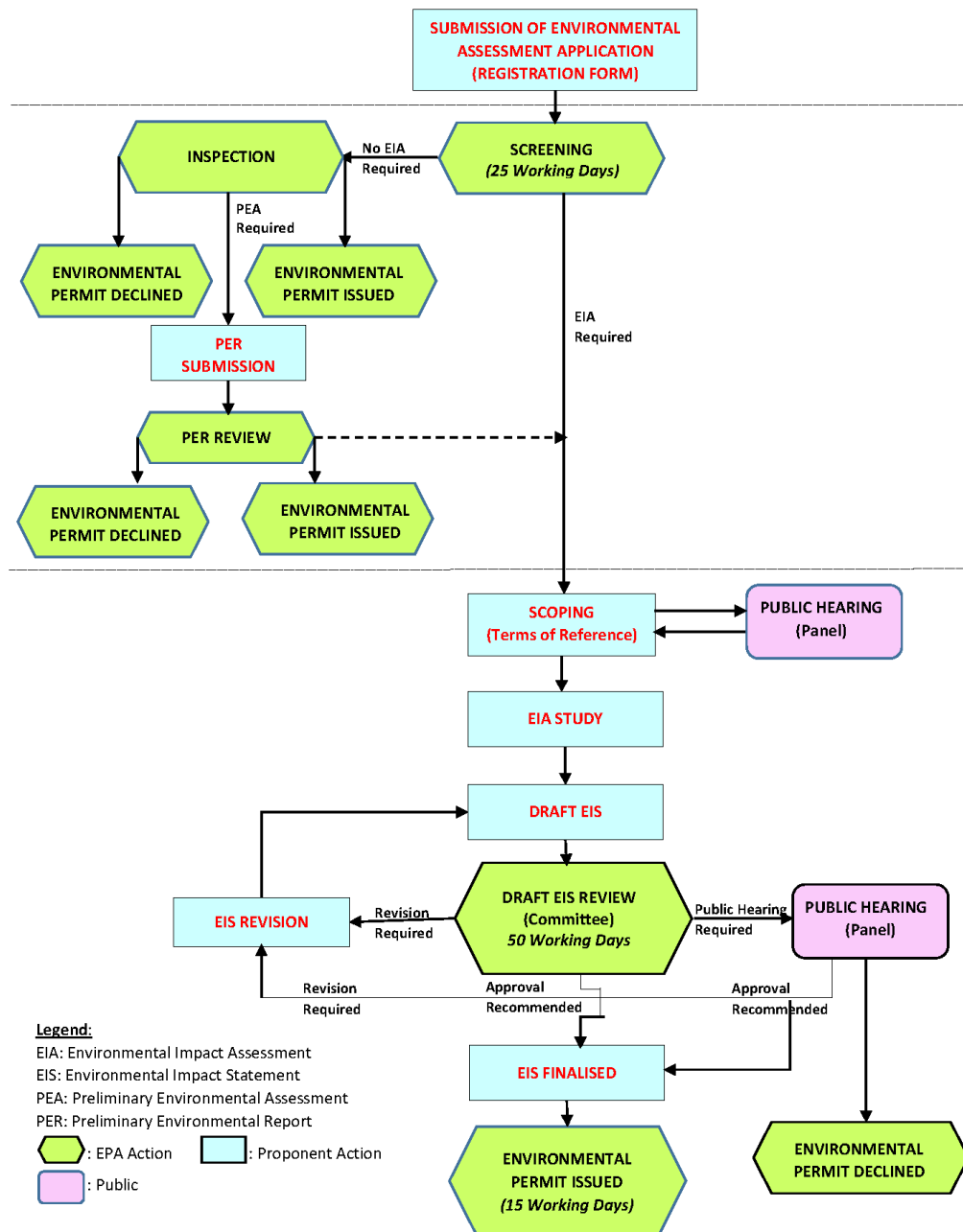
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13.0 ANNEXES

- Annex 1: Administrative flow chart of environmental assessment procedure
- Annex 2: List of environmentally sensitive areas
- Annex 3: Sample Code of Conduct
- Annex 4: Sample Grievance Form
- Annex 5: Details of Stakeholder Engagement
- Annex 6: Stakeholder Engagement Attendance Sheets

Annex 1: Administrative flow chart of environmental assessment procedure

Annex 2 List of environmentally sensitive areas

ENVIRONMENTAL ASSESSMENT REGULATIONS, 1999

SCHEDULE 3

(Regulation 30 (2))

ENVIRONMENTALLY SENSITIVE AREAS

1. All areas declared by law as national parks, watershed reserves, wildlife reserves and sanctuaries including sacred groves.
2. Areas with potential tourist value.
3. Areas which constitute the habitat of any endangered or threatened species of indigenous wildlife (flora and fauna).
4. Areas of unique historic, archaeological or scientific interests.
5. Areas which are traditionally occupied by cultural communities.
6. Areas prone to natural disasters (geological hazards, floods, rainstorms, earthquakes, landslides, volcanic activity etc.)
7. Areas prone to bushfires.
8. Hilly areas with critical slopes.
9. Areas classified as prime agricultural lands.
10. Recharge areas of aquifers.
11. Water bodies characterized by one or any combination of the following conditions -
 - a) water tapped for domestic purposes;
 - b) water within the controlled and/or protected areas;
 - c) water which support wildlife and fishery activities.
12. Mangrove areas characterised by one or any combination of the following conditions-
 - a) areas with primary pristine and dense growth;
 - b) areas adjoining mouth of major river system;
 - c) areas near or adjacent to traditional fishing grounds;
 - d) areas which act as natural buffers against shore erosion, strong winds or storm floods.

CLETUS AVOKA

Minister Responsible for the Environment

Date of *Gazette* notification: 26th February, 1999.

Entry into force: 24th June, 1999

Annex 3: Sample Code of Conduct

All the employees of the Contractor and support staff of Supervising Consultant shall adhere to the following Code of Conduct during the execution of the project:

1. Compliance with Applicable Laws, Rules and Regulations

- a. All employees shall perform their duties in accordance with the Labour Act, 2003 and other applicable labour laws in Ghana.
- b. Employees/key experts will enjoy freedom of association and expression as defined in the Constitution of Ghana and expressed in Labour Act, 2003 (Act 651) and other labour laws in Ghana.
- c. The Organization will not condone the activities of employees who achieve results through violation of the law or unethical business dealings. This includes any payments for illegal acts, indirect contributions, rebates, and bribery.
- d. The Organization shall not permit any activity that fails to stand the closest possible public scrutiny.
- e. Employees uncertain about the application or interpretation of any legal requirements should refer the matter to appropriate line supervisor
- f. Workers/employees who falsify their ages will be summarily dismissed as the company does not tolerate child and forced labour.
- g. The company will not tolerate any form of child or forced labour from any sub-contractor/employee who practice forced or child labour
- h. Employees are required to report suspected cases of child or forced labour on site to REWARD Environmental and Social Specialist, DOVVSU or Municipal Assembly.

2. Compliance with Applicable Health and Safety Requirements

- a. All employees' have the right and duty to ensure safe working conditions to the extent of exercising control over tools, equipment, machinery and processes and to express their views on working conditions that may affect their safety and health. Sub-contractors will do same for their employees
- b. Employees of the Contractor shall be responsible for removing themselves from danger as much as possible whenever they have good reason to believe that there is an imminent and serious danger to their safety or health. They should have the duty so to inform their supervisor immediately.
- c. Employees/key experts will be provided with the appropriate protective gear for the operations or activities and request for same before engaging in any activity associated with the works.
- d. No worker shall be allowed to undertake any work without wearing approved protective clothing/gear.
- e. Workers shall use and take care of personal protective equipment, protective clothing and facilities placed at their disposal and not misuse anything provided for their own protection or the protection of others
- f. First time offenders who are not in the appropriate protective gear will receive a verbal caution, second time offenders will receive a formal written caution, while multiple offenders will receive sanctions ranging from suspensions to dismissal.
- g. Except in an emergency, employees, unless duly authorised, should not interfere with, remove, alter or displace any safety device or other appliance furnished for their protection or the protection of others, or interfere with any method or process adopted with a view to avoiding accidents and injury to health.

- h. Every employee shall take reasonable care for their own safety and health and that of other persons who may be affected by their acts or omissions at work;
- i. Workers shall report to their immediate supervisor, and Health and Safety Officer, any situation which they believe presents a risk and which they cannot properly deal with themselves;
- j. Damaged or faulty electrical equipment such as power sockets, leads and appliances are removed from service.
- k. Damaged or faulty equipment should be replaced, or repaired by a qualified person as soon as possible.
- l. Power points should be protected by safety-shutters, or all vacant power points be covered by plastic plug protectors.
- m. Electrical appliances and leads should be kept away from water.
- n. All machines and vehicles should be turned off when not in use
- o. All employees shall comply with all the safety and health measures prescribed by the employer. Employees should not operate or interfere with plant and equipment that they have not been duly authorised to operate, maintain or use.
- p. Employees should not sleep or rest in dangerous places such as scaffolds, , garages, or in the vicinity of fires, dangerous or toxic substances, running machines or vehicles and heavy equipment.
- q. Supervisors should not assign employees to undertake activities that the later do not have necessary competence, training or certification or that has not been stated in their contract with the Company.
- r. Employees should not undertake any assigned activity for which you do not have necessary competence, training or certification or that has not been stated in their contract with the Company.
- s. Every employee is encouraged to contribute by integrating environmental sustainability issues as they relate to our industry into our business planning, strategies and decision-making.
- t. Employees shall avail themselves for all OHS, HIV/AIDS Gender Based Violence, Emergency Preparedness Training/Sensitization Programmes organized under the project.
- u. All Company employees should strive to conserve resources and reduce waste through re-use and other energy conservation measures.

3. Use of Illegal Substances

- a. No employee/key expert/sub-contractor shall report to work under the influence of alcohol or any substance considered as illegal under the laws of Ghana including marijuana.
- b. No employee shall smoke, consume alcohol or illegal substances while on duty, including lunches and during overtime meals, or on company property.
- a. Officers and directors may authorize, in advance, the consumption of alcohol for special occasions or for certain business meetings as long as such use is limited and does not violate other legal requirements.
- b. No employee shall under any circumstance engage in any work related to the organization under the influence of Alcohol or illegal substances even if consumption is permitted under the exception described above.
- c. Employees who violate this smoking and alcohol conduct standard may have their contract terminated.

4. Non- Discrimination

- a. Discrimination against any job applicant or employee on the grounds of colour, race, religion, age, nationality, sex, marital or family status, ethnic affiliation, pregnancy, sexual orientation, disability or other reason is prohibited.
- b. In certain cases, however, the requirements of safety regulations relating to specific positions/activities within a construction business will take precedence over clause 4(a).
- c. We do not employ any person below the legal minimum age (18 years) and will require commitments from suppliers and subcontractors to refrain from such practices
- d. Workers are not to undertake any assigned activity for which they do not have necessary competence, training or certification or that has not been stated in their contract with the Company.
- e. Recruitment, job transfer and progression, remuneration and training and award of discretionary bonuses when applicable are determined solely by the application of objective criteria, fair and unprejudiced opinion, personal performance and merit.
- d. Recruitments, transfers, training, maternity leave and standard terms and conditions will be done in accordance within line Ghana Labour laws.
- e. Employees who perceive that they have been discriminated against can seek redress through their supervisor, Environmental, Health and Safety Officer, management and/or the Ministry of Labour and Social Welfare.

5. Interaction with Community

- a. The Company strives to cultivate a local identity in each of its host communities by setting good corporate citizenship standards, while respecting local sensitivities.
- b. The Company will regularly contribute to the economic and social development of communities, and expects all employees to promote human rights and respectful community involvement anywhere it operates.
- c. Employees should comply with the norms, laws, rules and regulations applicable to the host communities except in cases where they are in conflict with that of Ghanaian laws.
- d. In a case where an employee perceives that the laws, rules and regulations of host communities are in conflict with that of the company, employees are to refer such cases to their supervisor, Environment, Health and Safety Officer or manager for further clarification at the Ministry of Labour and Social Security

6. Sexual Harassment

Sexual Harassment would be considered as unwelcome conduct of a sexual nature which makes a person feel offended, humiliated and/or intimidated. It includes situations where a person is asked to engage in sexual activity as a condition of that person's employment, as well as situations which create an environment which is hostile, intimidating or humiliating for the survivor

- a. Sexual harassment is unlawful.
- b. This company does not tolerate sexual harassment in any form.
- c. Every employee has a responsibility to ensure that sexual harassment does not occur.
- d. No employee shall under any circumstance sexually engage another either by the use of words or actions. Some acts that may be considered as sexual include;
 - *an unwelcome sexual advance*
 - *a request for sexual favours*
 - *unwelcome comments about someone's sex life or physical appearance*
 - *sexually offensive comments, stories or jokes*
 - *displaying sexually offensive photos, pinups or calendars, reading matter or objects*
 - *sexual propositions or continued requests for dates*

- *physical contact such as touching or fondling, or unnecessary brushing up against someone*
 - *Indecent assault, defilement or rape (these are criminal offences).*
- e. Any employee who believes he or she has been a target/survivor of sexual harassment is encouraged to inform the offending person orally or in writing that such conduct is unwelcome and offensive and must stop or to report the unwelcome conduct as soon as possible to a supervisor, management or the environmental and social officer of GASSLP representative on the Project Grievance Redress Committee or the nearest DOVVSU or Police Station
 - f. Reports of sexual harassment will be treated promptly, seriously and confidentially.
 - g. Complainants have the right to determine how a complaint will be treated and knowledge of the outcome of investigations.
 - h. Anyone found to have sexually harassed another person will be handed over to the Family Support Unit of the Ghana Police Force.
 - i. No employee will be treated unfairly as a result of making a complaint of sexual harassment. Immediate disciplinary action will be taken against anyone who victimizes or retaliates against someone who has made a complaint of sexual harassment.
 - j. For the purposes of reporting and dealing with sexual harassment and crimes, the Company will provide a hot line to a management level personnel for reporting cases of sexual abuse and harassment.
 - k. Rape, defilement and assault cases shall be reported to FSU of the Ghana Police Force by survivor or other employees'

7. Violence or Exploitation

- a. No employee shall bear any weapon on site unless he/she has been authorized and have a legitimate business reason to do so. Even so, this will have to be with the permission of the appropriate supervisor, manager and conformity with the laws of Ghana.
- b. The company is committed to maintaining a safe and secure workplace and working environment. Acts or threats of physical violence, intimidation, harassment or coercion, stalking, sabotage, and similar activities are not tolerated.
- c. Employees who engage in acts or threats of violence, outside of self-defense, shall be dismissed and handed over to the Police Station.
- d. Employees are expected to treat all individuals with respect, tolerance, dignity and without prejudice to create a mutually respectful and positive working environment.

8. Protection of Children

- a. As much as possible, employees' are to avoid bringing any person under 18 to work on the project site) unless with permission from Environment, Health and Safety Officer.
- b. Every employee shall himself be responsible for the safety and wellbeing of any person under age 18 years brought to work by them. *Physical contact with children can be misconstrued both by the recipient and by those who observe it, and should occur only when completely nonsexual and otherwise appropriate, and never in private.*
- c. One-on-one meetings with a child or young person are best held in a public area; in a room where the interaction can be (or is being) observed; or in a room with the door left open, and another employee or supervisor is notified about the meeting.
- d. Avoid any covert or overt sexual behaviors with children on site. This includes seductive speech or gestures as well as physical contact that exploits, abuses, or harasses.
- e. Employees are to provide safe environments for children and youth at all times on site

9. Sanitation Requirement

- a. The company shall provide and maintain sanitary facilities (according to building regulations) for all employees to ensure their total health and safety. All such facilities shall be labelled with inscription in English for the understanding of every employee.
- b. Every employee/key expert shall be responsible for the appropriate use of sanitary facilities including toilets, bathrooms and refuse bins/skip containers where provided.
- c. No employee shall resort to other inappropriate means of defecation or urination (open defecation or indiscriminate disposal of refuse or urination on the company's compound or project site) apart from what has been prescribed by the company.
- d. Any act of indecency with respect to the use of sanitary facilities shall attract punitive actions including suspensions or even dismissals.

10. Avoidance of Conflict of Interest

- a. The Company expects that employees will perform their duties conscientiously, honestly, and in accordance with the best interests of the Organization.
- b. Employees/key experts must not use their positions or the knowledge gained as a result of their positions for private or personal advantage.
- c. Regardless of the circumstances, if employees sense that a course of action they have been pursued, or are presently pursuing, or are contemplating pursuing may make it difficult to perform the work objectively, they should immediately communicate all the facts to their supervisor.
- d. An Employee or a member of his or her immediate family shall not receive improper personal benefits as a result of his or her position in the Company.
- e. Any situation that involves, or may reasonably be expected to involve, a conflict of interest with the Company should be disclosed promptly to supervisors/ managers.

11. Protection and Proper Use of Property

- a. All employees unless otherwise directed are responsible for the proper acquisition, use, maintenance and disposal of company assets (e.g., materials, equipment, tools, real property, information, data, intellectual property and funds) and services. Acquisition of assets should be in compliance with procurement standards of the company.
- b. Any act of theft, carelessness, and waste on the part of an employee shall attract sanctions including the termination of one's work contract.
- c. Every employee shall do their part to protect the company's assets and ensure their efficient use.
- d. Unless otherwise permitted by management, Company guidelines and procedures, the appropriation of Company property by employees for personal use, or for resale is strictly prohibited.
- e. Similarly, you are not permitted to use your authority over other employees to use Company resources for personal benefit.
- f. On termination of and at any other time during your employment when requested you must hand over Company's assets and records stored in whatever format or medium.
- g. The Company strictly prohibits any access, usage or disclosure of employees' personal data without legitimate authorization. Employees should note that the Company reserves the right to retrieve their e-mails transmitted via the Company e-mail accounts and to monitor your use of the Internet.
- h. Every employee shall use company assets only for legal and ethical activities.

12. Report of Violation of Code of Conduct

- a. Employees should promote ethical behavior and encourage other employees to talk to supervisors, managers or other appropriate personnel when in doubt about the best course of action in a particular situation.
- b. In order to protect our organization from unethical or illegal activity, it is your duty and obligation at all times to be watchful of the practices that you see occurring around you, to take reasonable steps to prevent or detect improper conduct, and to report any suspicion of fraudulent, abusive, unethical or illegal activity.
- c. All reports of misconduct or unethical behavior, conflict of interest, or illegal activity are to be handled as confidential and be treated seriously and discreetly.
- d. Employees may report anonymously should that be their preference.
- e. In the event of a grievance being raised to a manager relating to discriminatory behaviour or harassment, the manager must notify Human Resources immediately, irrespective of how trivial the complaint may appear.

13. Non-Retaliation

- a. The company will not tolerate any act of retaliation against anyone who, in good faith, reports known or suspected unethical or illegal misconduct, seeks advice, raises a concern, or provides information in an internal or external investigation or legal proceeding pertaining to the company.
- b. Allegations of retaliation will be investigated, as appropriate.
- c. Acts of retaliation (which may include firing or laying off, demoting, denying overtime or promotion, disciplining, denying benefits, failing to hire or rehire, intimidation or making threats) may lead to disciplinary action against the person responsible for the retaliation, up to and including termination of contract.
- d. Any employee who believes he/she has experienced retaliation, should report to his/her supervisor, manager or the REWARD Environmental and Social Officer.
- e. Any false accusation of retaliation would attract disciplinary actions even to the extent of termination of contract.

Implementation of Code of Conduct

- a. The Environment, Health and Safety Officer of the Contractor will be responsible for implementing and enforcing the Code of Conduct, while monitoring
- b. The following measures will be adopted to implement the Code of Conduct:
 - The Consultant will ensure that all employees/key experts and sub-contractors are given copies of the Code of Conduct for reference.
 - All employees on the assignment will be made to sign the Code of Conduct.

Annex 4: Sample Grievance Form**GRIEVANCE REGISTRATION FORM (FORM A) – For Complainant**Confidentiality Required: Yes ☐ No: ☐

Name (Complainant) Optional:.....

Contact Information (house number/ mobile phone):.....

Nature of Grievance or Complaint:.....

Details of Grievance:.....

.....

.....

.....

.....

.....

.....

Name (Receiver):..... Signature:..... Date:.....

Name (Filer):..... Signature:..... Date:.....

Relationship of Filer to Complainant (if different from Complainant):

.....

.....

Annex 5: Details of Stakeholder Engagement

Stakeholder/ Institution/ Location	Contact Person(s)	Role	Contact No.	Date	Concerns Raised/ Information Received	Pictures
Government Institutions – Category A						
Nandom Municipal Department of Agriculture	Abaching Esther Gaeten Baligi Issah Salifu	Coordinating Director Director of Agriculture, Plant protection & regulatory service	0243845050 0246334951 0241507290	2025-04-15	Compensation - If there are indications that there will be PAPs in the valley, they must be captured for the payment of appropriate compensation after valuation. - Possible compensation must cover structures and economic displacement as may be determined. - Compensation for land may arise if that is the requirement of the project. - Compensation must be based on proper valuation. Project Implementation - Crops grown are maize, sorghum, rice, beans, groundnut, millet, yam and soya. - The municipality is dominated by agricultural production activities. - The project should incorporate climate issues in the implementation. - Project activities (land development) should be timely before rains. - A refresher training needed on rice production for the people - More communities should be enrolled on the project. - The project will improve food security/livelihood, boost farmer income, improve rice value chain, increase rice yields, enhance farm income, and create jobs. - Irrigation development should be part of the project component to sustain the project. - Lands are mostly stool owned. • Challenges - Logistics (motor), funds (fuel), and inadequate staff are some of the challenges faced by the department. Recommendations - Agro-inputs from government will be required to boost the project. - Machinery for land preparation and processing should be provided.	
Water Resources Commission (WRC) / Nandom (Ko)	Tan Gifty	Technical assistant (meter reading/bill distribution)	0248558319	2025-04-23	Concerns/Recommendations - A committee should be set up for project site care. - Improve drainage, proper valley construction. - To minimize impact, the programme should consider constructing bigger canals for water passage. Intensive sensitization needed. Mechanized water sources needed. Project Impact – Project will improve livelihood, create jobs and increase income. No adverse effects anticipated. Water Use - Main use of water is for the preparation of pito (a local drink), drinking, and commercial (construction). Water Users - Food sellers, institutions, households, businesses. No competition over use. Permit procedure- A form is purchased for Ghs10 and sent to the regional office in Wa for processing/costing. • Disaster Profile - Flooding occurred last 3 years where crops and properties were destroyed.	

Stakeholder/ Institution/ Location	Contact Person(s)	Role	Contact No.	Date	Concerns Raised/ Information Received	Pictures
NADMO – Nandom Municipal	Fedelis Naaikuur	Account officer	0206720948	2025-04-16	• Concerns and Recommendation –There have to be more engagement with community members. – There should be clear understanding of the project goals. - Farmers can play a role in reducing impacts of disasters by planting early, stopping deforestation and creating fire belt on their farms. • Disaster – Most of the disaster that occur in the area include Bush burning, rainstorms, flooding and drought (peek rainy & dry seasons). • Food security- There is threat to Food security as a result of disaster. • Role of NADMO – Sensitize farmers on bush burning and Floods. This is done once in a while. • Challenges – They lack resources (transport, fuel, funds) for effective productivity.	
EPA – Wa (Upper West)	Fabians Aberinga	Program officer	0246484579	2025-04-15	• EPA Monitoring – The project will require environmental permit (before), Monitoring (during) and Assess impact/mitigation (after). - Monitoring via physical appearance, water/soil testing, and frequent monitoring. • Concerns/Recommendations – They should consider incorporate fish/snail farming to the programme. - Train extension staff. - Minimize chemical use. Ways to achieve that should be through organic fertilizers and manual weed control. • Project Impact: They believe the project will enhance food security by increasing food production. Concerns: Possible displacement of settlement which may result in conflict and the overuse of chemicals.	
Fire Service Nandom	Frederick Kuusangnayir, Ismail Jalilu, Abubakari Ramatu, Babai Aiden, Bomeh Clifford, Iddrisu Jahanata, Naadakogh Eric, Needome Peter, Nabie-ero Portia	In charge of Operations, Operations, Safety, In charge Watch, In charge Safety, Watchroom In charge, Operations, Driver 2ic, Administrator	0247955820, 0248409693, 0241400136, 0537765846, 0544817191, 0547658477, 0552100911, 0591084277, 0209852563	2025-04-16	• Fire Disaster – Fire mostly occur in the dry season between November and January. - Main cause of Fire is arson. • Community Sensitization – awareness creation for various communities to avoid deliberate or indiscriminate fire burning.	
Private Sector – Category B						

Stakeholder/ Institution/ Location	Contact Person(s)	Role	Contact No.	Date	Concerns Raised/ Information Received	Pictures
Commercial Farmer	Sylvester Aasom	Farm manager	0552106284	2025-04-16	• Project Implementation - The project will boost commercial agriculture production in the area. - Ready market for the rice produced will determine the sustainability of the project. - The project will enhance livelihood and improve household incomes. - The project can increase rice production volumes when implemented well. - Proper consultation with all beneficiary communities is necessary. • Recommendations - Extension services should be extended to the farmers. • Irrigation should be key in the project implementation.	
Small Holder Farmers Nandom (Ko)	Flavenu Be-iire, Gregory Mwenderi, Joseph Dery, Francis Dery, Titus Sinkang, Barely Siekang, Tangsegtaa Mary, Kale Elizabeth, Callistus Tengang	Chairman Secretary Organizer	0546872290 0540657631 0557587693 0559713922	2025-04-16	• Project Implementation - The project is a welcome development for farmers generally in the area. - Marketing of farm produce is a challenge which the project must intervene to resolve. - The project will improve income and livelihoods in the area. - Irrigation should be considered for the project to make farming sustainable. - Pest and disease control should be planned for the project. - Extension education and training should be offered to all farmers on the project. - Agriculture mechanization should be part of the project. - Improved seeds should be provided to farmer for cultivation. • Recommendations - Modern farming technology should be incorporated into the project design. • Agriculture infrastructure should be provided as part of the project.	
Small Holder Farmers Nandom-Kpee	Yiryang Thomas Bulmour Dominic Guo Martin Kuubertery Poukang Aayel Reginald Lambol Robert, Kalle Gregory Kaale Kennedy Kog Callistus Tamseb-Teb Anthony	Farmers Elder, Sub Chief Community Member Farmers	0554423670 0594787798 0207881330 0595068894 0554518110 0543300623 0595739839	2025-04-17	Project Implementation - The project will increase production, income levels. - All farmer groups interested in the project should be considered. - Marketing and processing of produce should be well planned before harvesting. - Pest and disease control should be planned for the project. - Extension education and training should be offered to all interested farmers on the project. Recommendations - Support farmers with mechanization service, inputs. The roads in the area should be improved.	

Stakeholder/ Institution/ Location	Contact Person(s)	Role	Contact No.	Date	Concerns Raised/ Information Received	Pictures
Aggregators / Nandom-Kpee	Dery Angelina	Agregator	0209027344, 0205837028, 0504449023, 0533109197, 0542719164	2025-04-16	Operations - They receive about 10 bags of rice a month from other aggregators. - They have a storage room where they keep their bag of rice. - They are sole proprietor received their license from the assembly and have been in operation since 2001. - They were not fully aware of the project. - They also engage in parboiling, milling, drying and cleaning. - They hire transport to convey their goods to the market for sales. Concerns/Recommendations- They need processing machines. - They need loans for their businesses. - They have difficulty selling since their produce takes long time before being bought - Impact won't be felt much if the community is not well informed. - No digital platforms Project Impact- They believe the project will Increase food production. Challenges - High transport costs, - Difficulty in market access, Lack of processing machine.	
FBO (Tietaa Group) / Nandom-Kpee	Niemebeke Francis, Landindome Anthony, Tiekyog Agnes, Naaluyir Angelina, Bonuzu Cecilia	Member, Organiser, Secretary, Ghairlady, Member	0543208999, 0246191899	2025-04-23	Concerns/Recommendations - Land acquisition won't be a problem if project abides by landlord conditions. - Need community sensitization for all stakeholders. Humbly plead for total collaboration. Project Impact- Boost rice production, reduce youth migration to the south in search of greener pastures. FBO Information: The Tietaa Group was established 2 years ago. - Its mission is to bring community members together and educate members on modern farming ways. It has been actively involved in other project interventions in the community.	
Suppliers (Farmer Life) / Nandom	Teleeb Philip Simon, Teleeb patience	CEO, Sells Manager	0543208999, 0246191899	2025-04-19	Concerns/Recommendations- They need capacity building and access to credit. - They have heard about the project. - Open to partnership (capacity building, credit access). Project Impact - It's going to Increase rice production/income and employment. - The project can have adverse effect such as soil erosion, land degradation if not well managed. Business Info - The Farmer Life company was established in 2019 and is registered under the EPA. - They operate all year-round and have a turnover of about 5,000. - Customers include Smallholder farmers which mostly comprise of 60 males, 10 females and 40 youth. Operations – They offer tech advice, market linkage. - They source from local people & foreign manufacturers. - They sometimes face stockouts due to high cost and few manufacturers available. - They use digital tools (Laptop) and don't offer credit. Don't access loans. Challenges – They have limited capital, storage, transport means. - They sometimes receive fake/low-quality products from the market. - Some of them lack the technical knowledge in the field.	

Stakeholder/ Institution/ Location	Contact Person(s)	Role	Contact No.	Date	Concerns Raised/ Information Received	Pictures
					- There are sometimes limited demand which affects business. - They do sometimes have regulatory issues. They need support for their business.	
Agro-Input Dealers / Nandom	Dong Richard Tinonetaar, Awudu Mariam	CEO (Tinonetaar), CEO (Farmer Life)	0241537323 0593291083	2025-04-19	Concerns/Recommendations: Need credit support. Business Info: Company was established in 2017 and licensed. Operations – They sell seeds, fertilizers, chemicals, tools and irrigation equipment for various crops. - They are mostly busy all year-round and have a turnover of about 30,000. - Customers include smallholder farmers which comprise of 60 male, 45 female and 40 youth. - They sometimes offer technical advice, market linkage and bundled inputs credit to 40% of their customers. - They source from local distributors and government. Challenges – They sometimes face stock outs due to storage, cost and lack of funds. - They have limited capital, storage and transport means. Farmers’ inability to buy and produce from them due to lack of funds making sales low for them.	
NGO (Holland Green Tech) / Nandom	Musah Muzaminu	Field Officer	0247281436	2025-04-20	Concerns/Recommendations – They want support for their organization with funds. - Support farmers to install irrigation facilities on their farms. - Impact of land acquisition on farmers. - They can help reduce impact by involving chiefs in the land acquisition. - They can also support the vulnerable. - The programme implementers can also involve them in the project. Project Impact -Project will have a Positive impact on farmers in the area by increasing rice production/income and employment. NGO Operations - Their focus is mostly on Vegetable seeds, irrigation, Green House installation etc. - They have been in operation for the past 2 years supporting farmers via community leaders/lead farmers. Challenge - Their pressing issue is lack of water, high irrigation cost. Impact – Project is going to increase rice production, income and employment.	
Community and Focus Group, – Category C						
Traditional Authorities Nandom (Ko)	Naa Thomas Domepeeh Gyereh Gregory Beyuo Aalangdong Prosper Dapilah Peter Aayel Cornelius	Chief of Ko Elders	0551470720 0554040162 0245417621 0551468707 0543299297	2025-04-17	Compensation - Land compensation may arise depending on the nature of negotiation and agreement arrived at with the proponent. - If people are found to be dependent on the earmarked land, some assistance must be extended to them. - Valuation must be conducted for properties fairly and honestly. Project Implementation - The project is laudable and will be important for the people. - Farming is prominent in the area and must be supported. - The lands in the project area are owned by the traditional authority and are available for the cultivation of rice as the project intend. - Irrigation for dry season farming should be part of the project as the dry season makes the people redundant. - Support for farmers should be consistent and timeous. - The project will help the communities and improve incomes and livelihoods. - Agro-inputs and other supports should be extended to the farmers. - Mechanization centers for the farmers should be set up to support land preparation. - Marketing and processing should be well planned and coordinated.	

Stakeholder/ Institution/ Location	Contact Person(s)	Role	Contact No.	Date	Concerns Raised/ Information Received	Pictures
					Recommendations - The traditional authorities should always be consulted on the project especially in respect of land acquisition. - Project implementation should be non-discriminatory and non-political.	
Traditional Authorities Nandom Kpee	Naawere Begel yen, Joseph Kuuvenibe, Dery Julia, Kundobuo Tagchuni, Bangfor Tadoor, Nyunyni Walieri	Chief of Kpee Elders	0535210485 0531384637 0551472867	2025-04-17	• Project Implementation - The lands in the project area are owned by the traditional authority and are available for the project. - The people are predominantly farmers and will be greatly involved in the project. - Irrigation for dry season farming should be part of the project. - Support for farmers should be consistent and timely. - Conflicts are not major issues in the area. - The project will help the youth and improve incomes and livelihoods. - Agro-inputs and other supports should be extended to the farmers. • Recommendations - Continuous engagement of the traditional authorities and the people on the project should be prioritized. - The road network is poor and should be improved. • Project implementation should be non-discriminatory.	
Men Group Nandom (Ko)	Daata Robert Lanbol Albert Naabieka Inatious Kulem Amasuou Aayel Reginald Kalle Gregory Kog Callistus	Head Man Community Member Animator Elder Sub Chief Community Member Member	0554906616 05344579929 0256818448 0595068894 0554518110 0595739839	2025-04-17	Project Implementation - The project will improve food security in the region and its laudable. - The project should provide the necessary support to men and other interested persons to undertake the rice production. - Irrigation facility to help in dry season farming should be incorporated in the project. - Farm inputs and machinery for land preparation should be extended to all beneficiaries. - Those who are already farming at the site should be compensated. - Access road to the project site should be worked on. - Farmer support centers should be set up to help in land preparation. - The project has the potential to improve livelihood for men and enhance incomes. Recommendations - Government support for this project should be offered timeously - Processing and marketing of rice should be vigorously pursued. - All the necessary support that needs to be provided by the project proponent should be available.	

Stakeholder/ Institution/ Location	Contact Person(s)	Role	Contact No.	Date	Concerns Raised/ Information Received	Pictures
Men Group Nandom Kpee	Kuunibe Joseph Mwinyang Dominic Bangfo Kuubio Kuunibe Peter Aratuo Festus Begarebogr Raymond Yiryang Thomas Saabnuu Der Bangfo Francis	Member Member Member Men Organizer Member Member Member Member	0248320309 0245129491 0551973290 0247737946 0248585376 0256897464 0554423670 0505423553 0541912158	2025-04-17	Project Implementation - Men have easy access to land and can fully participate in the project. - The men are mostly farmers and support the project. - The project could help improve food security in the area and the region. - The project should provide the necessary production incentives to encourage more men to be involved. - Agro-inputs and machinery for land preparation should be provided by the project. - Irrigation facility to help in dry season farming should be incorporated in the project. - Those who are already farming at the site should be compensated. - Access road to the project site should be worked on. - Farmer support centers should be set up to help in land preparation. - The project should be open to all persons in the area including the youth and women. Recommendations - Government and NGOs should fully support the project. - Processing and marketing of rice should be vigorously pursued. • The roads should be improved in the area for easy mobility.	
Women Group Nandom Kpee	Sombuor Eunice Nifaakang Gladys Aapuobe Grace Eru Tieruwel Zaba Alice Naawerebagr Emila	Farmers	0548159811 0593444356 0596150770 0541912158	2025-04-18	Project Implementation - There are women groups in farming that can be supported to engage in the project implementation. - The women support the project as it will boost income and livelihood if implemented effectively. - Support should be extended to women in terms of agro-input provision. - Land preparation support should be given to the beneficiaries. - Irrigation as a component of the project should seriously be considered. - The selection of women to partake in the project should be fair. - Adequate training should be provided to all farmers to be placed on the project. - Extension services by the Agric department should be effectively undertaken. - Improved seedlings should be the choice for the project to enhance crop yield. Recommendations - Processing and marketing to guarantee prices should be led by the project proponent. - All necessary support to make the project a success should not be withheld from the farmers. Infrastructure for the project should fully be provided to make the project sustainable.	
Youth Group Nandom (Ko)	Andrews Dery Martin Billley Vitus Yirwille Clement Kyorku Vitus Dabuo Baawuo Oswald Christopher Kpime Theresa Kuuper Esther Dabuo	Farmer Organizer Chairman Member Women's organizer	0537443843 0530721680 0240206804 0241126217 0555426306 0240087845 0546259421 0594842064 0256992112	2025-04-17	• Project Implementation - The project will help the youth in the farming business. - Support should be extended to them in the form of inputs - Agriculture mechanization should be set up as part of the project to support land preparation. - The project will help to manage the increasing migration of the youth down south. - Irrigation for dry season farming should be integral in the project implementation. - Training on modern agronomic practices should be offered to the youth to engage well in the farming activities. - The project will help to curb unemployment among the youth in the communities. • Recommendations - The selection of beneficiaries should be apolitical. - Attention should be given to the provision of input support as the youth do not have the resources to buy inputs. - Extension education and training should be part of the project Processing and marketing issues should be resolved by the project before implementation.	

Stakeholder/ Institution/ Location	Contact Person(s)	Role	Contact No.	Date	Concerns Raised/ Information Received	Pictures
	Mercy Zinale		0595570577			
Youth Group Nandom Kpee	Haruna Basit Issahaku Muniru	Youth leaders	0241299383 0204412799	2025-04-18	Project Implementation - Attention should be given to the provision of input support as the youth do not have the resources to buy farm inputs. - Extension education and training to the youth should be part of the project - Processing and marketing issues should be resolved by the project before commencement. - The project will help the youth in income generation. - Support should be extended to the in the form of inputs and tools. - Agriculture mechanization should be set up as part of the project to support land preparation. - The project will help to manage the increasing migration of the youth down south. - Irrigation for dry season farming should be integral in the project implementation. - Training on modern agronomic practices should be offered to the youth to engage well in the farming activities. - The project will help to curb unemployment among the youth in the communities. Recommendations - Further Community sensitization on the project is needed. - The selection of beneficiaries should be non-partisan. The road network to facilitate easy movement is bad in the area and should be improved.	

Time 09:01

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Final ESIA Report _REWARD Project _Kpee and Ko Valleys (Nandom)
October 2025

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