



MINISTRY OF FOOD AND AGRICULTURE

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

FOR

**TAMALE METROPOLITAN AREA
SUB-PROJECTS**

**SAVANNAH AGRICULTURE VALUE CHAIN
DEVELOPMENT PROJECT (SADP)**

FINAL REPORT

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ACRONYMS AND ABBREVIATIONS

1D1F	One District One Factory
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
DCP	Decommissioning and Site Closure Plan
DEMC	District Environmental Management Committees
EA	Environmental Assessment
EIS	Environmental Impact Statements
EPA	Environmental Protection Agency
ESIA	Environmental Impact Assessment
ESMP	Environmental and Social Management Plan
FAREC	Feed Africa Response to the Impact of COVID-19
FASDEP	Food and Agriculture Sector Development Policy
FAW	Fall Army Worm
FBGs	Farmer Based Groups
FBOs	Farmer Based Organizations
FID	Factories Inspectorate Division
GIDA	Ghana Irrigation Development Authority
GNFS	Ghana National Fire Service
GRC	Grievance Redress Committee
ICPM	Integrated Crop and Pest Management
MED	Metro Education Directorate
METASIP	Medium Term Agriculture Sector Investment Plan
MoFA	Ministry of Food and Agriculture
NADMO	National Disaster Management Organization
OSs	Operational Safeguards
PAPs	Project Affected Persons
PCR	Project Completion/Technical Review
PCU	Project Coordinating Unit
PFJ	Planting for Food and Jobs
PSC	Project Steering Committee
RCC	Regional Coordinating Council
RFJ	Rearing for Food and Jobs
SADP	Savannah Agriculture Value Chain Development Project
SAPIP	Savannah Zone Agriculture Productivity Improvement Project
SDHMT	Sub-district Health Management Team
SIP	Savannah Investment Programme
SPS	Sanitary and Phytosanitary
TAAT-s	Technologies for African Agricultural Transformation
TaMA	Tamale Metropolitan Assembly
UNFCCC	United Nations Framework Convention on Climate Change
WRC	Water Resources Commission

NON-TECHNICAL EXECUTIVE SUMMARY

0.1 OVERVIEW OF THE PROJECT

The Savannah Agriculture Value Chain Development Project (SADP) is being implemented by the Government of Ghana through the Ministry of Food and Agriculture to serve as part of post COVID-19 reconstruction efforts aimed at addressing disruptions in food systems in Ghana. It builds on earlier successes under the Savannah Zone Agriculture Productivity Improvement Project (SAPIP) and Savannah Investment Programme (SIP) that have so far expanded the production of maize and soybean from 80 hectares in 2018 to 14,000 hectares in 2021. This program is expected to build on the achievements made and to further expand production of rice, soybean and maize by additional 8,000 hectares by 2026. The SADP project, is being implemented in nine (9) different MMDAs across Ghana.

0.2 Objectives

The overall goal of the project is to increase production of livestock (particularly poultry meat), contribute to industrialization, youth employment and food security.

0.2.1 Specific Objectives

The project is expected to

- contribute to the Government's industrialization agenda, including One District One Factory (1D1F),
- support skills development and entrepreneurship for women and youth, and build resilient food systems in the savannah areas of northern and middle belts of Ghana.
- facilitate private sector investment in value chains associated with meat production, improved productivity and production of feedstock made up of rice, maize and soybean

0.3 Components and main activities

No	Component Name	Sub-Component and Activities
1	Production Development	<u>Sub-component 1.1 Commercial Production of Maize and Soybean under Conservation Agriculture</u> • Production and promotion of certified hybrid maize and improved soybean seeds, in collaboration with seed companies. • Support to land development and mechanisation services. • Training of producers, haulers, aggregators and marketers on sanitary and phytosanitary (SPS) issue relating to maize and soybeans • Farmer mobilisation and awareness creation on conservation agriculture. • Train project staff and farmers on Integrated Crop and Pest Management (ICPM), including biological control options for the management of Fall Army Worm (FAW) and aspergillus on Maize and Soybeans. • Conduct surveillance and collect data on pests attacking the Maize and Soybeans in the project zones with specific reference to FAW. • Support out-grower contractual arrangements • Use of ICT for soil suitability assessment and GIS mapping of commercial farms • Promotion of climate smart agriculture, environmental conservation best practices, including use of economic trees such as shea, dawadawa, mango, cashew etc • Community sensitization, Establishment of fire belts and enforcement of community fire by-laws to deal with the impact of bush fires.

No	Component Name	Sub-Component and Activities
		Promote the use of Nitrogen fixing inoculants to boost soybean yield
		<u>Sub-component 1.2 Promotion of Small and Medium Scale Commercial Poultry Production</u> - Input support to small and medium scale commercial poultry farmers (poultry cages, day old chicks, feed stock, vaccines, veterinary drugs, etc) - Supply of local chicken to vulnerable households, especially women headed households - Support to poultry diseases surveillance, diagnosis and control - Training and capacity building on business development, animal husbandry and health - Support to hatchery expansion, including parent stock for broilers, guinea fowls and local chicken
2	Agribusiness and Value Chain Development	<u>Sub-component 2.1 Value Addition and SME Development</u> - 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 poultry products, transport services, new agro-input delivery systems, etc) - Support and training of poultry producers on ISO 9000 & other necessary certification requirements on poultry to access premium market. - Support to feed millers to improve feed stock and expand processing capacity - Enhance investment facilitation and promotion to increase the number of commercial producers and processors in the Savannah regions - Support for cold chain development for chicken <u>Sub-component 2.2 Youth/Women Empowerment and Nutrition</u> - Promote other income generating activities for women and youth, including shea, dawadawa, mango, cashew production and processing - Support women and youth on marketing and supply of poultry products to key institutions and programs including the school feeding program - Capacity building for women and youth in small-scale commercial poultry business management and entrepreneurship, including mentorship. - Promote the consumption of local poultry and eggs to improve household nutrition, and in particular maternal and child nutrition to prevent stunting - Promote the breed improvement of local poultry through cockerel distribution program
3	Project Management and Institutional Support	<u>Sub-Component 3.1 Knowledge Management, Monitoring and Evaluation</u> - Development of annual work plan and budget - Establishment of results-based management system for M&E - Conduct Beneficiary Impact Assessment. - Conduct Project Mid-Term Review. - Conduct Project Completion/Technical Review (PCR). - Video and pictorial documentation of success stories - Undertake relevant studies, including socio-economic surveys, soil suitability surveys - Development and Implementation of Environmental and Social Management Plan (ESMP) - Enhance capacity to mobilize private sector investors in the maize-soybean-poultry industry
		<u>Sub-component 3.2 Project Coordination.</u> - Upgrade the project coordination unit with additional staff - Procure vehicles for PCU, office equipment and furniture as may be required. - Facilitate annual financial audits. - Facilitate procurement audit. - Facilitate Project Steering Committee (PSC) meetings.

0.4 Project Activities in the Tamale Metropolitan Area

The specific project activities to be implemented in the Tamale Metropolitan Area at the preparatory, construction and operation phases of the project implementation are:

0.4.1 Preparatory Phase

- Identification of potential beneficiary communities for the production of maize, soybeans and rice
- Conduct of relevant studies, including socio-economic surveys
- 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.

0.4.2 Construction Phase

- Provision of support for land development and access to mechanisation services.
- Production and promotion of certified hybrid maize and improved soybean seeds, in collaboration with seed companies.
- Promotion of climate smart agriculture, environmental conservation best practices, including use of economic trees such as shea, dawadawa, mango, cashew etc.
- Training and capacity building on business development, animal husbandry and health
- Enhance capacity to mobilize private sector investors in the maize-soybean-poultry industry

0.4.3 Operation Phase

- Support out-grower contractual arrangements
- Conduct surveillance and collect data on pests attacking the Maize and Soybeans 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.
- Promote the use of Nitrogen fixing inoculants to boost soybean yield
- 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 poultry products, transport services, new agro-input delivery systems, etc.)
- Support to feed millers to improve feed stock and expand processing capacity
- Enhance investment facilitation and promotion to increase the number of commercial producers and processors in the Savannah regions
- Promote other income generating activities for women and youth, including shea, dawadawa, mango, cashew production and processing
- Support women and youth on marketing and supply of poultry products to key institutions and programs including the school feeding program
- Capacity building for women and youth in small-scale commercial poultry business management and entrepreneurship, including mentorship.

0.5 Institutional and legal framework for implementation of the project

0.5.1 Roles and responsibilities of the project implementation entity (PIE)

- 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

0.5.2 Implementing agencies and other stakeholders for the implementation of the ESMP

Ministry of Food and Agriculture

- Project planning and design
- Payment of compensations to PAPs, if any
- Management of contract award
- Compliance monitoring
- Grievance redress

Environmental Protection Agency

- 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.

Tamale Metropolitan 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

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

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 PCU
- Responsible for remedying defects committed during construction

Grievance Redress Committee

- To receive and find solutions to grievances

0.5.3 Legislative and regulatory requirements for the implementation of the ESMP

The relevant legal and institutional frameworks include:

Policies and Plans

- Ghana Shared Growth and Development Agenda, 2010;
- National Environmental Policy, 2012;
- National Land Policy, 1999;
- National Water Policy, June 2007;
- National Climate Change Policy, 2013;
- National Gender Policy, 2015;
- Riparian Buffer Zone Policy, 2014;
- National Irrigation Policy, June 2010;
- 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 Agency Act 1994, Act 490;
- Environmental Assessment Regulations 1999, LI 1652
- Fees and Charges (Amendment) Instrument, 2019 (LI 2386);
- 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

- The Irrigation Development Authority Regulations, 1987 (L.I. 1350)
- Irrigation Development Authority (Irrigation Water Users Association) regulations, 2016 (LI 2230);
- 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 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 Environmental and Social Baseline Conditions

0.6.1 Project location in Tamale Metropolitan Area

The Tamale Metropolitan Assembly, one of the country's six Metropolitan Assemblies and the only Metropolis in the five Northern Ghanaian regions, namely the Upper East, Upper West, Northern, North East, and Savannah. Tamale is both the metropolitan and regional capital of the Northern Region. It is located in the central part of the Region and is bounded to the north-west by Sagnarigu Municipality, to the east by Mion District, to the south by East Gonja, and to the south-west by Central Gonja. The Metropolis has a total estimated land size of 454 sqkm and located between latitudes 9°16 and 9° 34 North and longitudes 0° 36 and 0° 57 West

0.6.2 Direct influence area

The immediate geographical area of influence of the project will be beneficiary communities, which have been identified based on the availability of vast land for commercial farming. Table xx describes the environmental and social conditions in these communities. Considering that the environmental and social characteristics are largely homogeneous, broader reference is made to information on the Tamale Metropolitan Area, where the project communities are located.

0.6.3 Indirect influence area: Tamale Metro District

The entire Tamale Metropolitan Area (TaMA) is largely the indirect influence area as all the beneficiary communities fall administratively under TaMA.

0.7 Environmental baseline conditions and major environmental stakes/challenges

0.7.1 Physical Environment

The area is generally flat with gentle undulating low relief and altitude ranging from 400 to 800 ft. above sea level. The area has relatively few seasonal water bodies that dry up in the dry season. The only natural water systems are a few seasonal streams which have water during the rainy season and dry up during the dry season.

The Metropolis has sandstone, gravel, mudstone and shale weathered into different soil grades as its major soil types. Owing to seasonal erosion, soil types resulting from this phenomenon are sand, clay, and laterite ochrosols. In the rural parts, the soil type is sandy loam and it is suitable for growing crops such as millet, maize, guinea corn, groundnuts, yam, and beans.

The area is characterized by two main seasons, the dry and the raining seasons with an annual average rainfall of 1200mm. The dry season starts from late October to early May followed by the raining season from late May to early October. Farming activities noted for the dry season are harvesting of rice, cassava, yam, drying of foodstuffs, preparation of farmlands and raising of yam mounds.

The rainy season is characterized by inaccessibility of some parts of the Metropolis due to bad roads. This period, June to early August, is also associated with lean or food shortage. Cultivation and sowing is also done during this period.

0.7.2 Biological Environment

The Metropolis lies within the Savannah Woodland Region of the country. The trees in this part of the country are short and scattered wood lots. Major tree types are the Shea, Dawadawa, Nim, Acacia, Mahogany, Baobab among others.

There are two main forest reserves located in the central part of the Metropolis namely the Nyohini and Agric Forest Reserves. However, these are being encroached upon by private developers (restaurants, petty traders and other businesses) with other portions used for open defecation. There are naturally grown tall grasses during the rainy season that are woven into a mat called “Zanamat”, (a type of local mat for roofing and also for fencing).

0.7.3 Social baseline conditions and major social stakes/challenges

The General Assembly of the Metropolis stands at a total of 62 members. Out of this number, 41 are elected, 18 appointed, 2 Members of Parliament and the Metropolitan Chief Executive. For effective implementation of policies in the Assembly, the Metropolitan Authority has the following Sub-Committees: the Development Planning Sub-Committee, Works Sub-Committee, Social Services Sub-Committee, Revenue Sub-Committee, Education Sub-Committee, Environment and Sanitation Sub-Committee, Finance and Administration Sub-Committee, Justice and Security Sub-Committee.

There are paramount and sub-chiefs who provide leadership at the local level and promote peace, stability and development. Key traditional rulers include the Dakpema, the Gulkpe Naa, the Lamashe Naa and the Banvim Lana. Also supporting local development efforts at that level are the Assembly members, NGOs, Women groups and other identifiable groups.

The Metropolis has a total population of 374,744 comprising 185,051 (49.4%) males and 189,693 (50.6%) females. This is about 16.2% and 1.2% of the regional and national population, respectively.

The population density is 825 per sqkm with a total of 89,011 households and a household size of 4.1 persons per household which is lower than the regional average of 5.2. Currently, 60.1% of those aged 11 and up are literate, while 39.9% are illiterate. About 27.2% are literate only in English, 9.4% in a Ghanaian language, and 61.8% are literate in both English and a Ghanaian language. Less than 1% of the population is literate in English and French (0.4%) and for all the three languages (English, French and a Ghanaian language) the proportion is 1.1%. The number of female illiterates is higher than that of males.

The most widely used method of solid waste disposal is by public dump (container) accounting for 98.3% households. About 72.5% of households have their solid waste collected with the remaining households resorting to indiscriminate dumping. Solid waste generated daily in the metropolis is managed mostly by dumping at the landfill with about 250 tons of waste disposed of in landfills daily.

Wholesale, agriculture and retail and manufacturing account for 64.1% of the industrial base of the Metropolis. Agricultural activities include crop farming (excluding gardening), tree growing, livestock rearing, and fishing. Crop farming is most dominant in the Metropolis as a whole accounting for more than half (52.9%) of the population in the urban areas.

Land ownership follows a patrilineal system with regards to land inheritance. Accordingly, inheritances can go to the male's sons or brothers. Conflict can emerge between these two inheritors, especially when the brothers have to raise dependent sons, as the elderly are required to do according to traditional custom.

Where royal land is involved, as in the case of chieftains, land and right to chieftaincy may be passed on from a father to his sons, who are wards of the father's brother on the understanding that the right to the land and chieftaincy should rotate among the sons of the father and the father's brother.

0.8 Major and moderate impacts and Mitigation

0.8.1 Preparatory Phase Negative Impacts

Land related disputes

The project communities are largely rural communities with vast land hence land take is not expected to generate major disputes. However, some farmers or individuals in order to be considered for project support may hurriedly acquire lands without following due process. This could result in ownership being contested especially if there is an ongoing land dispute resulting in a protracted dispute that could have some security implications.

Ownership of land should be made a requirement for qualification as a project beneficiary and evidence of ownership should be produced and documented. For lands without deeds, family or community consent should be obtained and documented before project is implemented.

Impact on livelihoods

Rearing of animals is a key economic activity in the project communities and animals such as cattle, sheep, and goat graze on surrounding vegetated lands. However, project activities such as land clearing and levelling could restrict locals access to lands that were otherwise used as pasture areas.

Considering that there are vast adjoining uncultivated lands, herdsmen can still lead their animals to graze at other areas. The impact is therefore local and the displacement will be temporary as alternative sites exist making this impact moderately significant.

Identification and proposal of alternative pasture areas to locals who otherwise used the project site as pasture area will help reduce the impact of restricted access. Furthermore, locals and herdsmen can be provided with some financial and technical support to acquire a sustainable source of feed for their livestock.

Destruction of vegetation and displacement of wildlife

Site clearing for soil suitability assessments and land preparation will lead to the destruction of some common vegetation, mostly shrubs and grasses, and a few trees. As required by the project, beneficiary farmers must own vast lands (>100 ha) and clearing of such vast areas could adversely affect vegetation including economic trees like shea and dawadawa. Habitats of common soil organisms such as dung beetle and earthworms will also be destroyed. However, the area, especially in the dry season, has very sparse vegetation and little fauna hence impact on vegetation will only be moderate.

To mitigate the impact of vegetation loss from clearing, only area required for project be cleared. Vegetation clearing should be carried out in the dry season, just before the rainy season, when very few plants will be affected. Economic trees such as dawadawa and shea should be avoided during clearing, if possible. 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.

0.8.2 Construction and Operation Phase Negative Impacts

Soil degradation

Construction

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 and potentially loading of nearby waterbodies. Also, oil spillages from the maintenance of construction equipment and vehicles could contaminate soils and affect flora and soil fauna including dung beetles and earthworms. As there are vast adjoining lands, excavated spoils from land levelling could be pushed into other tracts of land creating unsightly scenes. The impact is largely localized, persistent and of average severity hence it is considered moderate.

However, with measures such as reinstatement of excavated areas, maintenance of vehicles, machines and fuel refilling at a designated area, contamination of soil can be avoided. Fuel storage and refilling sites should be kept away from drains and important water bodies. All spoils shall be disposed of as desired and the site shall be fully cleaned before handing over. These measures are expected to minimize the impact on soil.

Operation

Leaving farmlands bare especially after harvesting could expose the soil to wind erosion from the strong winds in the dry season. Leaked or spilled oils from maintenance/operation of equipment and

vehicles could contaminate soil and adversely affect soil fauna. Also, contaminated soil could be washed into nearby waterbodies via runoff. However, this impact is localized and of average severity hence considered moderate in significance.

Farmlands should be kept always vegetated to prevent wind erosion from strong winds. An area should be designated for maintenance of vehicles and spill kits provided for accidental spillages.

Air Pollution

Construction

Land preparation and transport of materials on untarred roads will generate dust. Also, vehicular exhaust fumes will be emitted by poorly maintained vehicles and construction equipment. The dust and fumes could adversely affect air quality, especially in the dry season. The impact on air quality is likely to be considerable especially when particulate matter is carried over some distance by winds like the harmattan winds that characterize the climate of the project area. However, any possible impacts will be temporary hence the significance will be moderate.

Construction vehicles and equipment should be maintained regularly to reduce their emissions and engine idling should be discouraged. Water should be sprinkled on cleared areas and all areas that have loose soil and the potential for dust pollution to suppress dust.

Operation

At the operation stage, dust will be generated by speeding vehicles on untarred roads. Fumes will also be generated by poorly maintained vehicles and equipment. This could reduce the quality of air in beneficiary, neighbouring communities and communities along haulage routes. Sensitive receptors such as persons with allergies and upper respiratory tract diseases could experience aggravation of their condition. This impact is temporary but could be regional in extent and considered moderate.

Mitigation measures include regular maintenance of equipment and vehicles, discouraging engine idling and institution of speed limits for drivers.

Water Pollution

Construction

Disposal of domestic waste from construction workers and food vendors and deposition of sediment, waste oil, fertilizer and pesticides via runoff into nearby water bodies will reduce the quality of water and could also smother some fishes and benthic organisms. Waterbodies that drain the area such as the Kpalsini, Klubon, Juni, Yelbonni are only between 0.8km and 4km away from project communities and could be the direct recipient or indirect recipient of pollutants from its tributaries. The extent of the impact could be regional over a limited duration and cumulative in nature hence considered major in significance.

A waste management plan should be developed by the contractor to segregate, collect and dispose of waste to prevent indiscriminate disposal of waste. Maintenance of equipment and vehicle should be done at designated areas with spill kits and drip trays provided to manage spillages.

Operation

Domestic wastes, poultry waste, 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.

Wastes should be segregated in designated waste bins and collected regularly by a licensed waste collector. Disposal of wastes near water bodies should be avoided.

Noise and Vibration

Construction

Operation of construction equipment, movement of haulage vehicles and tooting of horns. Construction activities are anticipated to produce noise levels in the range of 80 - 95 dB (A). The construction equipment will have high noise levels, which can affect the personnel operating the machines as well as the residents within the project community or nearby communities.

Use of proper Personal Protective Equipment (PPE) such as earmuffs will mitigate any adverse impact of the noise generated by such equipment on workers. Equipment and vehicles will be maintained regularly to reduce noise levels. Also, construction activities will not be carried out during the night to reduce the impact of noise on residents and other sensitive receptors.

Operation

Noise and vibration from operation of processing equipment, equipment maintenance, movement of haulage vehicles, tooting of horns and noise from the poultry birds could be a nuisance to persons within the project community or nearby communities.

Waste generation and inefficient management

Construction

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. The impact is local, temporary and of a high intensity hence considered major in significance.

A waste management plan should be developed by the contractor to segregate, collect and dispose of waste to prevent indiscriminate disposal of waste. Segregation of waste such as domestic, i.e., food packaging and hazardous waste, i.e., containers of pesticides and herbicides should be practiced and waste collected by licensed waste collectors. Maintenance of equipment and vehicle should be done at designated areas with spill kits and drip trays provided to manage spillages.

Operation

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.

Provide bins and skips for waste collection and ensure it is disposed of regularly. Educate workers, vendors and visitors on the importance of proper waste management.

Workplace incidents/accidents

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.

Injuries resulting from falling from heights and falling objects, as well as from the misuse of equipment and tools, cuts from stepping on sharp objects such as nails and other metal off-cuts and injuries resulting from clashes between vehicles and the workers as they both operate within the same space are likely to occur during the implementation of the project.

This impact is considered significant since it affects human lives and would therefore require adequate mitigation measures. Occupational health and safety risks are rated highly sensitive because they could/may lead to mortality and long-term morbidity involving site workers. It is, however, localised small scale and short term, implying its magnitude is low. In terms of significance, Occupational Health and Safety risks are considered a moderately significant risk, though it has a low magnitude of impact because of its high sensitivity.

To mitigate this impact, the contractor should prepare an Occupational, Health and Safety plan and ensure compliance onsite.

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 also be victims of discrimination, forced labour, child labour, restriction of freedom of association and collective bargaining, a non-existent or ineffective worker grievance redress mechanism. Poor Labour working conditions is rated moderate scale, localised and short term, hence low magnitude of impact. It is also highly sensitive since subjecting employees to poor conditions of service and working conditions are against Ghana's labour laws such as Labour Act 2003 (Act 651). Hence this impact is moderately significant.

Provide all workers with signed contracts that are consistent with national labour laws as well as welfare facilities such as potable drinking water, shades, restrooms, etc. Encourage frequent breaks and job-rotation to reduce impact of the weather on workers. Also, policies should be developed against discrimination, forced and child labour, sexual harassment, and abuse. Workers should be allowed to unionize, and an effective grievance redress mechanism established to address worker grievances.

Traffic risks

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. At night, due to poor or low visibility, there is a high probability of road accidents. Though

temporary, this is considered major as it is regional in extent and of high severity because it could result in fatality.

To avoid or reduce road traffic accidents and incidents, only qualified drivers should be used, vehicles must be maintained regularly to ensure that they are in good working condition, use of signs as appropriate and driving at night should be discouraged. Also, speed limits must be set to ensure safe driving, e.g., 20km/h onsite, 40km/h on approaching communities along haulage routes and a maximum speed of 100km/h on highways.

Fire outbreak

Fire outbreaks from negligence of workers or the public burning refuse, game hunting and workers not properly extinguishing stubs of cigarette. Fire out breaks may also emanate from power surges or the use of sub-standard electrical cables and sockets. These fires could spread causing injuries or death to persons and destruction of property. Community health and safety risks on the site are rated regional, short term and small scale; low magnitude but highly sensitive because they lead to mortality and long-term morbidity. Hence such impacts are moderately significant.

Gender based violence

Workers with relatively high incomes will be working on the various sites. The site workers can lure girls, hawkers, food vendors, other petty traders who supply them food and other services and defile or rape them. Workers may also abuse themselves and/or supervisors.

Sexual favours could be demanded in exchange for jobs, promotion or other work-related benefits. Women may also be discriminated against, denied employment opportunities and /or their services may be undervalued on the basis of cultural norms. The incidence of GBV is short-term and small-scale hence considered moderate.

To prevent incidences of GBV, legal processes set out by national law must be followed. Policies on SEA/SH should be developed and implemented. Worker contracts should have clauses prohibiting rape, defilement, sexual harassment, child/forced labour and other GBV. Measures must be put in place to ensure that women constitute a certain percentage of the workforce i.e. affirmative action. numbers of representative on the Grievance Redress Committee and GBV Service Providers should be posted around the project site and within the immediate project zone.

Public health issues

Dust borne communicable diseases, respiratory infections and minor throat and eye irritations are expected, especially during the dry season because of the emission of vehicular pollutants and dust (carbon monoxide and particulates). The presence of workers and related increase in disposable cash makes the transmission of STDs a possibility. During project execution (civil works), large numbers of workers will be required to assemble in meetings, and even at work sites; varied number of workforces including suppliers of material and services are also expected to come in from various places which may be COVID-19 hot spots; and interaction of workers with the project host community. The potential for the spread of any infectious disease like COVID-19 is high.

Improper waste management may create conditions for the growth of vectors of diseases such as cholera and dysentery. The outbreak of these diseases would have far-reaching negative implications for the health of residents and put pressure on the limited health facilities in the area.

An awareness and sensitization campaign together with responsible government agencies like National AIDS Commission should ensure that the people in the project area (workers and locals) are made aware of the issues and provided with condoms. Conduct daily temperature screening of workers and visitors for COVID-19.

Security concerns

Civil works can be associated with theft and pilfering of construction materials normally from the public and site workers. Site workers can also steal from private properties within the immediate project zone. Other crimes include illicit sexual affairs, child labour and drunk driving, which are criminal under the laws of Ghana.

There may also be confrontations arising out of accidents and destruction of property by workforce, equipment, or vehicles. This impact is localized, severe but temporary hence considered moderate.

Workers and local community should be sensitized on cultural tolerance and grievance mechanisms to prevent confrontations. Workers should be made to sign and adhere to a code of conduct which prohibits vices.

0.9 Public Consultations

0.9.1 Stakeholders consulted

Institutions/stakeholders identified and consulted to work together to ensure sound project implementation and environmental protection are Ministry of Food and Agriculture, Ministry of Lands and Forestry, PCU, EPA, Fire Service, Tamale Metropolitan Assembly, Commercial farmers, Input Suppliers, Traditional Authorities and Focus Groups (including women and youth) within the project communities. Dates and locations of consultations are presented in the table below:

Group of stakeholders	Stakeholders	Date of consultation	Location of consultation	Total number of persons met	Total women met
Project Proponent/Beneficiary	Ministry of Food and Agriculture	18/11/2021	Tamale	23	3
	Project Coordinating Unit	18/11/2021	Tamale	2	0
Regulatory Institution	Environmental Protection Agency	21/06/2022	Tamale	1	1
	Fire Service	30/11/2021	Tamale	6	0

Other Government Institutions	Lands Commission	24/11/2021	Tamale	1	0
	Regional Coordinating Council	-	-	-	-
	Tamale Metropolitan Assembly	23/11/2021	Tamale	2	0
	National Disaster Management Organization, Tamale	-	-	-	-
	Rural Enterprises Project	-	-	-	-
Other stakeholders	Commercial Farmers	19/11/2021	Tamale	2	0
	Suppliers	24/11/2021		2	0
	FBOs/FBGs	25/11/2021		8	3
	NGOs	-	-	-	-
	Farmers	19-26/11/2021	Cheshei Changnaayili Futa	49	22
	Traditional Authority	19/11/2021	Changnaayili	4	0
	Women's group	19/11/2021	Cheshei	19	19
	Focus groups including Community Youth, Women, Traders	19-26/11/2021	Cheshei Changnaayili Futa	39	19

0.9.2 Opinion of stakeholders about the project

All stakeholders consulted were enthused about the project and indicated their readiness to lend their support for the successful implementation of the project. Most communities were, however, not aware of the project and advised that further engagement be conducted to sensitize the beneficiary and surrounding communities.

0.9.3 Concerns raised by stakeholders consulted and proposed solutions

The stakeholders engaged are in support of the project and are committed to ensuring smooth implementation of the project. Some of their major issues however include:

- **Project implementation and monitoring** – adequate funding should be provided for effective project implementation and monitoring. Minimal political interference will help in sticking to schedules.
- **Coordination and cooperation** - The District Assembly and other institutions like Lands Commission, Fire Service, etc. should be involved in project implementation and provided with resources, where necessary.
- **Sensitization** – Farmers, assembly men and project communities should be sensitized on the project to enable them to fully participate in the project.

- **Marketing and Pricing** - More feed mills must be made available if necessary, by the project to process produce into food. Standard weights and prices of goods should be set through consensus to deter some unscrupulous middlemen from exploiting farmers or producers.
- **Socio-economic issues** - The livelihood of the beneficiaries should ultimately be positively impacted by the project. Also, the standard of living in beneficiary communities should be improved through provision of social amenities like potable water, good roads, and healthcare units.
- **Environmental issues and natural disasters** - To cater for natural disasters such as drought and flooding, there is the need for the project to provide insurance for crops. Also, to protect water bodies, farming around water bodies should be prohibited. Fire belts should be created around project sites to prevent the occurrence of fires.
- **Financial support** - The project should help create access to affordable credit as most people especially women depend on Village Savings and Loans Associations (VSLA)
- **Transportation** - Adequate and affordable means of transportation should be made available to beneficiaries and suppliers to facilitate the transportation of livestock, produce and inputs.
- **Provision of farm inputs and machinery** - The project should provide farm inputs like viable seeds and procure adequate machinery to facilitate production.
- **Community leadership and governance** – At the local level, the key decision makers are the Chiefs and elders, religious leaders, youth groups and opinion leaders. The assembly member serves as government representative and is also revered by locals.
- **Land ownership, right and access** - Majority of lands are skin lands and can be accessed through a request from the traditional authorities. Squatting and land-related conflicts are rare.
- **Vulnerable groups** - There are some women-headed households and persons with disability who have limited access to land and no livelihood support.
- **Community challenges** - Communities have challenges with changes in rainfall pattern, lack of ready market and post-harvest losses.

The project will obviously benefit the local community through job creation, growth of businesses especially SMEs and government through increased revenue from taxes, food security, import substitution, etc. Stakeholders are therefore urged to ensure that the outlined benefits accrue to the beneficiaries which includes the local community and government.

0.10 Environmental and Social Management Plan

Environmental and Social Management Plan Matrix

Impact	Project Phase	Source	Mitigation Hierarchy	Mitigation Measure	Responsible Party	Monitoring	Cost (USD)
Preparatory Phase							
Impact on livelihoods	Construction	Site preparation	Repair or remedy	- Identify and propose alternative pasture areas to locals who otherwise used the project site as pasture area. - Provide locals with some financial and technical support to acquire a sustainable source of feed for their livestock.	PCU	Environmental and Social Safeguards Specialists of PCU	5,000
Destruction of vegetation and displacement of wildlife	Construction	Site preparation	Offset	- Clear only area required for the project - Reinstate excavated areas immediately after works to prevent excavated spoil from being transported by runoff into nearby water bodies - 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.	Works contractor	Environmental Safeguards Specialist of PCU	5,000
Construction Phase							
Soil erosion	Construction	Project site	Repair or remedy	- 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.	Works contractor	Environmental Safeguards Specialist of PCU	2,000

Impact	Project Phase	Source	Mitigation Hierarchy	Mitigation Measure	Responsible Party	Monitoring	Cost (USD)
Air Pollution	Construction	Project site and haulage route	Avoid or reduce at source	- 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.	Works contractor	Environmental Safeguards Specialist of PCU	5,000
Water Pollution	Construction	Project site	Avoid at source	- 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.	Works contractor	Environmental Safeguards Specialist of PCU	15,000
Noise Nuisance	Construction	Equipment and vehicles on site	Abate on site	- Unnecessary tooting of horn by truck drivers must be avoided. - 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.	Works contractor	Environmental Safeguards Specialist of PCU	5,000

Impact	Project Phase	Source	Mitigation Hierarchy	Mitigation Measure	Responsible Party	Monitoring	Cost (USD)
				• 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	Construction	• Project site	• Abate or reduce at source	• 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.	Works contractor	Environmental Safeguards Specialist of PCU	20,000
Occupational health and safety	Construction	• Project site	• Abate on site	• 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	Works contractor	Environmental Safeguards Specialist of PCU	20,000
Poor labour working conditions	Construction	• Project Site	• Avoid at source	• Provide all workers with signed contracted that are consistent with national labour laws	Works contractor	Environmental and Social Safeguards	10,000

Impact	Project Phase	Source	Mitigation Hierarchy	Mitigation Measure	Responsible Party	Monitoring	Cost (USD)
				• 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.		Specialists of PCU	
Traffic management/Public safety concerns	Construction	• Project site	• Abate on site	• Hoard project site to prevent unauthorized entry • Ensure all visitors accessing site are in appropriate PPE • 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. • Appropriate warning signs including reduced speed, "Men at Work", "No Parking" & hazard triangle must be placed beside road facing oncoming traffic and a similar "End" sign after work area. • Ensure that all trucks used are serviced regularly to maintain optimal performance and ensure safety.	Works contractor	Environmental and Social Safeguards Specialists of PCU	8,000

Impact	Project Phase	Source	Mitigation Hierarchy	Mitigation Measure	Responsible Party	Monitoring	Cost (USD)
				- 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 outbreaks	Construction	Project community interactions	Avoid at source, repair or remedy	- Create fire belts around project site to deal with any fire incidents - Liaise with the Fire Service to sensitize workers and the community on fire risks - Secure fire extinguishers for fire fighting	Works contractor	Environmental and Social Safeguards Specialists of PCU	20,000
Public health issues	Construction	Project-community interactions	Avoid at source	- 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. - Conduct daily temperature screening of workers and visitors. - Provide handwashing stations and sanitizers at all sites. - Ensure workers and visitors adhere to all COVID-19 protocols including wearing of face mask and social distancing. - Encourage workers to get vaccinated. - Organize trainings on COVID-19 and STDs for the workers and the community to create awareness. - Provide female and male condoms to the community and workers.	Works contractor	Environmental and Social Safeguards Specialists of PCU	15,000
Security concerns	Construction	Project site	Abate or reduce at source, abate on site	- Provide adequate security by liaising with Police to conduct regular patrols - Sensitize local community on cultural tolerance and grievance mechanisms to prevent confrontations	Works contractor	Environmental and Social Safeguards Specialists of PCU	10,000

Impact	Project Phase	Source	Mitigation Hierarchy	Mitigation Measure	Responsible Party	Monitoring	Cost (USD)
Gender based violence	Construction	Project and community interaction	Avoid at source, repair or remedy	- 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	Works contractor	Environmental and Social Safeguards Specialists of PCU	10,000
Operation Phase							
Soil erosion	Operation	Facility site	Avoid or reduce at source	- 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.	Facility manager	EPA, Agric Department, District Assembly EHU	5,000
Air Pollution	Operation	Facility site	Avoid or reduce at source	Trucks and heavy machinery with a valid emission test pass certificate should only be allowed on the project site.	Facility manager	EPA, Agric Department,	10,000

Impact	Project Phase	Source	Mitigation Hierarchy	Mitigation Measure	Responsible Party	Monitoring	Cost (USD)
				- 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.		District Assembly EHU	
Water Pollution	Operation	Facility site	Avoid at source	- 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. - Monitor volumes of water used and keep records - Promptly fix faulty or leaking pipes to preserve water	Facility manager	EPA, Agric Department, District Assembly EHU	7,000
Noise Nuisance	Operation	Facility site	Avoid or reduce at source	- Unnecessary tooting of horn by truck drivers must be avoided. - 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 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.	Facility manager	EPA, Agric Department, District Assembly EHU	8,000

Impact	Project Phase	Source	Mitigation Hierarchy	Mitigation Measure	Responsible Party	Monitoring	Cost (USD)
				• Provide silencers on all noise generating equipment.			
Waste generation and disposal	Operation	• Facility	• Reduce at source	• 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. • Regular toolbox talk on waste management must be provided to operatives/workers at the facility. • Have SOPs for managing hazardous and non-hazardous waste.	Facility manager	EPA, Agric Department, District Assembly EHU	20,000
Poor labour working conditions	Operation	• Facility site	• Avoid at source	• Provide all workers with signed contracted that are consistent with national labour laws • 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.	Facility manager	Agric Department, District Assembly EHU	10,000
Traffic management/ Public safety concerns	Operation	• Facility	• Abate on site	• Ensure all visitors accessing site are in appropriate PPE • 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	Facility manager	EPA, District Assembly EHU	8,000

Impact	Project Phase	Source	Mitigation Hierarchy	Mitigation Measure	Responsible Party	Monitoring	Cost (USD)
				• Arrangements must be made for truck drivers to ensure peak times are avoided for haulage of materials to site. • Appropriate warning signs are put in place, as required. • 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 outbreaks	Operation	• Project community interactions	• Avoid at source, repair or remedy	• Create fire belts around project site to deal with any fire incidents • Liaise with the Fire Service to sensitize workers and the community on fire risks • Secure fire extinguishers for fire fighting	Facility manager	EPA, Fire Service, Agric Department, District Assembly EHU	5,000
Public health issues	Operation	• Project community interactions	• Avoid or reduce at source	• 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. • Conduct daily temperature screening of workers and visitors. • Provide handwashing stations and sanitizers at all sites. • Ensure workers and visitors adhere to all COVID-19 protocols including wearing of face mask and social distancing. • Encourage workers to get vaccinated. • Organize trainings on COVID-19 and STDs for the workers and the community to create awareness. • Provide condoms to the community and workers.	Facility manager	EPA, Health Directorate, District Assembly EHU	15,000

Impact	Project Phase	Source	Mitigation Hierarchy	Mitigation Measure	Responsible Party	Monitoring	Cost (USD)
Security concerns	Operation	Community	Avoid or reduce at source	- Provide adequate security by liaising with Police to conduct regular patrols or make private security arrangement - Sensitize local community on cultural tolerance and grievance mechanisms to prevent confrontations	Facility manager	District Security Committee, EPA	8,000
Gender based violence	Operation	Workers, community	Avoid or reduce at source, repair and remedy	- 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	Facility manager	EPA, District Social Welfare Department	10,000
TOTAL COST OF ESMP IMPLEMENTATION							256,000

Environmental Monitoring Matrix

No.	Potential Environmental and Social Impacts	Monitoring Parameters/Mean of verification	Monitoring Site	Frequency	Responsibility (Implementation/ Monitoring)	Cost Estimate/ Year (USD)
CONSTRUCTION PHASE						
	Occupational health and safety	- Records of accidents, incidents and near misses. - Records of PPE disbursed - Housekeeping	Construction site	Monthly	Environmental and Social Safeguards Specialists	5,000
	Poor labour working conditions	- Availability of copies of signed contracts - Human Resource Management Plan/Recruitment Policy - Complaints lodged by workers	Construction site	Monthly	Environmental and Social Safeguards Specialists	3,000
	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	Construction site and Immediate environs	Monthly	Environmental Safeguards Specialist	4,000
	Air and Noise Pollution	- Dust (PM2.5, PM10 and TSP) - Emissions (NOx, SOx, TSP) - Noise (dB) levels - Number of complaints by residents/workers	Construction site and Immediate environs	Monthly	Environmental Safeguards Specialist	5,000
	Waste generation and disposal	- Number of mobile toilets and dustbins provided on site - Number of times waste is lifted in a week i.e. waste transfer notes - Cleanliness of site/housekeeping - Odour	Construction site and Immediate environs	Weekly	Environmental Safeguards Specialist	3,000

No.	Potential Environmental and Social Impacts	Monitoring Parameters/Mean of verification	Monitoring Site	Frequency	Responsibility (Implementation/ Monitoring)	Cost Estimate/ Year (USD)
		• Presence of human waste on site • Complaints by workers/residents				
	Traffic management/Public safety concerns	• Grievance records • Traffic related incidents/accidents • Records of accidents, incidents and near misses.	• Construction site and Immediate environs	Monthly	Environmental and Social Safeguards Specialists	5,000
	Fire outbreaks	• Fire related incidents/accidents • Records of fire incidents and near misses. • Number of functional fire extinguishers onsite	• Construction site and Immediate environs	Monthly	Environmental and Social Safeguards Specialists	5,000
	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	• Construction site and Immediate and environs	Monthly	Environmental and Social Safeguards Specialists	4,500
	Security and 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	• Construction site and Immediate environs	Monthly	Environmental and Social Safeguards Specialists	3,500
OPERATIONAL PHASE						

No.	Potential Environmental and Social Impacts	Monitoring Parameters/Mean of verification	Monitoring Site	Frequency	Responsibility (Implementation/ Monitoring)	Cost Estimate/ Year (USD)
	Occupational health and safety	- Records of accidents, incidents and near misses. - Records of PPE disbursed - Housekeeping	Facility site	Monthly	HSE Manager	3,000
	Poor labour working conditions	- Availability of copies of signed contracts - Human Resource Management Plan/Recruitment Policy - Complaints lodged by workers	Facility site	Monthly	HSE Manager and HR Manager	4,000
	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	Facility site and immediate environs	Monthly	HSE Manager	5,000
	Air and Noise Pollution	- Dust (PM2.5, PM10 and TSP) - Emissions (NOx, SOx, TSP) - Noise (dB) levels - Number of complaints by residents/workers	Facility site and immediate environs	Monthly	HSE Manager and Community Liaison Officer	3,000
	Waste generation and disposal	- Presence of toilets and number dustbins provided on site - Number of times waste is lifted in a week - Cleanliness of site/housekeeping - Odour - Presence of human waste on site - Complaints by workers/residents	Facility site and immediate environs	Weekly	HSE Manager and Community Liaison Officer	5,000

No.	Potential Environmental and Social Impacts	Monitoring Parameters/Mean of verification	Monitoring Site	Frequency	Responsibility (Implementation/ Monitoring)	Cost Estimate/ Year (USD)
	Traffic management/Public safety concerns	- Grievance records - Traffic related incidents/accidents - Records of all accidents, incidents and near misses.	Facility site and immediate environs	Monthly	HSE Manager and Community Liaison Officer	5,000
	Fire outbreaks	- Fire related incidents/accidents - Records of fire incidents and near misses. - Number of functional fire extinguishers onsite	Facility site and immediate environs	Monthly	HSE Manager and Community Liaison Officer	3,000
	Public health issues	- Number of sensitization campaigns - Number of condoms distributed to workers or placed in washrooms in a month - Prevalence of STD cases reported to local health facilities	Facility site and immediate environs	Monthly	HSE Manager and Community Liaison Officer	4,500
	Security and 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	Facility site and immediate environs	Monthly	HSE Manager and Community Liaison Officer	3,500
	TOTAL COST FOR MONITORING					74,000

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, a Grievance Redress Mechanism will be employed and it will include:

- Setting up of a Grievance Redress Committee (GRC) at the community level (12 GRCs, 1 for each community) 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, a Youth Leader, 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 District Planning Officer, District Lands Officer, A representative of the Agric Directorate, and District Social Welfare Officer.
- The PCU 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 District 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, Metropolitan Assembly, PCU and Ministry of Food and Agriculture on a weekly and monthly basis.

ESMP Implementation Budget

No	Activity	Description	Responsibility	Total Cost, US\$	Source of finance
A	Institutional measures				
1	Remuneration of the project's environmental safeguard specialist over 5 years	Implementation of ESMP	PIU	120,000	Project funds
2	Remuneration of the project's social safeguard specialist over 5 years	Implementation of ESMP	PIU	120,000	Project funds
3	Remuneration of the MDC environmental and social safeguard specialist over 10 months	Implementation of ESMP	PIU	20,000	Project funds
4	Remuneration of the environmental and social safeguard specialist of the works company over 12 months	Implementation of ESMP	PIU	24,000	Project funds
B	Technical measures			256,000	
	Specific technical measures				
5	Awareness creation on Project	Stakeholder engagement	PIU/ESS/SSS	5,000	Project funds
6	Capacity building for key stakeholders	Training workshop on National and AfDB requirements, EIA procedures, social measures and incorporating environmental and social measures etc. in contract documents.	PIU/Consultant	10,000	Project funds
7	Public engagement/ sensitization	Sensitization and engagement of project affected persons	PIU/Consultant	15,000	Project funds
8	Grievance Redress Mechanism (GRM)		PIU/ESS/SSS	79,000	Project funds
9	Decommissioning	Dismantling and removal of structures and equipment and waste disposal		15,000	Project funds
C	Monitoring and Audits				
10	Monitoring of environmental and social parameters of the works		PIU/ESS/SSS	267,000	Project funds
11	Annual E&S compliance Audits	To evaluate the compliance of the implementation of the project's E&S measures (ESMP)	PIU/ESS/SSS	150,000	Project funds
TOTAL of the ESMP IMPLEMENTATION				1,081,000	

1.0 INTRODUCTION

1.1 Background of the Project

The African Development Bank has launched the Feed Africa Strategy that takes a commodity value chain and Agro-Ecological Zones (AEZ) approach with emphasis on commodities that possess comparative advantages and potential for import substitution, future demand, and poverty alleviation. Also, in response to the novel coronavirus, COVID-19, the Feed Africa Response to the Impact of COVID-19 (FAREC) outlines measures to increase localized food production via targeted provision of agricultural inputs such as improved seeds, fertilizer, and other agro-chemicals through smart input subsidies targeting farmers and tying interventions to seasonal timetables. It also provides measures for post-harvest management to produce highly nutritious food and staple products that store for longer periods, policy support for free flow of food and inputs distribution (“green channels”) and increased food production.

The Government of the Republic of Ghana through the Ministry of Food and Agriculture (MoFA), and with assistance from the African Development Bank (AfDB) through the Feed Africa Strategy, seeks to develop the savannah areas as part of Government’s ongoing efforts in Planting for Food and Jobs (PFJ) and Rearing for Food and Jobs (RFJ) programs. This support is to allow medium scale commercial farmers and their out growers to expand areas under cultivation for rice, soybean and maize under PFJ, which feeds into poultry value chain under RFJ. This integrated approach supports elements of growing at scale and provision of market outlets for smallholder farmers, especially women and youth.

The Savannah Agriculture Value Chain Development Project (SADP) is being implemented to serve as part of post COVID-19 reconstruction efforts aimed at addressing disruptions in food systems of the Government of Ghana. It builds on earlier successes under the Savannah Zone Agriculture Productivity Improvement Project (SAPIP) and Savannah Investment Programme (SIP) that have so far expanded the production of maize and soybean from 80 hectares in 2018 to 14,000 hectares in 2021.

This current SADP is expected to build on the achievements made and to further expand production of rice, soybean and maize by additional 8,000 hectares by 2026. The SADP project, is being implemented in nine (9) different Metropolitan, Municipal and District Assemblies (MMDAs) namely (1) Tamale Metro, (2) Mion, (3) Savelugu in the Northern Region; (4) East Mamprusi in the North East Region; (5) West Gonja in the Savannah Region; (6) Bawku West, in the Upper East Region; (7) Wa Municipal, (8) Sissala East, and (9) Nandom in the Upper West Region of Ghana.

In line with environmental permitting requirements (**Annex 1a and b**) as provided under the Environmental Protection Agency (EPA) Act, 1994 (Act 490) and the Environmental Assessment Regulations of 1999 (LI1652), this Environmental Impact Assessment (ESIA) has been carried out to help understand the likely implications of the proposal in order to inform the environmental permitting decision-making prior to project implementation in Tamale Metropolitan Area. Also, the ESIA will ensure the project and subprojects comply with the requirements of the Bank's Integrated Safeguards System (ISS).

1.2 Objective of the Project

The overall goal of the project is to increase production of livestock (particularly poultry meat), contribute to industrialization, youth employment and food security. The project is expected to contribute to the Government's industrialization agenda, including One District One Factory (1D1F), support skills development and entrepreneurship for women and youth, and build resilient food systems in the savannah areas of northern and middle belts of Ghana.

1.3 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;
- 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.

1.4 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, Tamale Metro), Finance, Environmental Protection Agency (EPA) of Ghana, Savannah Zone Productivity Improvement Program (SAPIP) and Savannah Investment Programme (SIP), Tamale Metropolitan Assembly, Lands Commission, Fire Service,

Produce Suppliers, Commercial Farmers, Farmer Based Organizations, Assembly Representatives, Community Focus Groups including Traditional Authority, Youth Groups, Women Groups etc. The outcome of engagements with key stakeholders have been reviewed and incorporated in the study.

- **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 Tamale Metropolitan Area;
 - Medium Term Development Plan;
 - Population and Housing Census Report, 2015 and 2021;
 - Technical sheets for project development;
 - Ghana EPA Guidelines
 - GoG and AfDB Reference Documents
 - Sector policy documents and regulations; and
 - Relevant international conventions.

1.5 The ESIA Report Content and Structure

EPA guidelines for preparation of ESIA and the AfDB Integrated Safeguards System (ISS) 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 Tamale Metropolitan Area;
- Potential environmental and social issues and impacts;
- Proposed mitigation measures;
- Environmental and social management plan requirements;
- Institutional arrangement for the implementation of the ESMP;
- Monitoring and reporting arrangements;
- Capacity building and training required to implement the ESMP;
- Stakeholder Engagement and public consultations and disclosure;
- ESMP implementation budget;
- Conclusion; and
- Annexes.

2.0 PROJECT DESCRIPTION

2.1 Project Scope

As part of the comprehensive strategy by the current administration of the country is to resolve the perennial challenges with the livestock sector, and provide incremental jobs in the country, the government has designed a strategic program intervention, Rearing for Food and Jobs (RFJ). This program is to overcome the food and nutritional deficits situation and reduce drastically the importation of basic livestock commodities where Ghana has both competitive and comparative advantage to produce, as well as create more jobs within the agriculture and related sectors. The RFJ program focuses on five key livestock species in the country including cattle, sheep, goats, pigs and poultry.

The overall goal of the project is to increase production of livestock (particularly poultry meat), contribute to industrialization, youth employment and food security. The project is expected to contribute to the Government's industrialization agenda, including One District One Factory (1D1F), support skills development and entrepreneurship for women and youth, and build resilient food systems in the savannah areas of northern and middle belts of Ghana. This would be achieved through the facilitation of private sector investment in value chains associated with meat production, improved productivity and production of feedstock made up of rice, maize and soybean, a purposive intervention in poultry value chain. At least 8,000 Ha of rice, maize and soybean is expected to be put under cultivation and small-medium scale poultry farmers supported. It is expected to increase productivity of soybean from average of 0.8 tons/ha to 3.0 tons/ha; maize from 2.5 tons/ha to 5.5tons/ha and rice from 3.0 tons/ha to 3.5 tons/ha. At least 50 million additional broiler produced by 2026. Increased domestic production seeks to reduce importation of these basic commodities, creating jobs for women and youth along the priority value chains.

2.2 Project Locations

The programme will cover generally the Savannah Ecological Zone of Ghana for the Technologies for African Agricultural Transformation (TAAT-s) and specifically focus on 9 Districts that have the potential for maize, soya and rice production. It is also imperative to consolidate the gains of other programmes and projects that operated or are operating in these districts.

In the Tamale Metropolitan Area, there is the potential for the production of rice in lowland areas especially in valleys. For the production of maize and soya, majority of the upland areas are suitable and the potential beneficiary communities, listed in **Table 2-1 and shown in Figure 2-1**, have been selected based on these reasons.

Table 2- 1: Potential beneficiary communities

District	Potential Upland Communities for Maize and Soya production	Potential Rice Valley Communities
Tamale Metropolitan Area	Zorbogu	Zorbogu
	Changnaayili	Tugu
	Cheshei	Jarigu Baani
	Pagazaa	
	Futa	
	Labariga	
	Juni	
	Adubiliyili	
	Datoyili	
	Fooshegu	



2.3 Project Components

The proposed project will have three components namely (i) Component 1: Production Development, (ii) Component 2: Integrated Agribusiness and Value Chain Development, and (iii) Component 3: Project Management and Institutional Support.

Component 1: Production Development:

This component aims to support farmers with interventions including land development in inland valleys for rice production, following land and soil suitability surveys. It will also support land development under no-tillage systems using conservation agriculture. It will promote the use of economic trees as part of alley-cropping and promote measures to reduce bush fires. These measures will include the enforcement of community by-laws and establishment of fire belts. It will promote the use of hybrid seeds and bio-pesticides for the control of invasive pests including fall armyworm. There will be no land acquisition under this project. One key criterion for participating farmers is for them to own land under cultivation for which an expansion is required. There are no settlements/population in the inland valleys where water management structures are to be developed. Activities regarding land development will therefore not cause displacement (temporal or permanent).

Sub-component 1.1 Commercial Production of Maize and Soybean under Conservation Agriculture

- Production and promotion of certified hybrid maize and improved soybean seeds, in collaboration with seed companies.
- Support to land development and mechanisation services.
- Training of producers, haulers, aggregators and marketers on sanitary and phytosanitary (SPS) issue relating to maize and soybeans
- Farmer mobilisation and awareness creation on conservation agriculture.
- Train project staff and farmers on Integrated Crop and Pest Management (ICPM), including biological control options for the management of Fall Army Worm (FAW) and aspergillus on Maize and Soybeans.
- Conduct surveillance and collect data on pests attacking the Maize and Soybeans in the project zones with specific reference to FAW.
- Support out-grower contractual arrangements
- Use of ICT for soil suitability assessment and GIS mapping of commercial farms
- Promotion of climate smart agriculture, environmental conservation best practices, including use of economic trees such as shea, dawadawa, mango, cashew etc.
- Community sensitization, Establishment of fire belts and enforcement of community fire by-laws to deal with the impact of bush fires.
- Promote the use of Nitrogen fixing inoculants to boost soybean yield.

Sub-component 1.2 Promotion of Small and Medium Scale Commercial Poultry Production

- Input support to small and medium scale commercial poultry farmers (poultry cages, day old chicks, feed stock, vaccines, veterinary drugs, etc.)
- Supply of local chicken to vulnerable households, especially women headed households

- Support to poultry diseases surveillance, diagnosis and control
- Training and capacity building on business development, animal husbandry and health
- Support to hatchery expansion, including parent stock for broilers, guinea fowls and local chicken

Component 2: Integrated Agribusiness and Value Chain Development:

This component seeks to support actors along the value chain, particularly post-production actors. Key interventions include the promotion of quality standards for maize and soybean production, storage and processing, support the establishment of small-to-medium scale poultry processing units at district level to access financing, and enhance access to market information (e.g. quantity, quality, timing and pricing). It will support skills development for women and youth, promote entrepreneurship and mentoring programs, especially for poultry value chain. Women headed households in vulnerable communities would be supported to produce local chicken to improve their income status and help meet their nutritional requirements. Locations of infrastructure to be supported, such as poultry housing and poultry processing units for private sector is not yet determine as this is demand driven. A detailed site-specific environmental assessment will be undertaken for each private sector operation, in compliance with the environmental laws of Ghana before any support will be extended during project implementation.

Sub-component 2.1 Value Addition and SME Development

- 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 poultry products, transport services, new agro-input delivery systems, etc.)
- Support and training of poultry producers on ISO 9000 & other necessary certification requirements on poultry to access premium market.
- Support to feed millers to improve feed stock and expand processing capacity
- Enhance investment facilitation and promotion to increase the number of commercial producers and processors in the Savannah regions
- Support for cold chain development for chicken

Sub-component 2.2 Youth/Women Empowerment and Nutrition

- Promote other income generating activities for women and youth, including as shea, dawadawa, mango, cashew production and processing
- Support women and youth on marketing and supply of poultry products to key institutions and programs including the school feeding program
- Capacity building for women and youth in small-scale commercial poultry business management and entrepreneurship, including mentorship.
- Promote the consumption of local poultry and eggs to improve household nutrition, and in particular maternal and child nutrition to prevent stunting
- Promote the breed improvement of local poultry through cockerel distribution program.

Component 3: Project Management and Institutional Support:

This component involves the development of annual work plan and budget, establishment of results-based monitoring and evaluation system, conducting beneficiary impact assessment and other studies. It will also include the conduct of project mid-term review, project completion reports, technical reviews, video and pictorial documentation of success stories, support to the coordination and implementation of key government flagships including Rearing for Food and Jobs and Planting (RfJ) for Food and Jobs (PfJ).

Sub-Component 3.1 Knowledge Management, Monitoring and Evaluation

- Development of annual work plan and budget
- Establishment of results-based management system for M&E
- Conduct Beneficiary Impact Assessment.
- Conduct Project Mid-Term Review.
- Conduct Project Completion/Technical Review (PCR).
- Video and pictorial documentation of success stories
- Undertake relevant studies, including socio-economic surveys, soil suitability surveys
- Development and Implementation of Environmental and Social Management Plan (ESMP)
- Enhance capacity to mobilize private sector investors in the maize-soybean-poultry industry.

Sub-component 3.2 Project Coordination

- Upgrade the project coordination unit with additional staff
- Procure vehicles for PCU, office equipment and furniture as may be required.
- Facilitate annual financial audits.
- Facilitate procurement audit.
- Facilitate Project Steering Committee (PSC) meetings.

Project Activities in the Tamale Metropolitan Area

The specific project activities to be implemented in the Tamale Metropolitan Area at the preparatory, construction and operation phases of the project implementation are:

Preparatory Phase

- Identification of potential beneficiary communities for the production of maize, soybeans and rice
- Conduct of relevant studies, including socio-economic surveys
- Development and Implementation of Environmental and Social Management Plan (ESMP)
- Request for applications and screening of applicant farmers using the following criteria:
 - ✓ Prospective farmers must be interested in the cultivation of soybean, maize and rice and should operate an out-grower or an in-grower scheme.
 - ✓ Interested farmers shall be willing to cultivate these crops under Conservation Agricultural practices.
 - ✓ Prospective farmers should own a contiguous land of not less than 100ha suitable for production with potential to expand further.
 - ✓ A substantial area of land should have been developed and prepared for farming by the prospective farmer.

- ✓ The dedicated farmland of at least 100 ha shall be made available solely for the Conservation Agriculture for the next five (5) years.
- ✓ The farm should be accessible and motorable throughout the farming season. Farms located along major roads would be an added advantage.
- ✓ Prospective farmers should own at least a tractor with implements to compliment the use of other CA equipment. Ownership of other equipment such as Boom Sprayer, No-Till planters and Fertilizer Spreaders provide great opportunity for participation.
- ✓ Prospective Farmers must show an indication of access to storage facilities for inputs and harvested grain.
- ✓ Prospective farms must be located within the Northern Savannah Ecological Zone of Ghana
- ✓ Prospective Farmers should have access to technical services (Extension agents, Mechanization operators etc.) to support farm development and management.
- Assessment of soil suitability and GIS mapping of commercial farms using ICT.

Construction Phase

- Provision of support for land development and access to mechanisation services.
- Production and promotion of certified hybrid maize and improved soybean seeds, in collaboration with seed companies.
- Promotion of climate smart agriculture, environmental conservation best practices, including use of economic trees such as shea, dawadawa, mango, cashew etc.
- Training and capacity building on business development, animal husbandry and health
- Enhance capacity to mobilize private sector investors in the maize-soybean-poultry industry

Operation Phase

- Support out-grower contractual arrangements
- Conduct surveillance and collect data on pests attacking the Maize and Soybeans 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.
- Promote the use of Nitrogen fixing inoculants to boost soybean yield
- 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 poultry products, transport services, new agro-input delivery systems, etc.)
- Support to feed millers to improve feed stock and expand processing capacity
- Enhance investment facilitation and promotion to increase the number of commercial producers and processors in the Savannah regions
- Promote other income generating activities for women and youth, including shea, dawadawa, mango, cashew production and processing
- Support women and youth on marketing and supply of poultry products to key institutions and programs including the school feeding program
- Capacity building for women and youth in small-scale commercial poultry business management and entrepreneurship, including mentorship.

3.0 ANALYSIS OF ALTERNATIVES

3.1 Options for Consideration

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:

- Cropping system;
- Rice production system;
- Type of irrigation;
- Power supply;
- Sources of water;
- Waste management; and
- No option.

Table 3- 1: Analysis of Alternative Project Options

Option/ Method of Deployment	Potential Environmental, Social, Technological and Economic Implications		Preferred Option
Cropping system			
1. Mono-cropping	Advantages 1. Growing one type of crop all year round on the same land. 2. Allows large expanses of land to be cropped and harvested at the same time. 3. Easier to be mechanized. 4. Less types of equipment and machinery required.	Disadvantages 1. Higher risk of crop failure due to pest and disease infestation or drought. 2. Higher risk of investment loss due to crop failure. 3. Higher rate of nutrient depletion due to the same nutrient requirement.	Option 1, Mono cropping is considered as the preferred option due to the large expanse of land and ease of mechanization
2. Mixed Cropping	Advantages 1. Growing of two or more crops on different portions of the same land. 2. Spreads risk of crop failure. 3. Diversifies sources of income.	Disadvantages 1. Different maturity periods of crops affect planning. 2. Different requirements of plants require different types of equipment, fertilizers and other farm inputs.	
Rice production system			
1. Upland production	Advantages 1. Grown in rain-fed naturally well-drained soils 2. Plants have less exposure to alterations between aerobic and anaerobic environments 3. Rice varieties are drought tolerant	Disadvantages 1. It is largely for subsistence production 2. Soils are usually nutrient deficient 3. Have lower yield 4. Susceptible to weed invasion and diseases	Option 1, Mono cropping is considered as the preferred option due to the large

Option/ Method of Deployment	Potential Environmental, Social, Technological and Economic Implications		Preferred Option
2. Lowland valley production	Advantages 1. Fields can be flooded either by rainfall or irrigation 2. Lowland soils are usually fertile 3. Suitable for commercial production 4. Has higher yields	Disadvantages 1. Water level cannot be controlled exposing crops to serious floods or drought 2. Crops are exposed to alterations between aerobic and anaerobic environments	Option 2, Lowland valley production is the preferred option due to its higher yields and suitability for commercial production
Type of irrigation			
1. Surface irrigation (flood and furrow irrigation methods)	Advantages 1. Surface irrigation is one of the most common types of irrigation systems. 2. Uses the force of gravity to distribute the water, which is meant to then seep into the soil. 3. Less costly compared to other irrigation systems 4. Suitable for high water demand crops. 5. Can be used in windy conditions.	Disadvantages 1. Not suitable for crops which are sensitive to flooding.	Option 3, Drip irrigation is preferred as it is water efficient and can be installed in any type of landscape
2. Sprinkler irrigation	Advantages 1. High application efficiency 2. Can be combined with fertilizer application. 3. Can be applied at areas with variable topography.	Disadvantages 1. Water can be lost because of high winds or evaporation. 2. Irrigating the entire field uniformly can be difficult or tedious if the system is not properly designed 3. Water remaining on plants' leaves may promote fungal and other diseases. 4. If fertilizers are included in the irrigation water, plant leaves can be burned, especially on hot, sunny days.	
3. Drip Irrigation	Advantages 1. Consideration for vegetable crops, but requires pumping from laterals to storage tanks into a piped system. Can be done but needs full and multiple farmer cooperation	Disadvantages 1. Very costly compared to other irrigation systems. 2. Requires highly skilled labour in design, installation and operation. 3. Highly sensitive to clogging.	

Option/ Method of Deployment	Potential Environmental, Social, Technological and Economic Implications		Preferred Option
	2. Water is delivered at or near the root zone of plants, drop by drop. 3. In modern agriculture, drip irrigation is often combined with plastic mulch, further reducing evaporation. 4. High efficiency of fertilizer application. 5. This method can be the most water-efficient method of irrigation, if managed properly, since evaporation and runoff are minimized.		
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 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 2, which is the use of surface 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 5. Seasonal variations in flow 6. Vulnerable to pollution	

Option/ Method of Deployment	Potential Environmental, Social, Technological and Economic Implications		Preferred Option
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	
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, which already have limited space.
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.	
No Option			
	Advantages 1. Funds for the project implementation could be used for solving other development problems, albeit less dire	Disadvantages 1. Non implementation of the project will continue to deprive project communities of access to economic opportunities and food security associated with agriculture. Also, locals who would have been offered employment will continue environmentally unfriendly livelihood activities such as felling of trees for charcoal, game hunting leading to bushfires etc. 2. Government will lose revenue and the opportunity to leverage import substitution for economic growth.	This option is not preferable

4.0 POLICY, LEGAL AND REGULATORY 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** under the following themes:

- 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;
- African Development Bank safeguard policies; and
- International conventions.

4.1 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 2007;
- National Climate Change Policy, 2013;
- National Gender Policy, 2015;
- Riparian Buffer Zone Policy, 2014;
- National Irrigation Policy, June 2010;
- Food and Agriculture Sector Development Policy, FASDEPII (MOFA);
- National Environmental Action Plan/Policy, 1994; and
- National Employment Policy, 2012

Table 4- 1: Relevant Legal Framework and Key Compliance Requirements

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 earnings, food security, and supply of raw materials for value addition and rural development as well as significant reduction in the incidence of poverty.	The SADP is in accord with the focus of the policy.
2.	<u>National Environmental Policy, 2012</u>	The proposed project seeks to promote sustainable

No.	Policies and Plans	Applicability to Proposed Project
	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.	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, 2007</u> The objective of Section 2.2.3 Focus Area 3 –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".
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.

No.	Policies and Plans	Applicability to Proposed Project
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>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 ▪ Improve post-harvest capacity, e.g., storage and processing facilities and infrastructure.	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
9.	<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 project will ensure that the necessary buffer distances are observed on project sites to preserve water bodies. Also, the setback distances provided for the water pollution hazards will be applied in the siting of storage facilities for

No.	Policies and Plans	Applicability to Proposed Project
	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	agrochemicals, septic systems and waste bins.
10.	<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.
11.	<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 Regulatory 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 Agency Act 1994, Act 490;
- Environmental Assessment Regulations 1999, LI 1652
- Fees and Charges (Amendment) Instrument, 2019 (LI 2386);
- Water Resources Commission Act 1996, Act 522;
- The Water Use Regulations 2001, LI 1692;
- Ghana Meteorological Agency Act 2004, Act 687.

No.	Legal Framework and Key Compliance Requirements	Applicability to Proposed Project
12.	<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
13.	<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.
14.	<u>Environmental Protection Agency (EPA) Act 1994, Act 490</u> The Environmental Protection Agency (EPA) Act 1994 (Act 490) gives a mandate to the Agency to ensure compliance of all investments and undertakings with laid down Environmental Assessment (EA) procedures in the planning and execution of development projects, including compliance in respect of existing ones. The Environmental Protection Agency (EPA) Act 490 Section 12 of 1994 confers enforcement and control powers on the EPA to compel existing companies to submit environmental or pollution management plans on their operations as a management tool for effective pollution control. The EPA is the responsible for issuing environmental permits for operations such as this project subject to EPA review.	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, considering that project area is in an environmentally sensitive area according to EPA classification, a permit has to be obtained
15.	<u>Environmental Assessment Regulations 1999, LI 1652</u> The Environmental Assessment Regulations 1999 (LI 1652) enjoins any proponent or person to register an undertaking with the Agency 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 1652 seeks to ensure that development is undertaken in a sustainable environment.	The SADP will be guided by LI 1652 including registering sub-projects with the EPA and obtaining an environmental permit.
16.	<u>Fees and Charges (Amendment) Instrument, 2019 (LI 2386)</u> The Fees and Charges (Amendment) Instrument, 2019 (LI 2386) sets out the fee regime for processing and environmental permits, associated with the Environmental Assessment Regulations 1999, (LI 1652). The Environmental Assessment (Amendment) Regulations, 2014 (LI 2216) has been replaced by this new instrument.	Processing and permit fees are required for initial registration, submission of ESIA report and registration of sub-projects.

No.	Legal Framework and Key Compliance Requirements	Applicability to Proposed Project
17.	<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. Section 13 prohibits the use of water (divert, dam, store, abstract or use water resources or construct or maintain any works for the use of water resources) without authority. Section 16 empowers the Commission to grant Water Rights (water use permits) to prospective users. 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 proposed project will involve sourcing water from surface and groundwater. The appropriate authorization will be sought from the WRC prior to the commencement of work
18.	<u>Water Use Regulations 2001, LI 1692</u> The Water Use Regulations 2001, LI 1692 prohibits the use of water resources without authority from the Water Resources Commission. It provides procedures for allocating permits for various water uses including domestic, commercial, municipal, industrial, agricultural, power generation, water transportation, fisheries (aquaculture), environmental, recreational and underwater (wood) harvesting. The Act provides under section 16 for any person to apply to the Commission in writing for the grant of water right. The Regulations also prescribe the raw water charges and processing fees to be paid by prospective water users with respect to the water use permits. The Commission is also mandated to request for evidence that an environmental impact assessment or an environmental management plan has been approved by the EPA before issuance of the Water Use Permit.	Project managers will ensure the continuous renewal of water use permits through the appropriate tariff setting and compliance with permit requirements
19.	<u>Ghana Meteorological Agency 2004, Act 687</u> 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.	The project managers will liaise with the Ghana Meteorological Agency regularly especially in seeking meteorological information and advice

4.3 Agriculture Sector Legislation and Related Requirements

The agriculture sector legislation reviewed include:

- The Irrigation Development Authority Regulations, 1987 (L.I. 1350)
- Irrigation Development Authority (Irrigation Water Users Association) regulations, 2016 (LI 2230);
- Plants and Fertilizer Act 2010 (Act 803);

No.	Legal Framework and Key Compliance Requirements	Applicability to Proposed Project
20.	<u>The Irrigation Development Authority Regulations, 1987 (L.I. 1350)</u> The regulations provide procedures for managing irrigation projects including water management within such projects. Ghana Irrigation Development Authority's (GIDA) Technical Guidelines for Irrigated Agriculture, 2004, gives further details on how to effectively manage water	The SMEs will be guided by the procedures outlined in the regulations

No.	Legal Framework and Key Compliance Requirements	Applicability to Proposed Project
	for irrigated agriculture including water supply, distribution and application management.	
21.	<u>Irrigation Development Authority (Irrigation Water Users Association) regulations, 2016 (LI 2230)</u> LI 2230 proposes that persons who use irrigation water and are not less than fifteen in number may form an association after those persons have set up a provisional initiative team to identify the service area of the proposed association and a founders' committee, which may not exceed twelve potential members of the association. Persons who qualify to form the association are those who possess land on the basis of landholding system and use the land with water supplied from the irrigation infrastructure. The regulation is applicable associations formed on government irrigation infrastructure. The management body of the association shall include the General Assembly, Management Committee, Oversight Committee and Dispute Settlement Committee.	SADP will establish irrigation systems and is therefore bound by the requirements of the regulation.
22.	<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.

4.4 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;
- Land Use and Spatial Planning Act, 2016 (Act 925); and

No.	Legal Framework and Key Compliance Requirements	Applicability to Proposed Project
23.	<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 District 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 District Assemblies will be sought in designing water distribution networks
24.	<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	The project will involve development of agricultural infrastructure such as sheds, storage, hatcheries etc. and the

No.	Legal Framework and Key Compliance Requirements	Applicability to Proposed Project
	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.	necessary building permit will be acquired.
25.	<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 does not involve resettlement. However, in the event of any form of displacement or disturbance, due process will be followed in accordance with relevant provisions of this Act
26.	<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 SADP 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.
27.	<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 SADP project design will be guided by planning schemes and local plan guides developed by the Land Use and Spatial Planning Departments/District Assemblies

4.5 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;
- 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).

No.	Legal Framework and Key Compliance Requirements	Applicability to Proposed Project
28.	<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
29.	<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.
30.	<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 supporting workers injured at the workplace on the shoulders of the employers.	The Labour policy and employment contracts will provide for workmen compensation in the event of injury.
31.	<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
32.	<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
33.	<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
34.	<u>Ghana Standards for Health Protection - Requirements for Ambient Noise Control (GS 1222, 2018)</u> 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	Noise generated at both the construction and operation stages will be monitored as stated in the proposed ESMP to ensure it does not exceed acceptable limits

No.	Legal Framework and Key Compliance Requirements	Applicability to Proposed Project
	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	
35.	<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
36.	<u>Factories, Offices and Shops Act, 1970 (Act 328)</u> The Act requires all proponents to register every factory/workplace with the Chief Inspector of Factories Inspectorate Division (FID), report accidents, dangerous occurrences and industrial diseases, post in a prominent position in every factory the prescribed abstract of the Act and other notices and documentations, as well as outlines the regulations to safeguard the health and safety of workers.	Warehouses for storage of materials and project offices will be registered with the FID. Accidents/incidents will be captured in the HSE policy. Also, relevant safety notices will be posted at vantage points.
37.	<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.
38.	<u>Fire Precaution (Premises) Regulations, 2003 (LI1724)</u> The Fire Precaution (Premises) Regulations 2003 (LI 1724) requires all premises intended for use as workplaces to have Fire Certificates.	Fire certificates will be obtained for warehouses and project offices.
39.	<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.
40.	<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.
41.	<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.	

No.	Legal Framework and Key Compliance Requirements	Applicability to Proposed Project
42.	<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.	SADP 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.
43.	<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.	SADP 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.

4.6 Institutional Framework

The stakeholder institutions identified include:

- Ministry of Food and Agriculture;
- Ghana Irrigation Development Authority;
- Irrigation Company of Upper Region Limited (ICOUR);
- Water Resources Commission;
- Lands Commission;
- Forestry Commission;
- Environmental Protection Agency;
- Local Government Authority; and
- Traditional Authorities.

No.	Institutional Framework and Key Implementation Responsibilities for the project in general and subprojects	Roles and responsibilities in implementing project's ESMP
1.	<u>Ministry of Food and Agriculture (MOFA)</u> 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 Savanna Agricultural Value Chain Development Project (SADP) 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
2.	<u>Ghana Irrigation Development Authority (GIDA)</u> GIDA is a semi-autonomous agency of MOFA which was established by the Supreme Military Council Decree 85 (SMCD) of 1977 to explore all water resources for livelihood options in agriculture at appropriate scales for all communities. Its functions include formulating, developing and implementing irrigation and drainage plans for all year round agriculture production, livestock and fish culture in Ghana. Currently, its services and activities comprise: ▪ Developing design standards for irrigation infrastructure; ▪ Designing irrigation infrastructure and related facilities e.g. dams, ponds, and tube-wells, conveyance structures; ▪ Carrying out land-use planning in areas earmarked for irrigation development; ▪ Providing public irrigation facilities; ▪ Providing technical services for the development of irrigation facilities; ▪ Providing technical and managerial services for effective use of irrigation facilities; and ▪ Developing and disseminating adaptive irrigation technology.	GIDA will provide technical advice on the design and installation of the irrigation system.
3.	<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.	SADP must obtain water use permit from WRC and collaborate with the WRC in the protection of water bodies

No.	Institutional Framework and Key Implementation Responsibilities for the project in general and subprojects	Roles and responsibilities in implementing project's ESMP
	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.	
4.	<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 Tamale Metropolis 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.
5.	<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;	The SADP 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 for the project in general and subprojects	Roles and responsibilities in implementing project's ESMP
	- 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.	
6.	<u>The Forestry Commission (FC)</u> The Forestry Commission Act, 1999 (Act 571) makes the FC responsible for the regulation of utilization of forest and wildlife resources, the conservation and management of those resources and the coordination of policies related to them. The Commission embodies the various public bodies and agencies that were individually implementing the functions of protection, management, the regulation of forest and wildlife resources.	Implementation of the SADP will involve clearing of some trees as part of land preparation, This activity will be guided by the requirements of the FC
7.	<u>Environmental Protection Agency</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 Agency 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 Agency Act 1994, Act 490 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.	SADP will follow and abide by all EPA procedures in the implementation of the project.
8.	<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.	The project is located in the Tamale Metropolis 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.

No.	Institutional Framework and Key Implementation Responsibilities for the project in general and subprojects	Roles and responsibilities in implementing project's ESMP
	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.	
9.	<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 District Assemblies.	The proposed project site falls under the Dagbon Traditional Council that is a key stakeholders in the project.

4.7 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 below.

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	Species such as rosewood, which is listed on CITES, could be affected by project activities such as land clearing. The ESIA will identify endangered species in the project area and recommend appropriate mitigation measures for their protection and conservation.
3.	<u>United Nations Framework Convention on Climate Change (UNFCCC)</u>	06 September 1995	The SADP is a government agricultural initiative and is therefore bound by the requirements of the regulation.

No.	Legal Framework and Key Compliance Requirements	Ratification Date	Applicability to Proposed Project
	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.		

4.8 African Development Bank Operational Safeguards

The African Development Bank (AfDB) has published Operational Safeguards (OSs) to guide the safe development of projects it is funding. The triggered policies are described in the **Table 4-2** below. The AfDB requirements are not inconsistent with the national requirements and therefore no implementation conflicts are foreseen.

Table 4- 2: Operational Safeguards of the 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	Triggered	OS1 is triggered because SADP will be based on the development and rehabilitation of agriculture infrastructures, which may pose environmental and social risks. SADP risks will be managed throughout the implementation of mitigation measures prescribed in the site specific ESMPs.

No.	AfDB Operational Safeguard Policy	Summary of core requirements	Potential for Trigger under proposed project	Applicability to proposed project
		1, 2, 3, 4 and 5 based on the extent of adverse impacts anticipated from the project.		
2.	OS2– Involuntary resettlement: land acquisition, population displacement and compensation	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, 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.	Triggered	The project will not acquire lands since interventions will focus on only existing farmers and value chain actors. However, the project implementation could restrict locals or herders from accessing lands that are used as pasture lands.
3.	OS3- Biodiversity, renewable resources and ecosystem services	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	Triggered	OS3 is triggered since the proposed interventions will involve extraction of natural resources including use of water, soils (e.g., commercial harvesting, agriculture, livestock).
4.	OS 4–Pollution prevention and control, hazardous materials and resource efficiency	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,	Triggered	OS4 is triggered 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.

No.	AfDB Operational Safeguard Policy	Summary of core requirements	Potential for Trigger under proposed project	Applicability to proposed project
		hazardous materials and waste, and related issues		
5.	OS5–Labour conditions, health and safety	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 support the use of child labour and forced labour	Triggered	The Contractor shall comply with the Labour laws and Occupational Health and Safety Best Practice.

5.0 ENVIRONMENTAL AND SOCIAL BASELINE CONDITIONS

Baseline conditions give the existing status of the environment in the area before the commencement of the proposed project. The information serves the purpose of a base reference against which the changes due to the implementation of the project are measured. The baseline conditions of the proposed project area are discussed in this chapter.

5.1 Project Location

5.1.1 Direct influence area of the project

The immediate geographical area of influence of the project will be beneficiary communities, which have been identified based on the availability of vast land for commercial farming. **Table 5-1** describes the environmental and social conditions in these communities. Considering that the environmental and social characteristics are largely homogeneous, broader reference is made to information on the Tamale Metropolitan Area, where the project communities are located.

Table 5- 1: Environmental and social conditions in Potential Communities

MMDA	POTENTIAL COMMUNITIES	BASELINE ENVIRONMENT
Tamale Metro	Zorbogu	Topography: The landform is generally flat and undulating Drainage: The area is drained by the Kulbon' bila stream and Kpalsini dugout which is about 800m from the community. Biodiversity: The vegetation cover is predominantly shrubs and grasses interspersed with trees such as neem and shea. Some common fauna are earthworms, dung beetles, cattle, goats, and birds Socioeconomic activities: Farming and trading are the key economic activities. Crops cultivated include maize, soya, cowpea, cassava, yam, vegetables, potato, G. nuts, bambara beans Natural disasters: Events of natural disasters are seasonal in nature with bushfires experienced in the dry season while floods are experienced in the rainy season.
	Changnaayili	Topography: The topography is mostly flat with a few hills Drainage: The area is drained by the Kpalsini stream, and the Moag'palli and Moag'kurli dugouts Biodiversity: The vegetation cover is predominantly shrubs and grasses interspersed with trees such as neem and shea. Some common fauna are earthworms, dung beetles, cattle, goats, and birds Socioeconomic activities: Farming and trading are the key economic activities. Crops cultivated include maize, soya, cowpea, cassava, yam, vegetables, potato, groundnuts, and bambara beans Natural disasters: Events of natural disasters are seasonal in nature with bushfires experienced in the dry season while floods are experienced in the rainy season.
	Cheshei	Topography: The topography is mostly flat Drainage: The area is drained by the Cheshei dugout (about 1km away) and Golinga stream (about 2km away)

		Biodiversity: The vegetation cover is predominantly shrubs and grasses interspersed with trees such as neem and shea. Some common fauna are earthworms, dung beetles, cattle, goats, and birds Socioeconomic activities: Farming and trading are the key economic activities. Crops cultivated include maize, soya, cowpea, cassava, yam, vegetables, potato, groundnuts, and bambara beans Natural disasters: Events of natural disasters are seasonal in nature with bushfires experienced in the dry season while floods are experienced in the rainy season.
	Pagazaa	Topography: The topography is mostly flat Drainage: Waterbodies in and around the community are the Kpalsini dugout (800 m away) and Yelbonni stream (1.6 km) Biodiversity: The vegetation cover is predominantly shrubs and grasses interspersed with trees such as neem and shea. Some common fauna are earthworms, dung beetles, cattle, goats, and birds Socioeconomic activities: Farming and trading are the key economic activities. Crops cultivated include maize, soya, cowpea, cassava, yam, vegetables, potato, groundnuts, and bambara beans Natural disasters: Events of natural disasters are seasonal in nature with bushfires experienced in the dry season while floods are experienced in the rainy season.
	Futa	Topography: The topography is mostly flat Drainage: The source of the community's water is the Futa Kulbong stream Biodiversity: The vegetation cover is predominantly shrubs and grasses interspersed with trees such as neem and shea. Some common fauna are earthworms, dung beetles, cattle, goats, and birds Socioeconomic activities: Farming and trading are the key economic activities. Crops cultivated include maize, soya, cowpea, cassava, yam, vegetables, potato, groundnuts, and bambara beans Natural disasters: Events of natural disasters are seasonal in nature with bushfires experienced in the dry season while floods are experienced in the rainy season.
	Labariga	Topography: The topography is mostly flat Drainage: The source of the community's water is the Chirgini dugout (2.4km) Biodiversity: The vegetation cover is predominantly shrubs and grasses interspersed with trees such as neem and shea. Some common fauna are earthworms, dung beetles, cattle, goats, and birds Socioeconomic activities: Farming and trading are the key economic activities. Crops cultivated include maize, soya, cowpea, cassava, yam, vegetables, potato, groundnuts, and bambara beans Natural disasters: Events of natural disasters are seasonal in nature with bushfires experienced in the dry season while floods are experienced in the rainy season.
	Juni	Topography: The topography is mostly flat Drainage: The source of the community's water is the Juni stream Biodiversity: The vegetation cover is predominantly shrubs and grasses interspersed with trees such as neem and shea. Some common fauna are earthworms, dung beetles, cattle, goats, and birds

		Socioeconomic activities: Farming and trading are the key economic activities. Crops cultivated include maize, soya, cowpea, cassava, yam, vegetables, potato, groundnuts, and bambara beans Natural disasters: Events of natural disasters are seasonal in nature with bushfires experienced in the dry season while floods are experienced in the rainy season.
	Adebiliyili	Topography: The topography is mostly flat Drainage: The community and its environs are drained by the Teacherni dugout (2km away) and Golinga stream (4km away) Biodiversity: The vegetation cover is predominantly shrubs and grasses interspersed with trees such as neem and shea. Some common fauna are earthworms, dung beetles, cattle, goats, and birds Socioeconomic activities: Farming and trading are the key economic activities. Crops cultivated include maize, soya, cowpea, cassava, yam, vegetables, potato, groundnuts, and bambara beans Natural disasters: Events of natural disasters are seasonal in nature with bushfires experienced in the dry season while floods are experienced in the rainy season.
	Datoyili	Topography: The topography is largely undulating Drainage: The community and its environs are drained by the Teacherni dugout (1km away) and Golinga stream (2km away) Biodiversity: The vegetation cover is predominantly shrubs and grasses interspersed with trees such as neem and shea. Some common fauna are earthworms, dung beetles, cattle, goats, and birds Socioeconomic activities: Farming and trading are the key economic activities. Crops cultivated include maize, soya, cowpea, cassava, yam, vegetables, potato, groundnuts, and bambara beans Natural disasters: Events of natural disasters are seasonal in nature with bushfires experienced in the dry season while floods are experienced in the rainy season.
	Fooshegu	Topography: The topography is largely undulating Drainage: The sources of water for the community are the Fooshegu dugout (1km away) and Teacherni dugout (3km away) drained by the Teacherni dugout (1km away) and Golinga stream (2km away) Biodiversity: The vegetation cover is predominantly shrubs and grasses interspersed with trees such as neem and shea. Some common fauna are earthworms, dung beetles, cattle, goats, and birds Socioeconomic activities: Farming and trading are the key economic activities. Crops cultivated include maize, soya, cowpea, cassava, yam, vegetables, potato, groundnuts, and bambara beans Natural disasters: Events of natural disasters are seasonal in nature with bushfires experienced in the dry season while floods are experienced in the rainy season.
	Tugu	Topography: The topography is largely undulating Drainage: The sources of water for the community are the Kpeinduhini dugout (0.8km) and Nyevarini stream (2km), Biodiversity: The vegetation cover is predominantly shrubs and grasses interspersed with trees such as neem and shea. Some common fauna are earthworms, dung beetles, cattle, goats, and birds

		Socioeconomic activities: Farming and trading are the key economic activities. Crops cultivated include maize, soya, cowpea, cassava, yam, vegetables, potato, groundnuts, and bambara beans Natural disasters: Events of natural disasters are seasonal in nature with bushfires experienced in the dry season while floods are experienced in the rainy season.
	Jarigu Baani	Topography: The topography is largely undulating Drainage: The sources of water for the community is the Jarigu dugout Biodiversity: The vegetation cover is predominantly shrubs and grasses interspersed with trees such as neem and shea. Some common fauna are earthworms, dung beetles, cattle, goats, and birds Socioeconomic activities: Farming and trading are the key economic activities. Crops cultivated include maize, soya, cowpea, cassava, yam, vegetables, potato, groundnuts, and bambara beans Natural disasters: Events of natural disasters are seasonal in nature with bushfires experienced in the dry season while floods are experienced in the rainy season.

5.1.2 Indirect influence area of the project: Tamale Metro District

The Tamale Metropolitan Assembly, one of the country's six Metropolitan Assemblies and the only Metropolis in the five Northern Ghanaian regions, namely the Upper East, Upper West, Northern, North East, and Savannah. Tamale is both the metropolitan and regional capital of the Northern Region. It is located in the central part of the Region and is bounded to the north-west by Sagnarigu Municipality, to the east by Mion District, to the south by East Gonja, and to the south-west by Central Gonja. The Metropolis has a total estimated land size of 454 sqkm and located between latitudes 9°16 and 9° 34 North and longitudes 0° 36 and 0° 57 West (**Figure 5-1**).



Figure 5- 1: Map of Ghana showing the beneficiary districts including TaMA

sand, clay, and laterite ochrosols (**Figure 5-4**). The availability of the various soil types has aided rapid real estate development such as sea sand, gravel, and clay being used by developers especially in urban areas. In the rural parts, the soil type is sandy loam and it is suitable for growing crops such as millet, maize, guinea corn, groundnuts, yam, and beans.

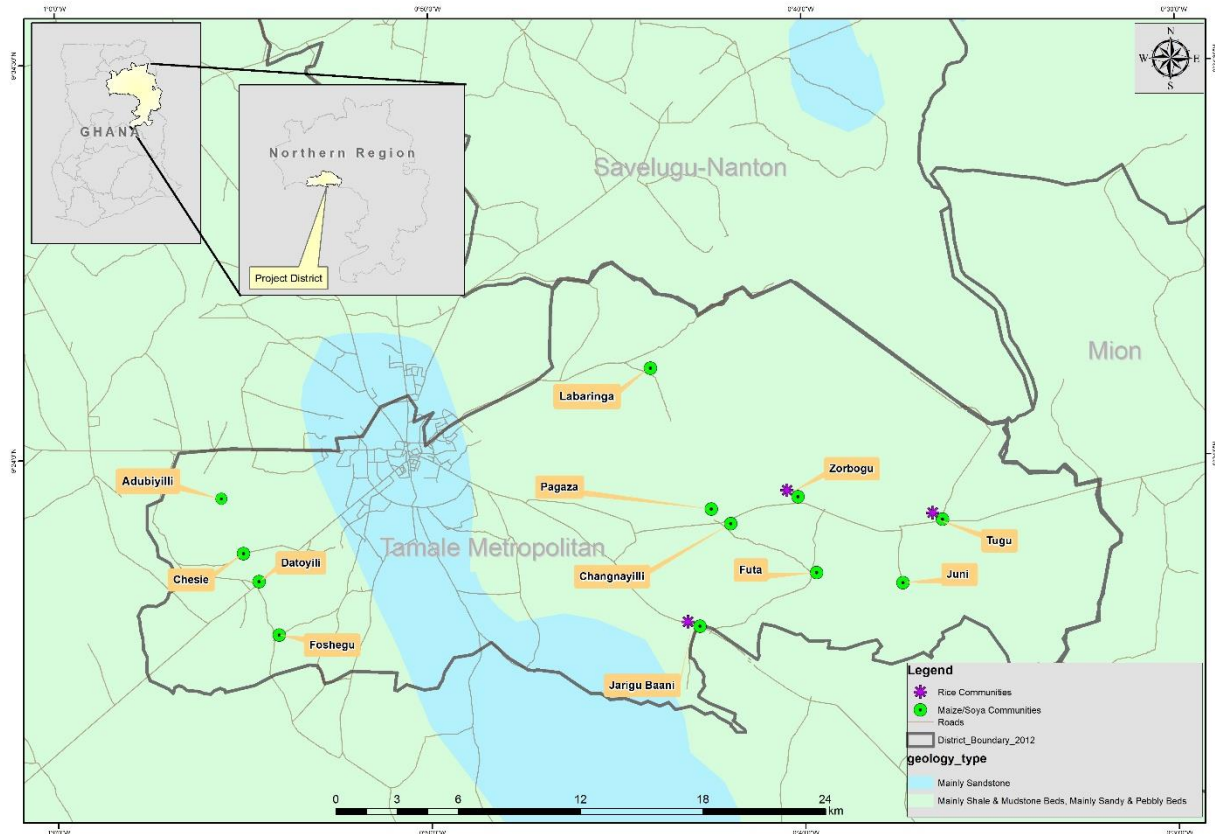


Figure 5- 3: Geology of the Tamale Metropolitan Area

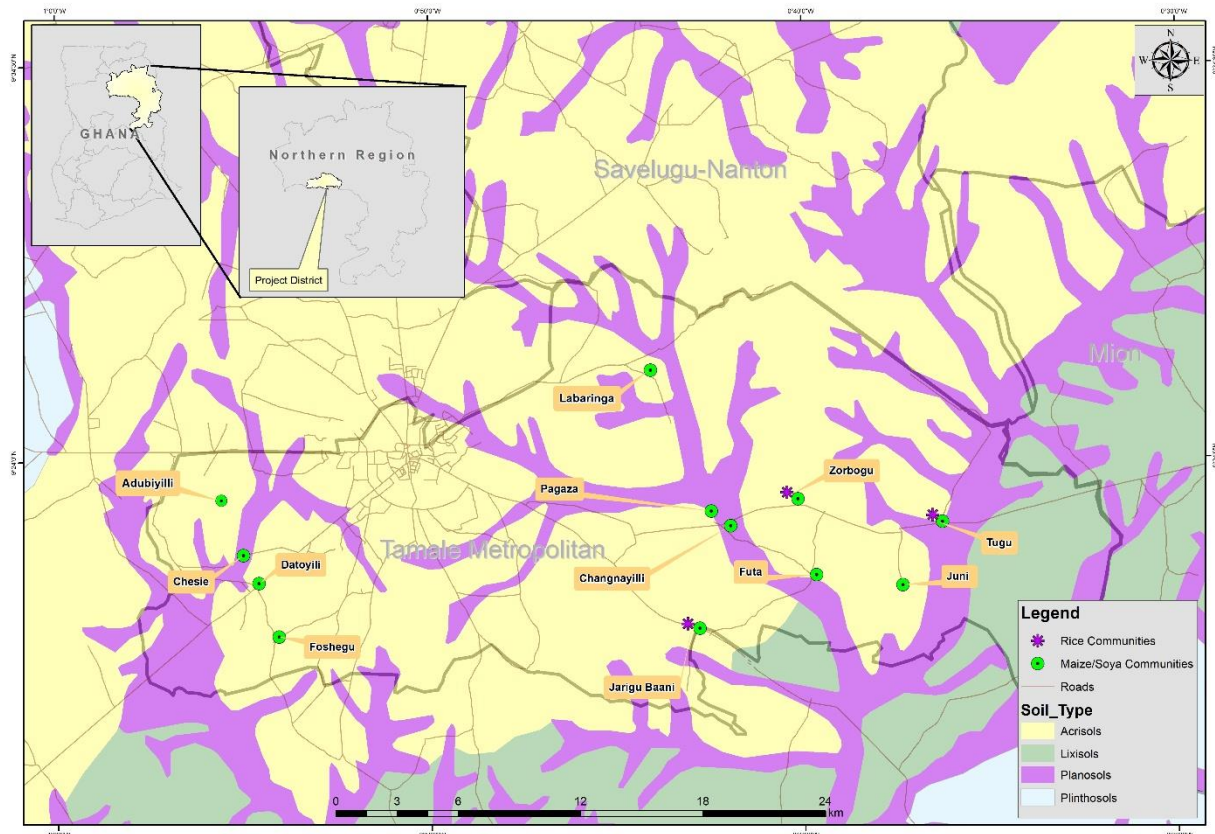


Figure 5- 4: Soil Map of the Tamale Metropolitan Area

5.2.3 Climate

The area is characterized by two main seasons, the dry and the raining seasons with an annual average rainfall of 1200mm. The dry season starts from late October to early May 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. Also, dry harmattan winds from the Sahara are experienced during the months of November to February. The coldest nights in the year are experienced in the months of December, January and February, while the hottest nights are experienced in the months of March, April and May. Farming activities noted for this period are harvesting of rice, cassava, yam, drying of foodstuffs, preparation of farmlands and raising of yam mounds.

The rainy season is characterized by inaccessibility of some parts of the Metropolis due to bad roads. This period, June to early August, is also associated with lean or food shortage. Cultivation and sowing is also done during this period.

5.2.4 Environmental Quality

The Zorbogu community was chosen for environmental quality assessment out of the twelve (12) potential communities because it has the largest land area suitable for cultivation of maize and soybeans.

Air Quality

The sampling and analysis of ambient particulate matter concentrations was done according to the ASTM Test Method D4096-17. Particulate matter was sampled 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 quartz filter paper was stabilized for a minimum of 24 hours before and after sampling in a desiccator.

The ARA N-FRM air sampler is equipped with a RTP profiler, which uses a Plantower light-scattering sensor to provide real-time data for two size ranges approximating PM₁₀ and PM_{2.5}. It shows trends during the sample run, supplementing the filter data. The fresh quartz filter paper was weighed before and after the 24-hour sampling period, and the difference in weight (W₂-W₁) used to calculate the concentration of the particulate matter in µg/m³.

The Particulate Matter (PM_{2.5} and PM₁₀) concentrations monitored at Zorbogu Community were 15 µg/m³ and 36 µg/m³ which are within the Ghana Standard (GS 1239:2019) permissible values of 35 and 70 (µg/m³). The monitoring team did not observe enough activities in the communities that could have significant influence on the air quality at the time of the assessment.

Ambient Noise

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_{max}, L_{min}, L_{Aeq}, L₁₀, L₅₀, L₉₀

The ambient noise levels (L_{EQ} values) recorded were compared to their respective Ghana Standard (GS 1222:2018) and IFC guideline values. The daytime ambient noise levels (dBA) for the project site (54.9dBA) was below the GSA and IFC L_{EQ} guideline values of 60 and 55 respectively. The nighttime ambient noise level (dBA) for the project site (45.0dBA) was also below the GSA and IFC L_{EQ} guideline values of 55dBA (**Annex 6**).

Surface water quality

Water testing was done at the nearest water sources to the community i.e. the Kpanlsini dugout and a borehole. The community relies mainly on the Kpanlsini dugout for drinking, washing and farming and the borehole to a limited extent.

The water sources which could potentially be recipients of any pollution impact from the project were tested on the, 17th January 2022 at 11:15am and 11:37am respectively. Parameters including Temperature, pH, TDS and Conductivity were measured in-situ using a field kit, Thermo Scientific EUTECH Handheld Meter Kit.

Parameters analyzed showed that the quality of water in the Kpalsini dugout and borehole is generally good. For the Kpanlsini dugout, pH was 6.43, conductivity, 82.9 $\mu\text{S}/\text{cm}$, and TDS of 43.17. The borehole recorded pH of 7.65, conductivity, 22.8 $\mu\text{S}/\text{cm}$, and TDS of 12.17. (Annex 6).

5.3 Biological Environment

5.3.1 Vegetation

The Metropolis lies within the Savannah Woodland Region of the country. The trees in this part of the country are short, scattered wood lots. Major tree types are the Shea, Dawadawa, Nim, Acacia, Mahogany, Baobab among others.

There are two main forest reserves located in the central part of the Metropolis namely the Nyohini and Agric Forest Reserves. However, these are being encroached upon by private developers (restaurants, petty traders, and other businesses) with other portions used for open defecation. There are naturally grown tall grasses during the rainy season that are woven into a mat called “Zanamat”, (a type of local mat for roofing and for fencing).

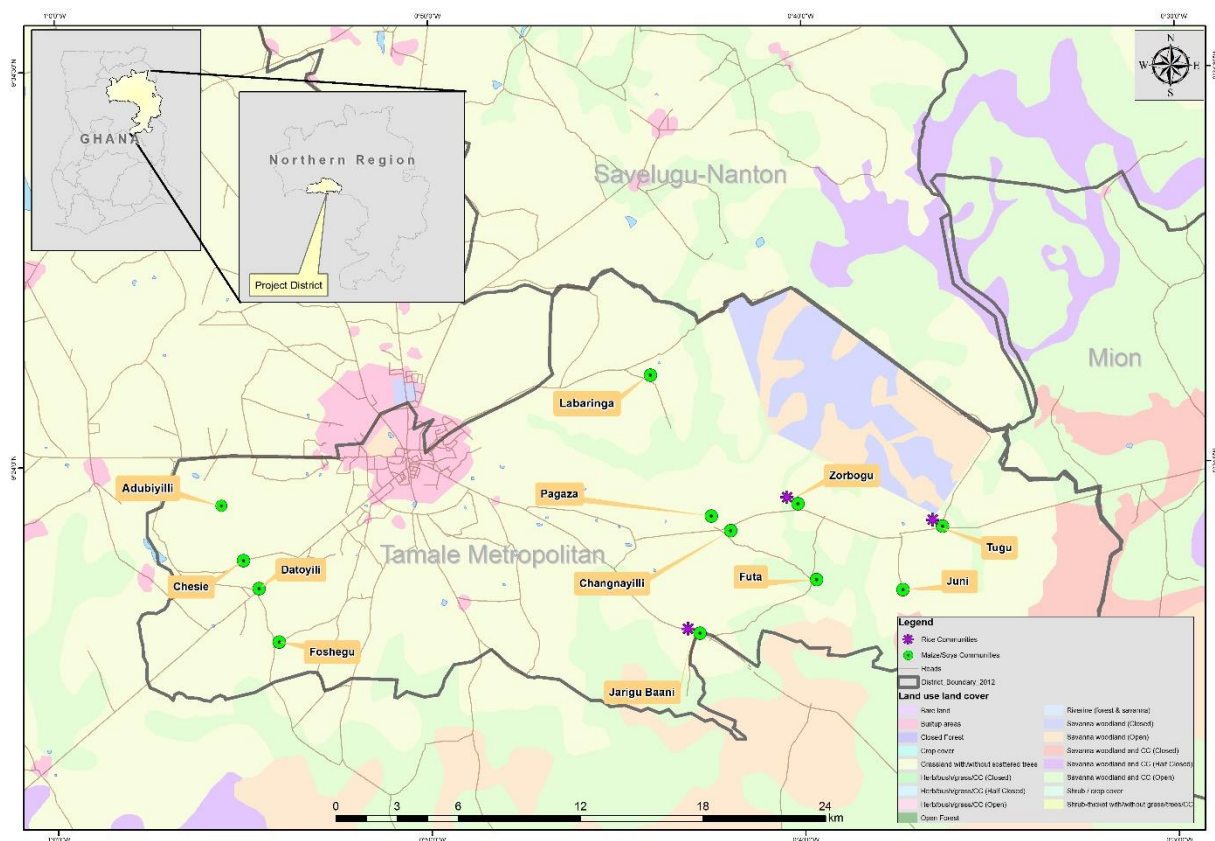


Figure 5- 5: Vegetation map of TaMA

5.4 Socio-Economic Environment

5.4.1 Governance Structure

The General Assembly of the Metropolis stands at a total of 62 members. Out of this number, 41 are elected, 18 appointed, 2 Members of Parliament and the Metropolitan Chief Executive. For effective implementation of policies in the Assembly, the Metropolitan Authority has the following Sub-Committee: the Development Planning Sub-Committee, Works Sub-Committee, Social Services Sub-Committee, Revenue Sub-Committee, Education Sub-Committee, Environment and Sanitation Sub-Committee, Finance and Administration Sub-Committee, Justice and Security Sub-Committee.

Apart from the main Assembly, there are two sub-district councils; that is Tamale South and Central Sub district councils popularly called Sub-Metros that work to achieve development at the grassroots level. The main assignment of the Sub-Metro structures is to facilitate participatory decision making, community participation in project planning and implementation. They are also expected to design pragmatic ways of generating revenue for the Sub-Metro and the Assembly in general.

There are paramount and sub-chiefs who provide leadership at the local level and promote peace, stability, and development. Key traditional rulers include the Dakpema, the Gulkpe Naa, the Lamashe Naa and the Banvim Lana. Also supporting local development efforts at that level are the Assembly members, NGOs, Women groups, and other identifiable groups.

5.4.2 Demography

The Metropolis has a total population of 374,744 comprising 185,051 (49.4%) males and 189,693 (50.6%) females. This is about 16.2% and 1.2% of the regional and national population respectively. The population density is 825 per sqkm with a total of 89,011 households and a household size of 4.1 persons per household which is lower than the regional average of 5.2.

There are four main types of dwelling units in the Metropolis. These are the separate isolated houses (Self Contained), the semi-detached houses, separate room (s) within a compound usually with common cooking and toilet facilities, and several huts or buildings within a common compound. These dwellings are identical of certain communities in the Metropolis.

According to the 2021 Population and Housing Census, all the people in the metropolis live in urban areas as compared to 80.8% in 2010. This makes the metropolis one of only two entirely urban districts in the region with the second being Tamale South.

The Metropolis is occupied by diverse ethnic and tribal groups with Dagombas being the traditional occupants of this area (more than 80%). Other tribal groups include the Gonja, Mamprusi, Nanumba, Konkomba, Asantes, Ewes, Hausa and some other minorities. This composition is important for inter-tribal cooperation which is required for peace and development in the Metropolis.

Majority (90.5%) of the population in the Metropolis is Muslim and followed by Christians. About (0.2%) has no religious affiliation. Among the Christians, the Catholics have the highest proportion of 3.0%,

followed by Pentecostal/Charismatic (2.4%) and Protestants (2.4%). The proportion of traditionalist in the Metropolis is (0.3%).

5.4.3 Education and Literacy

Currently, 60.1% of those aged 11 and up are literate, while 39.9% are illiterate. About 27.2% are literate only in English, 9.4% in a Ghanaian language, and 61.8% are literate in both English and a Ghanaian language. Less than 1% of the population is literate in English and French (0.4%) and for all the three languages (English, French and a Ghanaian language) the proportion is 1.1%. The number of female illiterates is higher than that of males.

Around 81.5% attend primary schools (Nursery, kindergarten, primary, JSS/JHS), 11.6% attend secondary/senior high schools, 0.7 percent attend vocational/technical/commercial schools, and 4.6% attend tertiary institutions. The majority of people who have previously attended school (43.0%) have completed at least the primary level. The primary level had the highest proportion of students attending school.

The Metro Education Directorate (MED) is headed by the Metropolitan Director of Education. This Directorate has the oversight responsibility of providing relevant education to all humans living in the Metropolis and to develop their potential to be productive, facilitate poverty reduction and promote socio-economic growth and development.

All the public Basic Schools are distributed among educational circuits in the Metropolis (**Figure 5-6**). The school system is run in three terms in an academic year beginning August/September. There are a number of Circuit Supervisors who inspect, supervise and monitor teaching/ learning activities within that circuit.

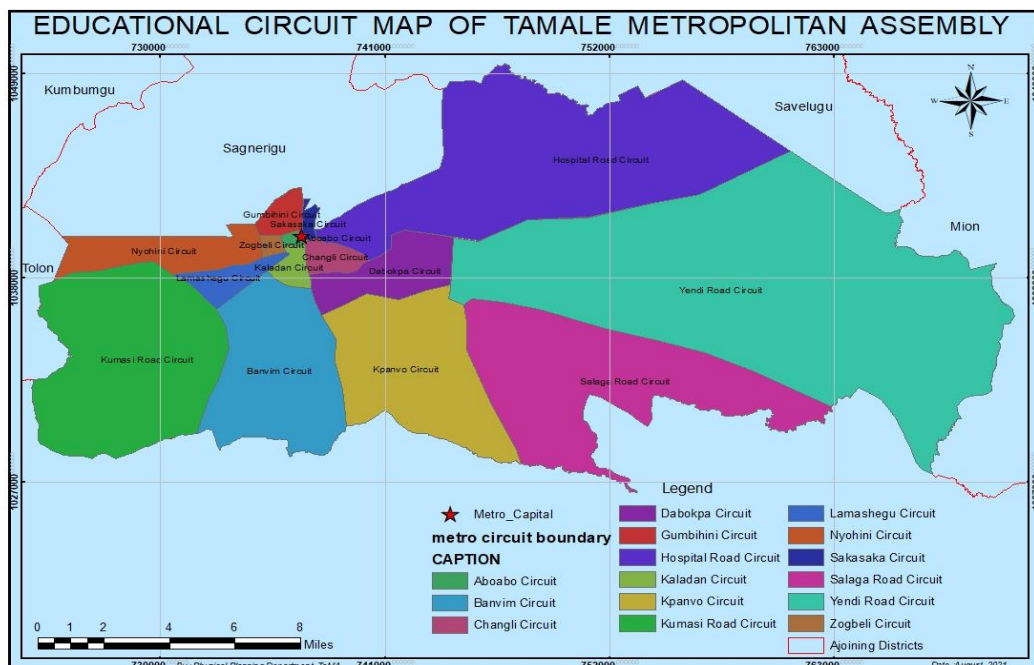


Figure 5- 6: Educational Circuits within the Tamale Metropolitan Area

5.4.4 Economic Activities

The occupation with the highest population in the Metropolis is service and sales workers (33.0%). This is followed by those in the craft and related trades workers (21.5%). The proportion of the employed persons engaged in skilled agriculture, forestry and fishery is (17.6%). There are more males compared to females in almost all the occupations except for service and sales (16.5%) for males and a large proportion (50.3%) for females.

In industry, wholesale and retail, repair of motor vehicles and motorcycles has the highest employed population (33.4%) with (22.1%) being male and (45.4%) female. Agriculture, forestry and fishing workers are the next major occupation in the Metropolis with a proportion of 18.2% of both sexes and with (24.4%) males and (11.8%) female. The next occupation that follows is manufacturing (12.5%), employing (12.1%) males and (12.9%) females. Wholesale, agriculture and retail and manufacturing account for 64.1% of the industrial base of the Metropolis.

Out of the total employed population, 11.3% are in public (government) sector while 88.1 percent are in private informal sector. A few persons are in NGOs (local and international) constituting 0.5 per cent and semi-public/parastatal has a negligible percentage of 0.1.

The 2010 PHC revealed that about half the population of the metropolis is engaged in agriculture and more than half (56.3%) of the population in the urban areas are engaged in agriculture, whereas less than half (43.3%) of the population in the rural areas are also engaged in agriculture. Agricultural activities include crop farming (excluding gardening), tree growing, livestock rearing, and fishing. Crop farming is most dominant in the Metropolis as a whole accounting for more than half (52.9%) of the population in the urban areas while less than half (43.3%) of them are also in the rural areas. Livestock rearing accounts for 49.8 percent and 50.2 percent of urban and rural households, respectively. Fish farming is virtually nonexistent in the metropolis and this may be attributed to the lack of water bodies suitable for that purpose. There is more livestock rearing in the rural areas (50.2%) as compared to the urban areas (49.8%).

5.4.5 Utilities and Services

Energy

The three main sources of lighting for most households are electricity (main grid), constituting 82.2% of households, kerosene lamp (11.6%) and flashlight/torch (4.7%).

The Metropolis enjoys electricity supply from the National Grid and about 80% of the communities are connected. Electricity supply has been fairly stable. This could be an advantage to heavy industrial development that would depend mostly on energy for production. With the expansion of electricity in the Metropolis, there is also an expansion of the Small and Medium Scale Enterprise businesses in the area.

Water

Most households in the metropolis depend on either pipe-borne water outside their dwelling or pipe-borne water inside their dwelling (representing 41.4% and 39.8% respectively). The main water system in the Metropolis is pipe borne water from the Dalun and the Nawuni Water Treatment Plants which is rationed and managed by the Ghana Water Company Limited in urban Tamale. Some urban communities have difficulty with water supply due to old pipeline structure or their location, i.e., high land areas. The Ghana Water Company Limited supplies over 45,000 cubic meters daily. Sachet water firms have therefore taken advantage of this opportunity to establish plants to utilize this resource in the area which is also creating employment opportunities for the youth. Other water facilities are town water systems, mechanized boreholes and wells.

Sanitation and Waste Management

The most widely used method of solid waste disposal is by public dump (container) accounting for 98.3% households. About 72.5% of households have their solid waste collected with the remaining households resorting to indiscriminate dumping.

Solid waste generated daily in the metropolis is managed mostly by dumping at the landfill with about 250 tons of waste disposed of in landfills daily. The landfill site at Gbalahi has a huge potential for the generation of not only biogas but also for generation of fertilizer which could be very useful to farmers but the challenge is that the waste is not segregated. The Assembly in collaboration with UNICEF is trying to develop a system that could separate liquid and solid wastes to ensure full utilization of the waste.

The commonest toilet facility is used by 56.2% of households in the metropolis and that is public toilet (WC/KVIP/Pit latrine/pan). The use of KVIP is the second commonest used by just 7.1% of households. As much as 26.1% of households in the district has no toilet facility. The commonest bath facility for most households (39.3%) in the metropolis is shared separate bathrooms in the same house. Only 24.6% of households own bathrooms for their exclusive use. For grey liquid waste disposal, most households throw onto the street/outside, into gutters or storm drains.

Communication

The TaMA also enjoys telecommunication services with an increase in telecommunication service providers such as Airtel-Tigo, Vodafone, Glo and MTN. RLG Limited has also sited their company in the metropolis which is serving as a source of employment for the youth. Broad band service in the Metropolis is also encouraging which links the Assembly to the worldwide web. This has ensured competitive service delivery in the area. Besides, business activities are done with partners on a faster schedule globally.

Media activities are now vibrant with an increase in radio stations, television stations and newspaper supply vendors. The Media houses are avenues for organizing educative programmes especially on government policies in the illiterate population in the local languages. The major problem with the newspapers is that they arrive in the Metropolis very late and as such the public cannot afford to read current news items. With technological advancement there would be the need for a newspaper printing press located in the Metropolis to serve the three Northern Regions of the country.

5.4.6 Health

The health services in the Metropolis are managed at three (3) levels namely: Metro Health Administration level, Sub-district level and the Community level (**Figure 5-7**). The Metropolis is sub-demarcated into sub-districts each with a management team known as the Sub-district Health Management Team (SDHMT). The sub-districts are:

- Builpela Sub-district
- Tamale Central Sub-district
- Vittin Sub-district

The SDHMTs are responsible for programme planning and implementation of health activities in their various sub-districts, some of them include:

- Conduct integrated static and outreach activities such as immunization, reproductive health, disease control, growth monitoring, health education/promotion and clinical care
- Training and supervision of community -based health workers such as traditional birth attendants (TBAs), Community Based Surveillance (CBS) volunteers, village Health Committees.

Health services are provided at the community level by sub-districts staff supported by TBAs, CBS volunteers.

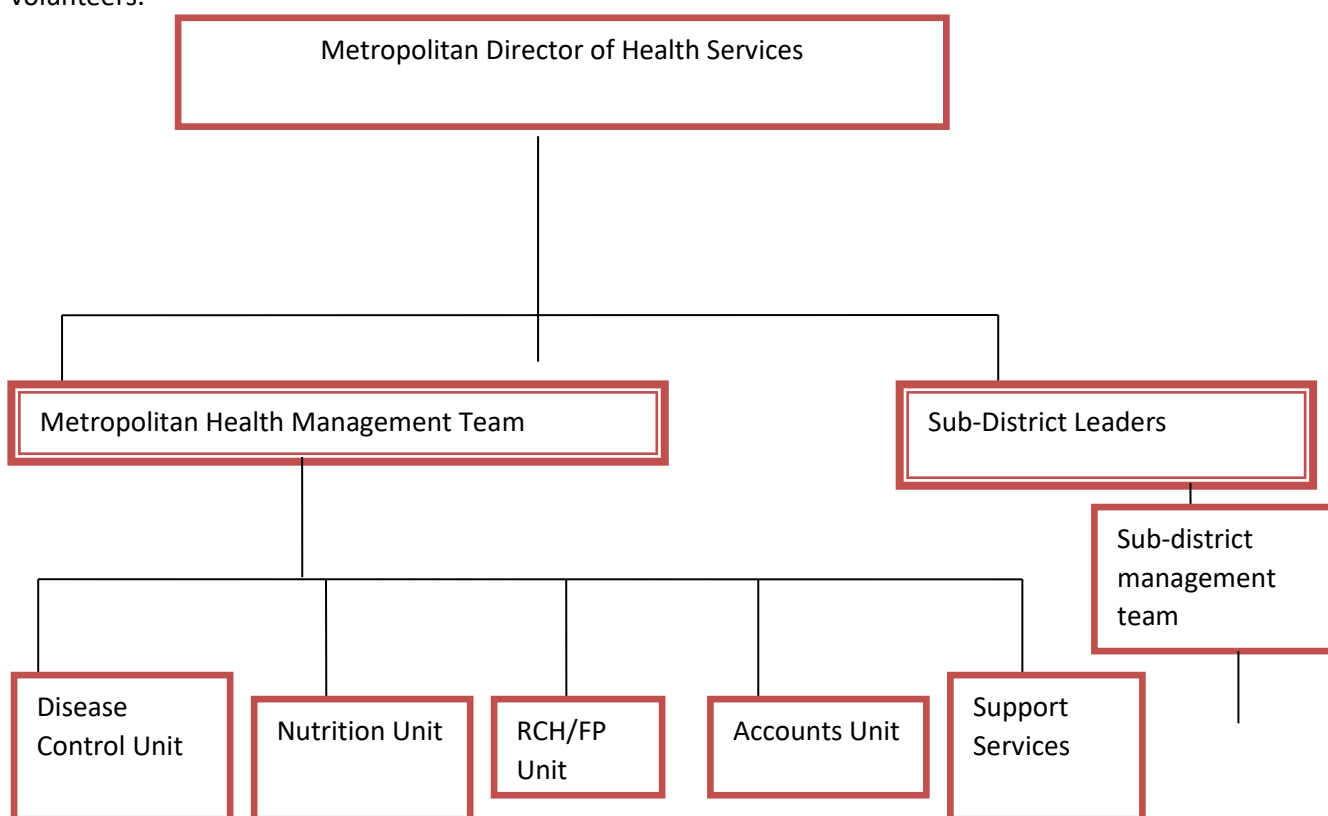


Figure 5- 7: Health Service Management Structure in the Tamale Metropolis

5.4.7 Transportation

The major transport services in the area are taxi cabs with a main taxi station at the Central Business District (CBD). There is also an enormous usage of motorbikes and tricycles within the metropolis which is the main source of affordable transport for both males and females. State bus services such as the State Transport Company and Metro Mass Transit, and other private bus services like OA Transport link the Metropolis with other cities and towns in the country.

For easy transport of goods and services, EMS, FEDEX, DHL and others offer fast and reliable express services from the Metropolis to other places. There is a National Airport located at Mile 9. Major airlines such as Africa World Airlines and Passion Air offer domestic air services to customers in and around the Northern part of the country.

The roads in the Metropolis are fairly good especially those that link the Metropolis to other adjoining district capitals. The tarred roads in the area facilitate easy commuting from one place to the other. There is no traffic congestion. Most of the farming and the peri-urban communities are linked to the marketing centers by feeder roads. The availability of access roads linking farming communities to marketing centres enables farmers to transport their produce to the urban marketing centres with ease. Consequently, their postharvest losses are likely to be less or reduced. The picture below shows one feeder road within the Metropolis (**Plate 5-1**).



Source: TAMA PHC 2010 Report

Plate 5- 1: Some Infrastructure on the project site

5.4.8 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.

Where royal land is involved, as in the case of chieftains, land and right to chieftaincy may be passed on from a father to his sons, who are wards of the father's brother on the understanding that the right to the land and chieftaincy should rotate among the sons of the father and the father's brother.

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. Only farmers who own lands, and can show evidence of land ownership, and meet other requirements will be supported. Due diligence will be done to ensure that ownership of farmlands is undisputed.

6.0 POTENTIAL ENVIRONMENTAL AND SOCIAL ISSUES AND IMPACTS

6.1 Project Area of Influence

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 SADP will have both positive and negative social, economic and environmental impacts at different levels.

6.2 Geographical area of influence

The immediate geographical area of influence will be communities near selected commercial farms or agricultural establishments such as poultry, warehousing facilities and processing plants.

6.3 Environmentally sensitive areas to be influenced

The project area is considered an environmentally sensitive area according to the list of Environmentally Sensitive Areas of the Environmental Assessment Regulations 1999 (LI 1652), Schedule 5 (Regulation 30 (2)) – No. 7. (see Annex 2)

6.4 Community influence and vulnerable groups

Communities in proximity to commercial farms or agricultural establishments may be affected by construction activities especially construction or expansion of infrastructure such as warehouses, hatcheries, etc.

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;
- the elderly, usually from 70 years and above;
- very sick and or physically weak individuals;
- people without formal land rights;
- migrants/settlers;
- women; and
- children.

6.5 Institutional Influence

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

- Ministry of Food and Agriculture;
- Project Coordinating Unit;

- Water Resources Commission;
- Lands Commission;
- Forestry Commission
- Environmental Protection Agency;
- Regional Coordinating Council;
- Metropolitan Assembly;
- Fire Service; and
- NADMO.

6.6 Criteria of Impact Evaluation

6.6.1 Duration of the Impact

- A temporary impact can last days, weeks or months, but must be associated with the notion of reversibility.
- A permanent impact is often irreversible. It is observed permanently or may last for a very long term.

6.6.2 Extent of the Impact

- The extent is regional if an impact on a component is felt over a vast territory or affects a large portion of its population.
- The extent is local if the impact is felt on a limited portion of the zone of study or by a small group of its population.
- The extent is site-specific if the impact is felt in a small and well defined well-defined space or by only some individuals.

6.6.3 Intensity of the Impact

- The intensity of an impact is qualified as strong when it is linked to very significant modifications of a component.
- An impact is considered of average intensity when it generates perceptible disturbance in the use of a component or of its characteristics, but not in a way to reduce them completely and irreversible.
- A weak intensity is associated with an impact generating only weak modifications to the component considered, without putting at risk some its utilization or its characteristics.

6.6.4 Impact severity

- A 'negligible or nil impact' or an impact of negligible significance is where a resource or receptor will not be affected in any way by a particular activity, or the predicted effect is deemed to be imperceptible or is indistinguishable from natural background levels.
- A 'minor impact' or an impact of minor significance is one where an effect will be experienced, but the impact magnitude is sufficiently small and well within accepted standards, and/or the receptor is of low sensitivity/value. In such instances, standard construction/ operational practices can address such impacts.

- A 'moderate impact' or an impact of moderate significance is where an effect will be 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. In such cases, standard construction practices can take care of these impacts, but mitigation measures may also be required.
- A 'major impact' or an impact of major significance is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors. In such cases, alternatives are required to address such impacts otherwise mitigation measures should be adopted with strict monitoring protocols.

The above classification is largely subjective and may be overruled by new site-specific issues or information and detailed project activities not captured in this report.

6.7 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 and risk reduction;
- Adoption of good agricultural practices;
- Technology transfer
- Save the Government of Ghana from importing poultry products as well as cereals and thereby save foreign exchange for Ghana
- Availability of poultry waste which can be used as organic manure on the maize and cereal farms

6.7.1 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, hatcheries, 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.

6.7.2 Increased commerce and boost to local economy

Agricultural productivity will increase quantitatively due to increased access to mechanization services by crop and poultry 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.

6.7.3 Food security and risk reduction

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.

6.7.4 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.

6.7.5 Technology transfer

Farmers will be exposed to new technologies for geomapping, crop and poultry 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, modern incubation and hatcheries, mechanized plucking and veterinary support will all increase productivity of farmers and increase their savings.

6.7.6 Availability of poultry waste which can be used as organic manure on the maize and cereal farms

Increased production in the poultry sector can help address the challenge of limited access to inorganic fertilizer. Farmers can use their poultry waste to create organic manure, which is environmentally friendly, in appreciable quantities to be distributed amongst farmers within the district to augment the distribution of inorganic fertilizers within the savannah regions.

6.8 Major and Moderate Negative Impacts

The environmental impacts of the project have been grouped as major and moderate impacts based on their significance. Also, impacts have been considered at the various phases of the project, i.e., preparatory, construction and operation. The major and moderate adverse impacts are described below and in **Table 6-1**:

Preparatory phase

- **Land related disputes** - Acquisition of lands without following due process could result in land-related disputes
- **Impact on livelihoods** - The project activities could restrict locals access to lands and other resources 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 waterbodies and affect flora and soil fauna.
- **Air pollution** – Land preparation and transport of materials on untarred roads will generate dust. Also, vehicular exhaust fumes will be emitted by trucks and construction equipment. The dust and fumes could 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, fertilizer and pesticides via runoff into nearby water bodies will reduce the quality of water and could also smother some fishes and other vertebrate and invertebrate organisms, including benthic ones
- **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 for dinning, resting, sick bays, etc. 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.

- **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 and ambient air will adversely affect the health of users. Sexual relations between workers and locals may bring about increase in sexually transmitted diseases including HIV/AIDs. Interactions between workers and locals could also lead to the spread of COVID-19.
- **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. Also, haulage of products and inputs such as fertilizers, pesticides, seeds especially on untarred routes to and from farms or agricultural establishments will generate dust.
- **Pollution of Soils and Water** – Wastes, workforce sewage effluent, as well as runoff from cultivated land (containing fertilizers, pesticides, fungicides and herbicides, inoculants, etc.) could pollute surface water, reduce its quality and make it unsuitable for use.
- **Odours** - Odours associated with poultry and waste may have nuisance value for nearby receptors i.e. humans.
- **Noise and Vibration** - Noise and vibration from operation of processing equipment, equipment maintenance, movement of haulage vehicles, tooting of horns and noise from the poultry birds could be a nuisance to persons within the project community or nearby communities. Also, continual high background noise has a detrimental effect on poultry especially in egg production.
- **Waste generation and disposal** - Improper disposal of vegetative waste from weeding, harvests, and 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. Incidence of transmission of H1NI virus from poultry to the workforce.
- **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. There could be issues of discrimination, forced labour, child labour, restriction of freedom of association and collective bargaining and lack of worker grievance redress mechanism.

- **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
- **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. Interactions between workers and locals could also lead to the spread of COVID-19. There is the potential for the transmission of H1N1 virus from poultry to humans especially workers handling birds
- **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.

Table 6- 1: Major and moderate Adverse Impacts of the Subproject in the Tamale Metropolitan Area

No.	Project Component	Description	Possible project area/ activity with potential E&S risks	Relevant OS	Anticipated issues/ risks
1	C1-1	Commercial Production of Maize and Soybean under Conservation Agriculture	• Clearing of vegetation as part of land preparation • Civil works during development of water management systems e.g. dugouts • Civil works, e.g., rehabilitation/expansion of sheds, storage etc. • Equipment purchases and usage e.g. harvesters etc. • Haulage of inputs and produce • Handling and storage of produce • Hiring and management of workers	• 1, 2, 3, 4, 5	• Loss of vegetation and impact on natural habitats • Occupational Health and Safety issues (including COVID-19 infections) • Waste generation (including solid, liquid and hazardous waste) • Noise pollution • Air pollution (including dust, fumes etc.) • Bushfires • Traffic management issues along haulage routes • Potential surface water contamination • Potential produce contamination • Sexual Exploitation and Abuse and Sexual Harassment (SEA/SH) • Women and vulnerable individuals or groups • Grievance from workers with respect to labour and working conditions • Potential conflicts between farmers and herdsman over animal grazing fields

No.	Project Component	Description	Possible project area/ activity with potential E&S risks	Relevant OS	Anticipated issues/ risks
2	C1-2	Promotion of Small and Medium Scale Commercial Poultry Production	• Clearing of vegetation as part of land preparation • Minimum civil works e.g. rehabilitation/expansion of hatchery, storage etc. • Small equipment purchases and usage e.g. hatchers, incubators, brooders/heaters, egg transfer units, rack washers, dressing machine etc. • Hiring and management of workers • Operations of SMEs	• 1, 2, 3, 4, 5	• Loss of vegetation and impact on natural habitats • Occupational Health and Safety issues (including COVID-19 infections) • Waste generation (including solid, liquid and hazardous waste) • Noise pollution • Air pollution (including dust, fumes etc.) • Potential water contamination • Workers' grievances • Sexual Exploitation and Abuse and Sexual Harassment (SEA/SH) • Women and vulnerable individuals or groups excluded from project benefits • Potential elite capture • Grievance from workers with respect to labour and working conditions • Odour from the poultry operations
3	C2-1	Value Addition and SME Development	• Civil works e.g. rehabilitation/expansion of sheds, storage, cold stores etc. • Promotion of packaging, new distribution networks for poultry	• 1, 3, 4, 5	• Occupational Health and Safety issues (including COVID-19 infections) • Waste generation (including solid, liquid and hazardous waste) • Noise pollution • Air pollution (including dust, fumes etc.)

No.	Project Component	Description	Possible project area/ activity with potential E&S risks	Relevant OS	Anticipated issues/ risks
			products, transport services, new agro-input delivery systems - Increased feed processing at feed mills - Hiring and management of workers - Operations of SMEs		- Traffic management along distribution corridors - Potential water contamination - Workers' grievances - Elite capture
4	C2-2	Youth/Women Empowerment and Nutrition	- Production and processing of shea, dawadawa, mango and cashew - Small equipment purchases	1, 3, 4, 5	- Occupational Health and Safety issues (including COVID-19 infections) - Waste generation (including solid, liquid and hazardous waste) - Elite capture - Land acquisition and ownership
5	C3-1	Knowledge Management, Monitoring and Evaluation	- Conduct Beneficiary Impact Assessment. - Development and Implementation of Environmental and Social Management Plan (ESMP) - Hiring and management of workers	1, 5	- PCU capacity to monitor implementation of ESMP and assess beneficiary impacts - Workers' grievances
6	C3-2	Project Coordination	- Screening of SMEs for their capacity to carry out E&S actions - Procurement of vehicles for PCU, office equipment and furniture as may be required.	1, 4, 5	PCU competence to undertake E&S screening of grant beneficiaries

No.	Project Component	Description	Possible project area/ activity with potential E&S risks	Relevant OS	Anticipated issues/ risks

6.8.1 Preparatory Phase: Major and moderate adverse impacts and specific measures

The preparatory phase major and moderate adverse impacts are provided in **Table 6-2**.

Table 6- 2: Preparatory Phase Potential Adverse Impacts

AfDB OS and Ghana EPA Legislation	Potential Impact	Sources of Impact	Extent	Duration	Intensity	Severity	Mitigation
<i>Involuntary resettlement, land acquisition, population displacement and compensation</i>	Land related disputes	Acquisition of lands without following due process could result in land-related disputes	Local	Temporary	Average	Moderate	• Ownership of land should be made a requirement for qualification as a project beneficiary. Evidence of ownership should be produced and documented • For lands without deeds, community consent should be obtained and confirmed
	Impact on livelihoods	The project activities could restrict locals and migrants/settlers access to lands that were otherwise used as pasture areas.	Local	Permanent	Weak	Moderate	• Identify and propose alternative pasture areas to locals who otherwise used the project site as pasture area. • Provide locals with some financial and technical support to acquire a sustainable source of feed for their livestock.
<i>Biodiversity, renewable resources and ecosystem services</i>	Destruction of vegetation and displacement of wildlife	Site clearing will lead to the destruction of some common vegetation, a few trees and destruction of the habitats of some animals.	Local	Permanent	Weak	Moderate	• 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.

Preparatory Phase Negative Impacts

Land related disputes

The project communities are largely rural communities with land ownership and tenurial arrangements that have to be followed. However, some farmers or individuals in order to be considered for project support may hurriedly acquire lands without following due process. This could result in ownership being contested, especially if there is an ongoing land dispute, resulting in a protracted dispute that could have some security implications.

Ownership of land should be made a requirement for qualification as a project beneficiary and evidence of ownership should be produced and documented. For lands without deeds, family or community consent should be obtained and documented before project is implemented.

Impact on livelihoods

Rearing of animals is a key economic activity in the project communities and animals such as cattle, sheep, and goat graze on surrounding vegetated lands. However, project activities such as land clearing and levelling could restrict locals access to lands that were otherwise used as pasture areas. Considering that there are vast adjoining uncultivated lands, herdsmen can still cut and carry grass to feed their animals. The impact is therefore local and the displacement will be temporary as alternative sites and resources exist making this impact moderately significant.

Identification and proposal of alternative pasture areas to locals and herdsmen who otherwise used the project site as pasture area will help reduce the impact of restricted access. Herdsmen should be encouraged to cut and carry grass to feed their animals to avoid any potential disputes over access.

Destruction of vegetation and displacement of wildlife

Site clearing for soil suitability assessments and land preparation will lead to the destruction of some common vegetation, mostly shrubs and grasses, and a few trees. As required by the project, beneficiary farmers must own vast lands (>100 ha) and clearing of such vast areas could adversely affect vegetation including economic trees like shea and dawadawa. Habitats of common soil organisms such as dung beetle and earthworms will also be destroyed. However, the area, especially in the dry season, has very sparse vegetation and little fauna hence impact on vegetation will only be moderate.

To mitigate the impact of vegetation loss from clearing, only area required for project be cleared. Vegetation clearing should be carried out in the dry season, just before the rainy season, when very few plants will be affected. Economic trees such as dawadawa and shea should be avoided during clearing, if possible. 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.

6.8.2 Construction Phase: Major and moderate adverse impacts and specific measures

The construction phase major and moderate adverse impacts are provided in **Table 6-3**.

Table 6- 3: Construction Phase Potential Adverse Impacts

AfDB OS and Ghana EPA Legislation	Potential Impact	Sources of Impact	Extent	Duration	Intensity	Severity	Mitigation
Pollution prevention and control, hazardous materials and resource efficiency	Soil erosion	Excavation for foundation of structures could lead to soil erosion and creation of gullies through runoff especially in the rainy season	Local	Temporary	Average	Moderate	• 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.
	Air Pollution	Emission of fumes and dust from transport of materials especially on untarred routes to project site	Local	Temporary	Average	Moderate	• 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	Sediment and waste oil transport into nearby water bodies	Local	Temporary	Average	Moderate	• Conduct regular maintenance on trucks to prevent oil leakages that could be washed together with sediment into nearby waterbodies

AfDB OS and Ghana EPA Legislation	Potential Impact	Sources of Impact	Extent	Duration	Intensity	Severity	Mitigation
							• Manage leaked oil by placing trays under trucks to collect leaked oil.
		Domestic waste from the construction workers and food vendors to the construction crew	Local	Temporary	Average	Moderate	• Provide bins for collection of solid waste • Educate workers on the importance of waste management
	Noise and Vibration	Operation of construction equipment, movement of haulage vehicles and tooting of horns	Local	Temporary	Average	Moderate	• Unnecessary tooting of horn by truck drivers must be avoided. • 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

AfDB OS and Ghana EPA Legislation	Potential Impact	Sources of Impact	Extent	Duration	Intensity	Severity	Mitigation
							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	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 Inefficient waste management during construction, operation and maintenance of equipment leading to excess consumption of materials, generation of wastes/emissions, pollution of soils and water.	Local	Temporary	Strong	Major	• 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 and Ghana EPA Legislation	Potential Impact	Sources of Impact	Extent	Duration	Intensity	Severity	Mitigation
<i>Labour conditions, health and safety</i>	Workplace incidents/accidents	Workplace and traffic accidents/incidents and animal/insect threat/bites	Local	Temporary	Strong	Major	• 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
	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	Local	Temporary	Average	Moderate	• Provide all workers with signed contracted that are consistent with national labour laws • 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.

AfDB OS and Ghana EPA Legislation	Potential Impact	Sources of Impact	Extent	Duration	Intensity	Severity	Mitigation
		ineffective worker grievance redress mechanisms					• 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
	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	Temporary	Average	Moderate	• 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.

AfDB OS and Ghana EPA Legislation	Potential Impact	Sources of Impact	Extent	Duration	Intensity	Severity	Mitigation
							• 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	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.	Local	Temporary	Average	Moderate	• Create fire belts around project site to deal with any fire incidents • Liaise with the Fire Service to sensitize workers and the community on fire risks • Secure fire extinguishers for fire fighting

AfDB OS and Ghana EPA Legislation	Potential Impact	Sources of Impact	Extent	Duration	Intensity	Severity	Mitigation
	Gender based violence	Presence of workers and increase in incidents of rape, defilement and GBV	Local	Temporary	Average	Moderate	• 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 and Ghana EPA Legislation	Potential Impact	Sources of Impact	Extent	Duration	Intensity	Severity	Mitigation
	Public health issues	Pollution of local water bodies will adversely affect the health of users	Local	Temporary	Average	Moderate	• Point source treatment of pollutants
		Sexual relations between workers and locals may bring about increase in sexually transmitted diseases including HIV/AIDs. Interactions between workers and locals could also lead to the spread of COVID-19.	Local	Temporary	Average	Moderate	• 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. • Conduct daily temperature screening of workers and visitors. • Provide handwashing stations and sanitizers at all sites. • Ensure workers and visitors adhere to all COVID-19 protocols including wearing of face mask and social distancing. • Encourage workers to get vaccinated. • Organize trainings on COVID-19 and STDs for the workers and the community to create awareness. • Provide condoms to the community and workers.

AfDB OS and Ghana EPA Legislation	Potential Impact	Sources of Impact	Extent	Duration	Intensity	Severity	Mitigation
	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	Temporary	Average	Moderate	• Provide adequate security by liaising with Police to conduct regular patrols or make private security arrangement • Sensitize local community on cultural tolerance and grievance mechanisms to prevent confrontations

Construction and Operation Phase Negative Impacts

Soil degradation

Construction

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 including dung beetles and earthworms. As there are vast adjoining lands, excavated spoils from land levelling could be pushed into other tracts of land creating unsightly scenes. The impact is largely localized, persistent and of average severity hence it is considered moderate.

However, with measures such as reinstatement of excavated areas, maintenance of vehicles, machines and fuel refilling at a designated area, contamination of soil can be avoided. Fuel storage and refilling sites should be kept away from drains and important water bodies. All spoils shall be disposed of as desired and the site shall be fully cleaned before handing over. These measures are expected to minimize the impact on soil.

Operation

Leaving farmlands bare especially after harvesting could expose the soil to wind erosion from the strong winds in the dry season. Leaked or spilled oils from maintenance/operation of equipment and vehicles could contaminate soil and adversely affect soil fauna. Also, contaminated soil could be washed into nearby waterbodies via runoff. However, this impact is localized and of average severity hence considered moderate in significance.

Farmlands should be kept vegetated at all times to prevent sheet erosion from strong winds. Drains must be created to properly channel runoff. An area should be designated for maintenance of vehicles and spill kits provided for accidental spillages.

Air Pollution

Construction

Land preparation and use of un-serviced/unmaintained vehicles for the 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. The impact on air quality is likely to be considerable especially when particulate matter is carried over some distance by winds like the harmattan winds that characterize the climate of the project area. However, any possible impacts will be temporary hence the significance will be moderate.

Construction vehicles and equipment should be maintained regularly to reduce their emissions and engine idling should be discouraged. Water should be sprinkled on cleared areas and all areas that have loose soil and the potential for dust pollution to suppress dust.

Operation

At the operation stage, fumes and dust generated by equipment and vehicles could reduce the quality of air in beneficiary, neighbouring communities and communities along haulage routes. Sensitive receptors such as persons with allergies and upper respiratory tract diseases could experience aggravation of their condition. This impact is temporary but could be regional in extent and considered moderate.

Mitigation measures include regular maintenance of equipment and vehicles, discouraging engine idling and institution of speed limits for drivers.

Water Pollution

Construction

Disposal of domestic waste from construction workers and food vendors and deposition of sediment, waste oil, fertilizer and pesticides via runoff into nearby water bodies will reduce the quality of water and could also smother some fishes and benthic organisms. Waterbodies that drain the area such as the Kpalsini, Klubon, Juni, Yelbonni are only between 0.8km and 4km away from project communities and could be the direct recipient or indirect recipient of pollutants from its tributaries. The extent of the impact could be regional over a limited duration and cumulative in nature hence considered major in significance.

A waste management plan should be developed by the contractor to segregate, collect and dispose of waste to prevent indiscriminate disposal of waste. Maintenance of equipment and vehicle should be done at designated areas with spill kits and drip trays provided to manage spillages.

Operation

Domestic wastes, poultry waste, 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.

Wastes should be segregated in designated waste bins and collected regularly by a licensed waste collector. Disposal of wastes near water bodies should be avoided

Noise and Vibration

Construction

Operation of construction equipment, movement of haulage vehicles and tooting of horns. Construction activities are anticipated to produce noise levels in the range of 80 - 95 dB (A). The construction equipment will have high noise levels, which can affect the personnel operating the machines as well as the residents within the project community or nearby communities.

Use of proper Personal Protective Equipment (PPE) such as earmuffs will mitigate any adverse impact of the noise generated by such equipment on workers. Equipment and vehicles will be maintained regularly to reduce noise levels. Also, construction activities will not be carried out during the night to reduce the impact of noise on residents and other sensitive receptors.

Operation

Noise and vibration from operation of processing equipment, equipment maintenance, movement of haulage vehicles, tooting of horns and noise from the poultry birds could be a nuisance to persons within the project community or nearby communities

Waste generation and inefficient management

Construction

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. The impact is local, temporary and of a high intensity hence considered major in significance.

A waste management plan should be developed by the contractor to segregate, collect and dispose of waste to prevent indiscriminate disposal of waste. Segregation of waste such as domestic i.e. food packaging and hazardous waste i.e. containers of pesticides and herbicides should be practiced and waste collected by licensed waste collectors. Maintenance of equipment and vehicle should be done at designated areas with spill kits and drip trays provided to manage spillages.

Operation

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.

Provide bins and skips for waste collection and ensure it is disposed of regularly. Educate workers, vendors and visitors on the importance of proper waste management.

Workplace incidents/accidents

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.

Injuries resulting from falling from heights and falling objects, as well as from the misuse of equipment and tools, cuts from stepping on sharp objects such as nails and other metal off-cuts and injuries resulting from clashes between vehicles and the workers as they both operate within the same space are likely to occur during the implementation of the project.

This impact is considered significant since it affects human lives and would therefore require adequate mitigation measures. Occupational health and safety risks are rated highly sensitive because they lead to mortality and long-term morbidity involving site workers. It is, however, localised small scale and short term, implying its magnitude is low. In terms of significance, Occupational Health and Safety risks

considered a moderately significant risk, though it has a low magnitude of impact because of its high sensitivity.

To mitigate this impact, the contractor should prepare an Occupational, Health and Safety plan and ensure compliance onsite.

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 also be victims of discrimination, forced labour, child labour, restriction of freedom of association and collective bargaining, a non-existent or ineffective worker grievance redress mechanism. Poor Labour working conditions is rated moderate scale, localised and short term, hence low magnitude of impact. It is also highly sensitive since subjecting employees to poor conditions of service and working conditions are against Ghana's labour laws such as Labour Act 2003 (Act 651). Hence this impact is moderately significant.

Provide all workers with signed contracts that are consistent with national labour laws as well as welfare facilities such as potable drinking water, shades, restrooms, etc. Encourage frequent breaks and job-rotation to reduce impact of the weather on workers. Also, policies including codes of conduct should be developed against discrimination, forced and child labour, sexual harassment, and abuse. Workers should be allowed to unionize and an effective grievance redress mechanism established to address worker grievances.

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. At night, due to poor or low visibility, there is a high probability of road accidents. Though temporary, this is considered major as it is regional in extent and of high severity because it could result in fatality.

To avoid or reduce road traffic accidents and incidents, only qualified drivers should be used, vehicles must be maintained regularly to ensure that they are in good working condition, use of signs as appropriate and driving at night should be discouraged. Also, speed limits must be set to ensure safe driving, e.g. 20km/h onsite, 40km/h on approaching communities along haulage routes and a maximum speed of 100km/h on highways.

Fire outbreak

Fire outbreaks from negligence of workers or the public burning refuse, game hunting and workers not properly extinguishing stubs of cigarette. Fire out breaks may also emanate from power surges or the use of sub-standard electrical cables and sockets. These fires could spread causing injuries or death to persons and destruction of property. Community health and safety risks on the site are rated regional, short term and small scale; low magnitude but highly sensitive because they lead to mortality and long-term morbidity. Hence such impacts are moderately significant.

Gender based violence

Workers with relatively high incomes will be working on the various sites. The site workers can lure girls, hawkers, food vendors, other petty traders who supply them food and other services and defile or rape them. Workers may also abuse themselves and/or supervisors.

Sexual favours could be demanded in exchange for jobs, promotion or other work-related benefits. Women may also be discriminated against, denied employment opportunities and /or their services may be undervalued on the basis of cultural norms. The incidence of GBV is short-term and small-scale hence considered moderate.

To prevent incidences of GBV, legal processes set out by national law must be followed. Policies on SEA/SH should be developed and implemented. Worker contracts should have clauses prohibiting rape, defilement, sexual harassment, child/forced labour and other GBV. An employment quota should be allocated to women. Contact numbers of representatives on the Grievance Redress Committee and GBV Service Providers should be pasted around the project site and within the immediate project zone.

Public health issues

Dust borne communicable diseases, respiratory infections and minor throat and eye irritations are expected, especially during the dry season because of the emission of vehicular pollutants and dust (carbon monoxide and particulates). The presence of workers and related increase in disposable cash makes the transmission of STDs a possibility. During project execution (civil works), large numbers of workers will be required to assemble in meetings, and even at work sites; varied number of workforces including suppliers of material and services are also expected to come in from various places which may be COVID-19 hot spots; and interaction of workers with the project host community. The potential for the spread of any infectious disease like COVID-19 is high.

Improper waste management may create conditions for the growth of vectors of diseases such as cholera and dysentery. The outbreak of these diseases would have far-reaching negative implications for the health of residents and put pressure on the limited health facilities in the area.

An awareness and sensitization campaign together with responsible government agencies like National AIDS Commission should ensure that the people in the project area (workers and locals) are made aware of the issues and provided with condoms. Conduct daily temperature screening of workers and visitors for COVID-19.

Security concerns

Civil works can be associated with theft and pilfering of construction materials normally from the general public and site workers. Site workers can also steal from private properties within the immediate project zone. Other crimes include illicit sexual affairs, child labour and drunk driving, which are criminal under the laws of Ghana.

There may also be confrontations arising out of accidents and destruction of property by workforce, equipment or vehicles. This impact is localized, severe but temporary hence considered moderate.

Workers and local community should be sensitized on cultural tolerance and grievance mechanisms to prevent confrontations. Workers should be made to sign and adhere to a code of conduct which prohibits vices.

6.8.3 Operation Phase: Major and moderate adverse impacts and specific measures

The operation phase major and moderate adverse impacts are provided in **Table 6-4**.

Table 6- 4: Operation Phase Potential Adverse Impacts

AfDB OS and Ghana EPA Legislation	Potential Impact	Sources of Impact	Extent	Duration	Intensity	Severity	Mitigation
<i>Pollution prevention and control, hazardous materials and resource efficiency</i>	Soil erosion	Leaving farmlands bare especially after harvesting could expose the soil to wind erosion from the strong winds in the dry season	Local	Temporary	Average	Moderate	• 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.
	Air Pollution	Emission of fumes/dust from haulage of materials and equipment especially on untarred routes to farms or agricultural establishments	Local	Temporary	Average	Moderate	• 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 and over abstraction	Sediment and waste oil transport into nearby water bodies	Local	Temporary	Average	Moderate	• Conduct regular maintenance on trucks to prevent oil leakages that could be washed together with sediment into nearby waterbodies

AfDB OS and Ghana EPA Legislation	Potential Impact	Sources of Impact	Extent	Duration	Intensity	Severity	Mitigation
							• Manage leaked oil by placing trays under trucks to collect leaked oil. • Monitor volumes of water used and keep records • Promptly fix faulty or leaking pipes to preserve water • Develop a participatory water management plan
	Pollution of Soils and Water	Pollution of watercourses caused by wastes workforce sewage effluent, as well as runoff from land used for growing maize (containing fertilisers, pesticides and herbicides etc.).	Local	Temporary	Average	Moderate	• Point source treatment
	Odours	Odours associated with poultry and waste may have nuisance value for nearby receptors i.e. humans.	Local	Temporary	Average	Moderate	• Sensitive site selection, and siting of construction works and access roads. • Use of modern equipment, meeting appropriate emissions standards, and regular preventative maintenance. • Implement measures to increase efficiency of vehicle use, aiming to reduce the number of journeys and vehicles required. • No use of ozone depleting substances during construction or operation.

AfDB OS and Ghana EPA Legislation	Potential Impact	Sources of Impact	Extent	Duration	Intensity	Severity	Mitigation
							- Dust and odour control and suppression measures, such as dampening and use of vegetation hedges. - Implement appropriate waste disposal measures
	Noise and Vibration	Noise and vibration from operation of processing equipment, equipment maintenance, movement of haulage vehicles and tooting of horns and noise from the poultry birds	Local	Temporary	Average	Moderate	- Unnecessary tooting of horn by truck drivers must be avoided. - 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 equipment and hand tools should be operated by trained, experienced and competent persons, and where required persons must produce operator's license upon request.

AfDB OS and Ghana EPA Legislation	Potential Impact	Sources of Impact	Extent	Duration	Intensity	Severity	Mitigation
							• 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	Improper disposal of waste, i.e. packaging, refuse and effluent from installations could clog drains and facilitate the outbreak of sanitary related diseases such as cholera and malaria	Local	Temporary	Average	Moderate	• 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.
	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.	Local	Temporary	Average	Moderate	• Materials handling and control procedures, use of appropriate storage and containment equipment. • Control of vehicle movements and prohibition of vehicle washing in watercourses, and similar practices • Emergency response plans during construction (contractors and local

AfDB OS and Ghana EPA Legislation	Potential Impact	Sources of Impact	Extent	Duration	Intensity	Severity	Mitigation
							authorities) and operation (local authorities).
Labour conditions, health and safety	Occupational health and safety	Workplace and traffic accidents/incidents and animal/insect threat/bites Incidence of transmission of H1NI virus from poultry to the workforce	Local	Temporary	Strong	Major	• 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
	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 be exposed to discrimination, forced	Local	Temporary	Average	Moderate	• Provide all workers with signed contracted that are consistent with national labour laws • Provide welfare facilities such as potable drinking water, shades, restrooms etc. for workers.

AfDB OS and Ghana EPA Legislation	Potential Impact	Sources of Impact	Extent	Duration	Intensity	Severity	Mitigation
		and child labour, restriction of freedom of association and collective bargaining, non-existent or ineffective worker grievance redress mechanism					• Encourage frequent breaks and job-rotation to reduce impact of the weather on workers. • 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
	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 trucks could lead to road accidents and traffic congestion especially on busy roads.	Local	Temporary	Average	Moderate	• Ensure all visitors accessing site are in appropriate PPE • 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.

AfDB OS and Ghana EPA Legislation	Potential Impact	Sources of Impact	Extent	Duration	Intensity	Severity	Mitigation
							• 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. • Appropriate warning signs are put in place, as required. • 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	Fire outbreaks from negligence of workers or the public burning refuse, game hunting and not properly extinguishing stubs of cigarette. These fires could spread	Local	Temporary	Average	Moderate	• Create fire belts around project site to deal with any fire incidents • Liaise with the Fire Service to sensitize workers and the community on fire risks • Secure fire extinguishers for fire fighting

AfDB OS and Ghana EPA Legislation	Potential Impact	Sources of Impact	Extent	Duration	Intensity	Severity	Mitigation
		causing injuries to persons and destruction of property.					
	Gender based violence	Presence of workers and increase in incidents of rape, defilement and GBV	Local	Temporary	Average	Moderate	• Let workers sign a Code of Conduct alongside the contract that workers sign • Include in workers' 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

AfDB OS and Ghana EPA Legislation	Potential Impact	Sources of Impact	Extent	Duration	Intensity	Severity	Mitigation
							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
	Public health issues	Pollution of local water bodies will adversely affect the health of users	Local	Temporary	Weak	Minor	• Ensure point source treatment
		Sexual relations between workers and locals may bring about increase in sexually transmitted diseases including HIV/AIDs. Interactions between workers and locals could also lead to the spread of COVID-19. Incidence of outbreak of H1N1 virus from poultry to humans	Local	Temporary	Weak	Moderate	• 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. • Conduct daily temperature screening of workers and visitors. • Provide handwashing stations and sanitizers at all sites. • Ensure workers and visitors adhere to all COVID-19 protocols including wearing of face mask and social distancing. • Encourage workers to get vaccinated. • Organize trainings on COVID-19 and STDs for the workers and the community to create awareness.

AfDB OS and Ghana EPA Legislation	Potential Impact	Sources of Impact	Extent	Duration	Intensity	Severity	Mitigation
							• Provide condoms to the community and workers.
	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.	Local	Temporary	Average	Moderate	• Provide adequate security by liaising with Police to conduct regular patrols or make private security arrangement • Sensitize local community on cultural tolerance and grievance mechanisms to prevent confrontations • Adoption of a Stakeholder Engagement Plan, as a framework for • early and ongoing community consultation. • Implementation of a Grievance Redress Mechanisms. • Works procedures, defining a Code of Appropriate Conduct for all workers, including acceptable behaviour with respect to community interactions.

Cumulative Negative Impacts of the Project

Cumulative impacts are the combined, incremental effects of human activity that pose a serious threat to the environment. Cumulative environmental impacts result from many different, often individually insignificant, effects. They are usually neither measured nor accounted for before they cause significant damage through accumulation.

In the medium to long term, the project implementation is likely to have some cumulative impacts including:

- Surface water pollution as a result of runoff carrying waste into nearby water bodies
- Contamination of groundwater pollution from drilling of boreholes and wells for irrigation and other uses
- Waste generation from multiple sources, and multiple waste and dumping sites from uncoordinated waste management.

Mitigation measures for these impacts include careful design, implementation of the ESMP, and ensuring compliance through monitoring to confirm that activities and their outputs meet permissible limits (e.g. air emissions, chemical use, effluent treatment) under national law and international best practice.

7.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

This section presents the Environmental and Social Management Plan (ESMP), **Table 7-1** 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 7- 1: Environmental and Social Management Plan

Impact	Project Phase	Source	Mitigation Hierarchy	Mitigation Measure	Responsible Party	Monitoring	Cost (USD)
Preparatory Phase							
Impact on livelihoods	Construction	Site preparation	Repair or remedy	- Identify and propose alternative pasture areas to locals who otherwise used the project site as pasture area. - Provide locals with some financial and technical support to acquire a sustainable source of feed for their livestock.	PCU	Environmental and Social Safeguards Specialists of PCU	5,000
Destruction of vegetation and displacement of wildlife	Construction	Site preparation	Offset	- Clear only area required for the project - Reinstate excavated areas immediately after works to prevent excavated spoil from being transported by runoff into nearby water bodies - 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.	Works contractor	Environmental Safeguards Specialist of PCU	5,000
Construction Phase							
Soil erosion	Construction	Project site	Repair or remedy	- 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.	Works contractor	Environmental Safeguards Specialist of PCU	2,000
Air Pollution	Construction	Project site and haulage route	Avoid or reduce at source	- 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.	Works contractor	Environmental Safeguards Specialist of PCU	5,000

Impact	Project Phase	Source	Mitigation Hierarchy	Mitigation Measure	Responsible Party	Monitoring	Cost (USD)
Water Pollution	Construction	Project site	Avoid at source	- 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.	Works contractor	Environmental Safeguards Specialist of PCU	15,000
Noise Nuisance	Construction	Equipment and vehicles on site	Abate on site	- Unnecessary tooting of horn by truck drivers must be avoided. - 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.	Works contractor	Environmental Safeguards Specialist of PCU	5,000
Waste generation and disposal	Construction	Project site	Abate or reduce at source	- 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.	Works contractor	Environmental Safeguards Specialist of PCU	20,000

Impact	Project Phase	Source	Mitigation Hierarchy	Mitigation Measure	Responsible Party	Monitoring	Cost (USD)
				- 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.			
Occupational health and safety	Construction	Project site	Abate on site	- 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	Works contractor	Environmental Safeguards Specialist of PCU	20,000
Poor labour working conditions	Construction	Project Site	Avoid at source	- Include code of conduct into contracts to be signed by workers - Provide all workers with signed contracts that are consistent with national labour laws - 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.	Works contractor	Environmental and Social Safeguards Specialists of PCU	10,000
Traffic management/P	Construction	Project site	Abate on site	- Hoard project site to prevent unauthorized entry - Ensure all visitors accessing site are in appropriate PPE - The highway code must be strictly followed. Driver training must be provided as part of induction training	Works contractor	Environmental and Social Safeguards	8,000

Impact	Project Phase	Source	Mitigation Hierarchy	Mitigation Measure	Responsible Party	Monitoring	Cost (USD)
Public safety concerns				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. • Appropriate warning signs including reduced speed, "Men at Work", "No Parking" & hazard triangle must be placed beside road facing oncoming traffic and a similar "End" sign after work area. • 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.		Specialists of PCU	
Fire outbreaks	Construction	• Project community interactions	• Avoid at source, repair or remedy	• Create fire belts around project site to deal with any fire incidents • Liaise with the Fire Service to sensitize workers and the community on fire risks • Secure fire extinguishers for fire fighting	Works contractor	Environmental and Social Safeguards Specialists of PCU	20,000

Impact	Project Phase	Source	Mitigation Hierarchy	Mitigation Measure	Responsible Party	Monitoring	Cost (USD)
Public health issues	Construction	Project-community interactions	Avoid at source	- 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. - Conduct daily temperature screening of workers and visitors. - Provide handwashing stations and sanitizers at all sites. - Ensure workers and visitors adhere to all COVID-19 protocols including wearing of face mask and social distancing. - Encourage workers to get vaccinated. - Organize trainings on COVID-19 and STDs for the workers and the community to create awareness. - Provide female and male condoms to the community and workers.	Works contractor	Environmental and Social Safeguards Specialists of PCU	15,000
Security concerns	Construction	Project site	Abate or reduce at source, abate on site	- Provide adequate security by liaising with Police to conduct regular patrols - Sensitize local community on cultural tolerance and grievance mechanisms to prevent confrontations	Works contractor	Environmental and Social Safeguards Specialists of PCU	10,000
Gender based violence	Construction	Project and community interaction	Avoid at source, repair or remedy	- Let workers sign a code of conduct as annex to the contract. - 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	Works contractor	Environmental and Social Safeguards Specialists of PCU	10,000

Impact	Project Phase	Source	Mitigation Hierarchy	Mitigation Measure	Responsible Party	Monitoring	Cost (USD)
				• 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			
Operation Phase							
Soil erosion	Operation	• Facility site	• Avoid or reduce at source	• 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.	Facility manager	EPA, Agric Department, District Assembly EHU	5,000
Air Pollution	Operation	• Facility site	• Avoid or reduce at source	• 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.	Facility manager	EPA, Agric Department, District Assembly EHU	10,000
Water Pollution	Operation	• Facility site	• Avoid at source	• 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.	Facility manager	EPA, Agric Department, District Assembly EHU	7,000

Impact	Project Phase	Source	Mitigation Hierarchy	Mitigation Measure	Responsible Party	Monitoring	Cost (USD)
				• Monitor volumes of water used and keep records • Promptly fix faulty or leaking pipes to preserve water			
Noise Nuisance	Operation	• Facility site	• Avoid or reduce at source	• Unnecessary tooting of horn by truck drivers must be avoided. • 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 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.	Facility manager	EPA, Agric Department, District Assembly EHU	8,000
Waste generation and disposal	Operation	• Facility	• Reduce at source	• 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. • Regular toolbox talk on waste management must be provided to operatives/workers at the facility. • Have SOPs for managing hazardous and non-hazardous waste.	Facility manager	EPA, Agric Department, District Assembly EHU	20,000

Impact	Project Phase	Source	Mitigation Hierarchy	Mitigation Measure	Responsible Party	Monitoring	Cost (USD)
Poor labour working conditions	Operation	Facility site	Avoid at source	- Provide all workers with signed contracted that are consistent with national labour laws - 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.	Facility manager	Agric Department, District Assembly EHU	10,000
Traffic management/ Public safety concerns	Operation	Facility	Abate on site	- Ensure all visitors accessing site are in appropriate PPE - 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. - Appropriate warning signs are put in place, as required. - 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.	Facility manager	EPA, District Assembly EHU	8,000

Impact	Project Phase	Source	Mitigation Hierarchy	Mitigation Measure	Responsible Party	Monitoring	Cost (USD)
Fire outbreaks	Operation	Project community interactions	Avoid at source, repair or remedy	- Create fire belts around project site to deal with any fire incidents - Liaise with the Fire Service to sensitize workers and the community on fire risks - Secure fire extinguishers for fire fighting	Facility manager	EPA, Fire Service, Agric Department, District Assembly EHU	5,000
Public health issues	Operation	Project community interactions	Avoid or reduce at source	- 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. - Conduct daily temperature screening of workers and visitors. - Provide handwashing stations and sanitizers at all sites. - Ensure workers and visitors adhere to all COVID-19 protocols including wearing of face mask and social distancing. - Encourage workers to get vaccinated. - Organize trainings on COVID-19 and STDs for the workers and the community to create awareness. - Provide condoms to the community and workers.	Facility manager	EPA, Health Directorate, District Assembly EHU	15,000
Security concerns	Operation	Community	Avoid or reduce at source	- Provide adequate security by liaising with Police to conduct regular patrols or make private security arrangement - Sensitize local community on cultural tolerance and grievance mechanisms to prevent confrontations	Facility manager	District Security Committee, EPA	8,000
Gender based violence	Operation	Workers, community	Avoid or reduce at source, repair and remedy	- Let workers sign code of conduct as an annex to the contract. - Include in works contract clauses on mandatory and regular training for workers on required lawful conduct	Facility manager	EPA, District Social Welfare Department	10,000

Impact	Project Phase	Source	Mitigation Hierarchy	Mitigation Measure	Responsible Party	Monitoring	Cost (USD)
				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			
TOTAL COST OF ESMP IMPLEMENTATION							256,000

7.1 ESMP Implementation

7.1.1 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 7-2**. The ESMP implementation activities will be under the overall guidance of the PCU.

Table 7- 2: Roles and Responsibilities of Key Actors

Key Actors / Institutions	Description of Key Roles/Responsibilities	Duration	Monitoring cost (USD)	Reporting
PCU	- 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	Included in PCU operation cost	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	Part of MoFA Annual Budget	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	Included in fees paid for permit processing and issuance	Annually
Tamale Metropolitan 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	Metropolitan Assembly Annual Environmental Budget	Annually

Key Actors / Institutions	Description of Key Roles/Responsibilities	Duration	Monitoring cost (USD)	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	Included in PCU operation budget	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 PCU - Responsible for remedying defects committed during construction	Construction phase	Included in contractor's BoQ	Monthly
Grievance Redress Committee	To receive and find solutions to grievances	Preparatory and construction phases	Included in PCU operation budget	Monthly

7.2 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 PCU, Agric Department, EPA, TaMA, Fire Service etc. A summary of impacts, mitigation, management and monitoring measures to be implemented is captured in **Table 7-3**.

E&S Monthly monitoring reports will be prepared by the works contractor and submitted to the PCU, TaMA and EPA. 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 District Assembly, will be prepared.

The completion report will form the basis for EPA's final monitoring for project completion and closure. Also, PCU 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.

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

The Annual Environmental and Social Compliance Audit meets AfDB's ISS 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 PCU 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 is USD 30,000 and this includes the consultant's service cost and reimbursable expenses.

Cost of implementing environmental and social measures

Duration	Materials required for monitoring	No. of audits	Estimated cost of an annual audit (USD)	Total amount (USD)
Once a year	Field vehicle	5	30,000	150,000

Table 7- 3: Environmental and Social Monitoring Plan

No.	Potential Environmental and Social Impacts	Monitoring Parameters/Mean of verification	Monitoring Site	Frequency	Responsibility (Implementation/ Monitoring)	Cost Estimate/ Year (USD)
CONSTRUCTION PHASE						
	Occupational health and safety	- Records of accidents, incidents and near misses. - Records of PPE disbursed - Housekeeping	Construction site	Monthly	Environmental and Social Safeguards Specialists	5,000
	Poor labour working conditions	- Availability of copies of signed contracts - Human Resource Management Plan/Recruitment Policy - Complaints lodged by workers	Construction site	Monthly	Environmental and Social Safeguards Specialists	3,000
	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	Construction site and Immediate environs	Monthly	Environmental Safeguards Specialist	4,000
	Air and Noise Pollution	- Dust (PM2.5, PM10 and TSP) - Emissions (NOx, SOx, TSP) - Noise (dB) levels - Number of complaints by residents/workers	Construction site and Immediate environs	Monthly	Environmental Safeguards Specialist	5,000
	Waste generation and disposal	- Number of mobile toilets and dustbins provided on site - Number of times waste is lifted in a week i.e. waste transfer notes - Cleanliness of site/housekeeping - Odour - Presence of human waste on site	Construction site and Immediate environs	Weekly	Environmental Safeguards Specialist	3,000

No.	Potential Environmental and Social Impacts	Monitoring Parameters/Mean of verification	Monitoring Site	Frequency	Responsibility (Implementation/ Monitoring)	Cost Estimate/ Year (USD)
		Complaints by workers/residents				
	Traffic management/Public safety concerns	- Grievance records - Traffic related incidents/accidents - Records of accidents, incidents and near misses.	Construction site and Immediate environs	Monthly	Environmental and Social Safeguards Specialists	5,000
	Fire outbreaks	- Fire related incidents/accidents - Records of fire incidents and near misses. - Number of functional fire extinguishers onsite	Construction site and Immediate environs	Monthly	Environmental and Social Safeguards Specialists	5,000
	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	Construction site and Immediate environs	Monthly	Environmental and Social Safeguards Specialists	4,500
	Security and 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	Construction site and Immediate environs	Monthly	Environmental and Social Safeguards Specialists	3,500
OPERATIONAL PHASE						

No.	Potential Environmental and Social Impacts	Monitoring Parameters/Mean of verification	Monitoring Site	Frequency	Responsibility (Implementation/ Monitoring)	Cost Estimate/ Year (USD)
	Occupational health and safety	- Records of accidents, incidents and near misses. - Records of PPE disbursed - Housekeeping	Facility site	Monthly	HSE Manager	3,000
	Poor labour working conditions	- Availability of copies of signed contracts - Human Resource Management Plan/Recruitment Policy - Complaints lodged by workers	Facility site	Monthly	HSE Manager and HR Manager	4,000
	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	Facility site and immediate environs	Monthly	HSE Manager	5,000
	Air and Noise Pollution	- Dust (PM2.5, PM10 and TSP) - Emissions (NOx, SOx, TSP) - Noise (dB) levels - Number of complaints by residents/workers	Facility site and immediate environs	Monthly	HSE Manager and Community Liaison Officer	3,000
	Waste generation and disposal	- Presence of toilets and number dustbins provided on site - Number of times waste is lifted in a week - Cleanliness of site/housekeeping - Odour - Presence of human waste on site - Complaints by workers/residents	Facility site and immediate environs	Weekly	HSE Manager and Community Liaison Officer	5,000

No.	Potential Environmental and Social Impacts	Monitoring Parameters/Mean of verification	Monitoring Site	Frequency	Responsibility (Implementation/ Monitoring)	Cost Estimate/ Year (USD)
	Traffic management/Public safety concerns	- Grievance records - Traffic related incidents/accidents - Records of all accidents, incidents and near misses.	Facility site and immediate environs	Monthly	HSE Manager and Community Liaison Officer	5,000
	Fire outbreaks	- Fire related incidents/accidents - Records of fire incidents and near misses. - Number of functional fire extinguishers onsite	Facility site and immediate environs	Monthly	HSE Manager and Community Liaison Officer	3,000
	Public health issues	- Number of sensitization campaigns - Number of condoms distributed to workers or placed in washrooms in a month - Prevalence of STD cases reported to local health facilities	Facility site and immediate environs	Monthly	HSE Manager and Community Liaison Officer	4,500
	Security and 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	Facility site and immediate environs	Monthly	HSE Manager and Community Liaison Officer	3,500
	TOTAL COST FOR MONITORING					74,000

8.0 DECOMMISSIONING

A Decommissioning and Site Closure Plan (DCP) is required to guard against the remote possibility that the temporary construction structures or infrastructure (such as hatcheries, storage) and equipment used at the operation phase are abandoned. 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.

8.1 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.

8.2 Decommissioning Phase Activities

8.2.1 *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 dissembled 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.

8.2.2 Solid Waste Management

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

8.3 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.

9.0 CAPACITY BUILDING AND TRAINING

9.1 Major Institutions

The main institutions to be involved with the implementation of the project and to ensure sound management of the environmental and social aspects include:

- Ministry of Food and Agriculture;
- Project Coordinating Unit;
- Water Resources Commission;
- Lands Commission;
- Environmental Protection Agency;
- Regional Coordinating Council;
- Metropolitan Assembly;
- Fire Service; and
- NADMO.

9.2 Capacity Building Requirements

Project institutions need to understand the purpose of the ESMP, their expected roles and the extent to which the ESMP will facilitate the respective statutory functions. This will engender the required collaboration for the ESMP implementation.

Competence of government i.e., the ability of active government parties to carry out their respective design, planning, approval, permitting, monitoring and implementation roles will, to a large extent, determine the success and sustainability or otherwise of the project.

The objectives and provisions of the ESMP therefore cannot be achieved in the absence of relevant competencies on environmental and social management within the Ministry of Food and Agriculture, and other stakeholders. The following sections provide recommendations on capacity building to support the program's environmental and social management objectives.

Identification of Capacity Building Needs

The first step in pursuing capacity building will be to identify the 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 requirements will mostly be in the form of training workshops as follows:

(1) A training workshop on the E&S Safeguards should be organized for the major stakeholders identified above.

(2) A training workshop for the key project implementers including the Ministry of Food and Agriculture, PCU, and EPA should cover the following:

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

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.

9.3 Public Engagement/Sensitization

In order to ensure proper implementation of the project, and to avoid public agitations/litigations which could affect the project execution, the Ministry of Food and Agriculture and Metropolitan Assembly should engage/sensitize farmers and the public, particularly those whose property or livelihood may be affected. The engagement/sensitization should include the schedule of implementation, resettlement and compensation processes for any affected persons, grievance redress mechanism, traffic management, etc. The engagement/sensitization should be carried out ahead of construction works and any grievances addressed.

10.0 PUBLIC CONSULTATIONS AND DISCLOSURE

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.

10.1 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.

10.2 Stakeholders Identified and consulted

The stakeholders identified and consulted are shown in **Table 10-1**.

Table 10- 1: Details of stakeholders identified and consulted

Group of stakeholders	Stakeholders	Date of consultation	Location of consultation	Total number of persons met	Total women met
Project Proponent/Beneficiary	Ministry of Food and Agriculture	18/11/2021	Tamale	23	3
	Project Coordinating Unit	18/11/2021	Tamale	2	0
Regulatory Institution	Environmental Protection Agency	21/06/2022	Tamale	1	1
	Fire Service	30/11/2021	Tamale	6	0
Other Government Institutions	Lands Commission	24/11/2021	Tamale	1	0
	Regional Coordinating Council	-	-	-	-

	Tamale Metropolitan Assembly	23/11/2021	Tamale	2	0
	National Disaster Management Organization, Tamale	-	-	-	-
	Rural Enterprises Project	-	-	-	-
Other stakeholders	Commercial Farmers	19/11/2021	Tamale	2	0
	Suppliers	24/11/2021		2	0
	FBOs/FBGs	25/11/2021		8	3
	NGOs	-	-	-	-
	Farmers	19-26/11/2021	Cheshei Changnaayili Futa	49	22
	Traditional Authority	19/11/2021	Changnaayili	4	0
	Women's group	19/11/2021	Cheshei	19	19
	Focus groups including Community Youth, Women, Traders	19-26/11/2021	Cheshei Changnaayili Futa	39	19

10.3 Opinion of stakeholders about the project

All stakeholders consulted were enthused about the project and indicated their readiness to lend their support for the successful implementation of the project. Most communities were however, not aware of the project and advised that further engagement be conducted to sensitize the beneficiary and surrounding communities.

10.4 Concerns raised by stakeholders consulted and proposed solutions

A summary of the outcome of the initial consultations is provided below. These are mostly concerns and suggestions/interventions from institutions and individuals engaged. Details are captured in **Annex 5**.

Project implementation and monitoring

- Adequate funds should be provided to facilitate the implementation of project activities
- Periodic and regular monitoring should be conducted on the project to facilitate the implementation of project activities.
- Ensure project cycles/phases run according to schedule
- The project should be devoid of all political interferences to successfully reach the target beneficiaries thus ensuring the overall success of the project.

Coordination and cooperation

- The District Assembly and other institutions like Lands Commission, Fire Service etc. should be involved in project implementation and provided resources, where necessary

Sensitization

- Farmers should be sensitized on the project to enable them to fully participate in the project.
- Community members should be adequately engaged and informed of project as some have no idea of the project
- Assembly officers and the beneficiary community should be well sensitized on the project to ensure smooth implementation

Marketing and Pricing

- More feed mills must be made available, if necessary, by the project to process produce into food.
- Standard weights and prices of goods should be used as some middlemen employ inappropriate means in pricing goods. A consensus should be arrived in obtaining a fixed value for produce.
- There is difficulty in obtaining a good market for produce in addition to a lack of standard prices for goods.

Socio-economic issues

- The livelihood of the beneficiaries should be positively impacted by the project.
- The standard of living in the community is low. The community's life is made positive by the availability of land for farming and livestock production. Provision of social amenities such as potable water, good roads, and a clinic will improve the quality of life for the community.

Environmental issues and natural disasters

- To cater for natural disasters such as drought and flooding, there is the need for the project to provide insurance for crops
- In order to effectively protect available water bodies, farming around water bodies should be avoided.
- Fire belts should be created around project sites to prevent the occurrence of fires.

Financial support

- The project should assist in providing financial support to beneficiaries.
- Most people especially women depend on Village Savings and Loans Associations (VSLA)

Transportation

- Adequate and affordable means of transportation should be made available to beneficiaries and suppliers to facilitate the transportation of livestock, produce and inputs.

Provision of farm inputs and machinery

- The project should provide farm inputs like viable seeds and procure adequate machinery to facilitate production.
- The project should supply adequate farm machinery soya bean processing machines, and combined harvesters to facilitate production of produce and complementing the inadequate labor in the community.
- The community has challenges with procurement of farm machinery and inputs such as tractors, combined harvesters, and feed for livestock and poultry.

Community leadership and governance

- Communities appoint elders/leaders through succession and by community appointment. Untrustworthy people, people with specific ailments, and those who are under the age limit are all prohibited from being elders/leaders.
- Chief and elders, religious leaders, youth groups and opinion leaders are among the key decision-makers. The assembly member serves as government representative, of which the community is satisfied with their representation.

Land ownership, right and access

- Majority of lands are stool lands and can be accessed through a request from the traditional authorities. There are no squatters present who may be affected by any land acquisition.
- Land-related conflicts are rare albeit

Vulnerable groups

- There are some women-headed households who have no livelihood support
- There are vulnerable people who may be poor or have limited access to land. There are disabled persons in the community.

Community needs/priorities

- Potable water, healthcare facilities, toilet facilities, good road network and a good price for farm produce are pressing needs of local communities.
- The community has challenges with changes in rainfall pattern, lack of ready market and post-harvest losses.

10.5 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.

10.6 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 on the site;
- Non-compliance with the measures or provisions contained in the ESMP

In managing grievances, a Grievance Redress Mechanism will be employed, and it will include:

- Setting up of a Grievance Redress Committee (GRC) at the community level (12 GRCs, 1 for each community) 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, a Youth Leader, 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 District Planning Officer, District Lands Officer, A representative of the Agric Directorate, and District Social Welfare Officer.
- The PCU 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 District 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, Metropolitan Assembly, PCU 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 10-1**.

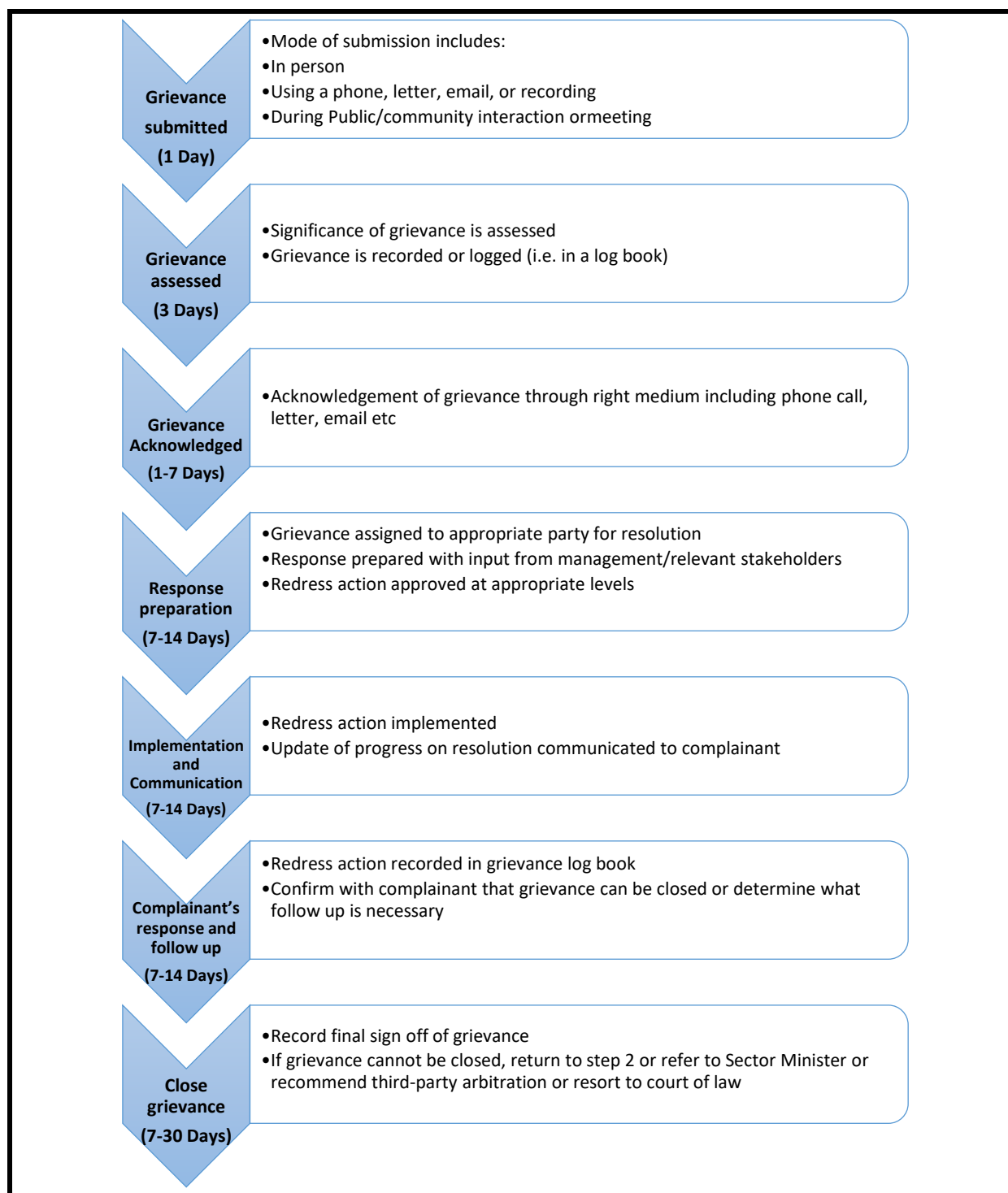


Figure 10- 1: Procedure for Grievance Redress

GRM operating budget

Table 10-2 presents the operating budget of the GRM. This budget is estimated at USD 79,000

Table 10- 2 : 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 district 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

11.0 ESMP IMPLEMENTATION BUDGET

Budgetary estimates are provided in **Table 11-1** below to support the implementation of the environmental and social management plan. The estimated budget is **USD 1,081,000**.

Table 11- 1: Estimated budget to implement ESMP

No	Activity	Description	Responsibility	Total Cost, US\$	Source of finance
A	Institutional measures				
1	Remuneration of the project's environmental safeguard specialist over 5 years	Implementation of ESMP	PIU	120,000	Project funds
2	Remuneration of the project's social safeguard specialist over 5 years	Implementation of ESMP	PIU	120,000	Project funds
3	Remuneration of the MDC environmental and social safeguard specialist over 10 months	Implementation of ESMP	PIU	20,000	Project funds
4	Remuneration of the environmental and social safeguard specialist of the works company over 12 months	Implementation of ESMP	PIU	24,000	Project funds
B	Technical measures			256,000	
	Specific technical measures				
5	Awareness creation on Project	Stakeholder engagement	PIU/ESS/SSS	5,000	Project funds
6	Capacity building for key stakeholders	Training workshop on National and AfDB requirements, EIA procedures, social measures and incorporating environmental and social measures etc. in contract documents.	PIU/Consultant	10,000	Project funds
7	Public engagement/ sensitization	Sensitization and engagement of project affected persons	PIU/Consultant	15,000	Project funds
8	Grievance Redress Mechanism (GRM)		PIU/ESS/SSS	79,000	Project funds
9	Decommissioning	Dismantling and removal of structures and equipment and waste disposal		15,000	Project funds
C	Monitoring and Audits				
10	Monitoring of environmental and social parameters of the works		PIU/ESS/SSS	267,000	Project funds
11	Annual E&S compliance Audits	To evaluate the compliance of the implementation of the project's E&S measures (ESMP)	PIU/ESS/SSS	150,000	Project funds
TOTAL of the ESMP IMPLEMENTATION				1,081,000	

CONCLUSION

The proposed project is expected to be implemented in accordance with relevant national laws as well as best international practices.

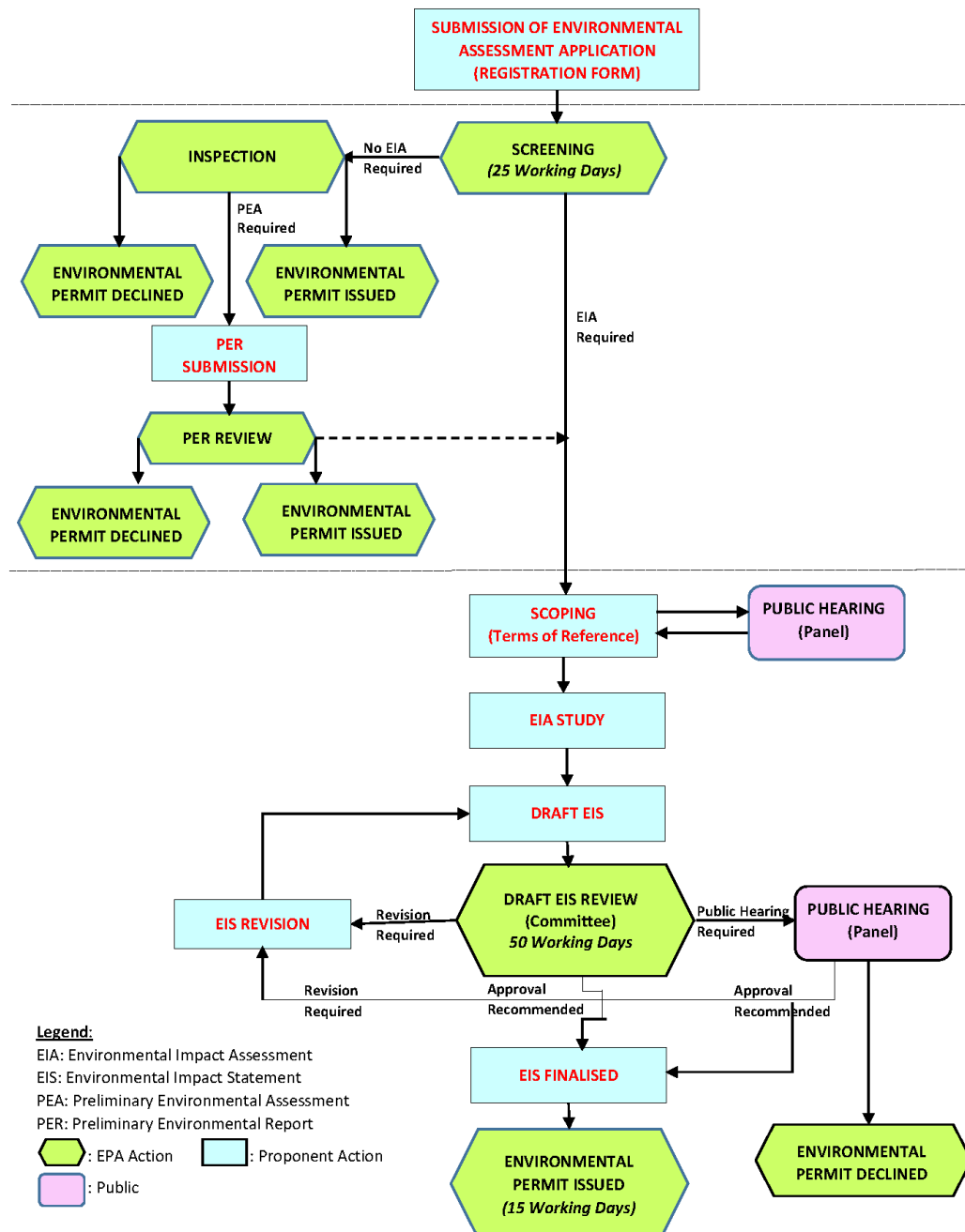
Assessments have shown that the project generally has moderate impacts on the environment and impacts could be further mitigated with the adoption of good health, safety and environment practices. Occupational, public health, safety and security issues and impacts will be properly managed to prevent any serious incident/accident or conflict. No resettlement is envisaged however, if any persons are displaced, impacts will be minimised through community sensitisation and extensive engagement with affected persons.

Identified adverse impacts will be mitigated with the implementation of the proposed mitigation measures and residual impacts contained and controlled by implementing the environmental management plan included in this report. Stakeholder concerns arising out of the public consultation and involvement process will be properly handled or addressed and further consultations will continue during the implementation stage.

The project will obviously benefit the local community through job creation, growth of businesses especially SMEs, increased knowledge and adoption of best agricultural practices etc. Some benefits will accrue to government in the form of increased revenue from taxes, reduced unemployment rate, foreign direct investment, import substitution and a general improvement in the economy. Stakeholders are therefore urged to ensure that the outlined benefits accrue to the beneficiaries which includes the local community and government.

ANNEXES

- Annex 1a: Administrative flow chart of environmental assessment procedure
- Annex 1b: Evidence of project registration with EPA
- 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: Air Quality, Noise Assessment and Surface Water Testing at TaMA
- Annex 7: Pictures of Engagement

Annex 1a: Administrative flow chart of environmental assessment procedure

Annex 1b: Evidence of project registration with EPA

ENVIRONMENTAL PROTECTION AGENCY, GHANA	
	
ENVIRONMENTAL ASSESSMENT REGISTRATION FORM	
(To be completed in Duplicate)	
Serial No.	
FORM EA2	
ASSESSMENT NO:	FILE NO:
Environmental Protection Agency (Head Office) P. O. Box M.326 Accra, Ghana	
Tel: +233 0302 664697/8, 664223, 662465 Fax: +233 0302 662690	

Environmental Impact Assessment
Registration Form

PROPOSED: SAVANNAH AGRICULTURE VALUE CHAIN DEVELOPMENT PROJECT (SADP)

Address for correspondence: Ministry of Food and Agriculture, Savannah Agriculture Value Chain Development Project (SADP)

Contact Person: Felix N. Darimaani

Position: Project Coordinator

Phone No.: 0244582508

Email: darimaanifelix@yahoo.com

1. Proposed Undertaking/Development:

The Savannah Agriculture Value Chain Development Project (SADP) is being implemented by the Government of Ghana through the Ministry of Food and Agriculture to serve as part of post COVID-19 reconstruction efforts aimed at addressing disruptions in food systems in Ghana. It builds on earlier successes under the Savannah Zone Agriculture Productivity Improvement Project (SAPIP) and Savannah Investment Programme (SIP) that have so far expanded the production of maize and soybean from 80 hectares in 2018 to 14,000 hectares in 2021. This program is expected to build on the achievements made and to further expand production of rice, soybean and maize by additional 8,000 hectares by 2026. The SADP project, is being implemented in nine (9) districts in the Savannah Zone of Ghana.

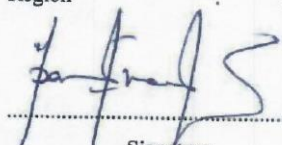
Sector : Agriculture

Shareholders : Ministry of Food and Agriculture, Ghana

2. Proposed Site : Nine (9) Districts in the Savannah Zone (Map attached)

District : Tamale Metro, Mion, Savelugu, East Mamprusi, West Gonja, Bawku West, Wa Municipal, Sissala East, and Nandom

Region : Northern, North East, Savannah, Upper East and Upper West


.....
Signature

20-June-2022

.....
Date

Annex 2 List of environmentally sensitive areas*ENVIRONMENTAL ASSESSMENT REGULATIONS, 1999**SCHEDULE 5**(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 GASSLIP Environmental and Social Specialist, DOVVSU or Municipal/ Metropolitan 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, railway tracks, 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 Environmental and Social Officer GASSLIP.
- 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
Government Institutions – Category A					
Department of Agriculture, Tamale Metro	Nouri-Deen I.	MAO-EXT	0244955595	18/11/2021	• Project implementation – Adequate funds should be provided to facilitate the implementation of project activities. • Marketing of produce – More feed mills must be made available if necessary by the project to process produce into food. • Sensitization on project – Farmers should be sensitized on the project to enable them to fully participate in the project. • Monitoring of project – Periodic and regular monitoring should be conducted on the project to facilitate the implementation of project activities.
	Abubakari M. Adom	AEA	0244381457		
	Gloria D. Sabblah	AEA	0249660705		
	Seidu Alhassan	AEA	0249012618		
	Ziblim Mohammed	AEA	0200937076		
	Abdul Latif Y. Yussif	AEA	0249758113		
	Alhaji Yussif Fuseini	MAO-APO	0240830693		
	Jennifer Anankani	AEA	0548203031		
	Dennice Amponsah	MAO-WIAD	0249581915		
	Abdul Iddrisu Yakubu	NSP	0546577639		
	Abdul Razak Lukman	NSP	0544228956		
	Aminu Abdul-Selilu	NSP	0546612915		
	Ambrose A. Aduma	NSP	0556122554		
	Yakubu Mohammed	NSP	0241788541		
	Abubakari M. Tofiq	NSP	0540445716		
	Dambol Ben Biakanang	NSP	0553843099		
	Fuseini Mohammed Mustapha	Attachment Personnel	0543810154 0553924341		

Stakeholder/ Institution/ Location	Contact Person(s)	Role	Contact No.	Date	Concerns Raised/ Information Received
	Iddrisu M. Mikidad Abdulai M. Yakubu Adam Ibrahim Bawa Ibrahim Zakawa A. Alhassan Abubakari Sulemana	NSP NSP NSP NSP NSP MAO	0556971252 0558839832 0248869843 0243071382 0546287437		
Tamale Metropolitan Assembly	Ibrahim Mustapha Musah Nashirudeen	MPO Finance officer	0247646751 0244703466	23/11/2021	• Collaboration – During the project's implementation, the project should coordinate with the district assembly. Moreover, funds needed to execute project activities should be provided on time and made readily available. • Sensitization on project – In order to ensure that the project is carried out efficiently, assembly officers and the beneficiary community should be well sensitized on the project. • Planning of project – The project's various cycles/phases should run according to schedule and on time. • Land acquisition – Since the community is a peri-urban one the project may have a significant impact on the community. • Project Capacity – A greater percentage of the community should benefit from the implementation of the project in order to improve the standard of living in the community. • Crop insurance- To cater for natural disasters such as drought and flooding, there is the need for the project to provide insurance for crops.
Land Commission, Tamale Metro	Saaka Ahmed Mustapha	Regional land officer administrator	0248545419	24/11/2021	• Site selection – The specific site for the project should be sorted and issues during land acquisition should be directed to the Land commission. • Soil analysis – In order to ensure a maximum impact of the project, soil fertility tests should be conducted on the land to identify the most appropriate soil for production. • Collaboration – There should be a liaison between the project and the Lands commission to facilitate project implementation.

Stakeholder/ Institution/ Location	Contact Person(s)	Role	Contact No.	Date	Concerns Raised/ Information Received
					• Socio-economic benefit – The livelihood of the beneficiaries should be positively impacted by the project.
Metro Fire Office, Tamale Metro	Abubakari Abdulai Abdul-Wahab H. Aiben Babong Emmanuel Bokuro Abubakari M. Suale Dramani Nasiru	Administrating officer Accounts Operational officer Operations Stores	0209832055 0245375457 0246220444 0243925342 0244059115 0245725610	30/11/2021	• Collaboration – The project should coordinate with other stakeholders such as MOFA, and fire service etc. in the implementation of the project. • Resource provision – Adequate resources needed for fire-fighting should be supplied to the department to effectively address fire outbreaks. For example, vehicles needed for fire-fighting should be made available to access sites of fire outbreaks. • Motivation of fire volunteers – The project should provide remuneration such as boots overalls etc. for fire volunteers and officers of the training team. • Sensitization on project – The community should be thoroughly informed about the project so that they may completely embrace it and participate in it. • Women involvement – The project should ensure that women are also involved in the project. • Protection of water bodies – In order to effectively protect available water bodies, farming around water bodies should be avoided. • Protection of project areas – Fire belts should be created around project sites to prevent the occurrence of fires.
EPA – Tamale	Huriatu Moro	Programme Officer	0241583006	21/06/2022	• Acquiring Environmental Permits – Farmers should acquire environmental permits before start of farming activities. • EPA Monitoring – the project should include EPA staff in the implementation phase of the project to monitor the compliance of the farmers with environmental standards.
Private Institutions – Category B					
Supplier, Tamale	Mohammed Awal Abdulai Issahaku	Supplier Supplier	0244869409 0201760674	24/11/2021	• Standard market pricing – Standard weights and prices of goods should be used as some middle men employ inappropriate means in pricing goods. A consensus should be arrived in obtaining a fixed value for produce. • Provision of packaging – The project should procure packaging materials for farmers. • Capital acquisition – The project should assist in providing financial support to beneficiaries. • Transportation – Adequate means of transportation should be made available to beneficiaries to facilitate the transportation of livestock and produce. Moreover, cost of transport should be reduced to suppliers.

Stakeholder/ Institution/ Location	Contact Person(s)	Role	Contact No.	Date	Concerns Raised/ Information Received
FBO	Twalhatu Mutawakilu Fuseina Amadu Memunatu Abdulai Mohammed Aminu Mustapha Mumuni Amina Abdallah Abdul-Mumin Maizara Fuseini Rahama	Chairperson Member Member Secretary Organiser	0241527831 0246533300 0551906530 0591912116 0240233309 0241638685 0550436723 0556614842	25/11/2021	• Provision of farm inputs and machinery – The project should provide farm inputs like viable seeds and procure adequate machinery to facilitate production. • Access to land - The community has access to nearby land. • Absence of a ready market and good pricing - There is difficulty in obtaining a good market for produce in addition to a lack of standard prices for goods. • Land development - Initial stamping of land is very expensive. • Accessibility of service center - The project should provide more than a center in the community owing to the availability of land at multiple places in the community in order to ensure ease of access.
Commercial farmer, Tamale Metro	Sayibu Mohammed	Manager	0244946168	19/11/2021	• Inadequate machinery and farm inputs - The project should supply adequate farm machinery soya bean processing machines, and combined harvesters to facilitate production of produce and also complementing the inadequate labor in the community. • High cost of fuel for machinery - The cost of fuel for machinery is high and should be considered by the project. • Transportation of farm produce - Adequate means of transportation should be provided to efficiently transport produce without contamination and loss.
Commercial Poultry Farmer	Abass Danladi	Manager	0242210862	19/11/2021	• Political interference – The project should be devoid of all political interferences in order to successfully reach the target beneficiaries thus ensuring the overall success of the project. • Timely implementation of project – All the stages and activities of the project must be carried out in accordance with schedule and executed in a timely fashion. • Monitoring and evaluation of project – The project should be monitored on a regular basis and evaluated to ensure that the project runs smoothly and efficiently.
Community and Focus Group – Category C					
Changnaayili, Tamale Metro	Ibrahim Ibn Baako Abubakari Sumali Baako Kamalideen		0247706040 0240343990 0548534669	19/11/2021	• Community awareness of project – The community is not aware of the project. • Land acquisition and involuntary resettlement – Community is aware there may be land acquisition and resettlement as a result of the project.

Stakeholder/ Institution/ Location	Contact Person(s)	Role	Contact No.	Date	Concerns Raised/ Information Received
					• Project impact on Community – By getting the project to reach the target beneficiaries, the community will be positively impacted. The community will like to know the overall benefit the project will have for farmers. • Land Ownership – About 95% of community land is stool land and the remaining 5% being government land. • Land use – The land is mainly used for farming and livestock production. • Land right and access - The land can be accessed through a request from the traditional authorities. There are no squatters present who may be affected by any land acquisition. • Land-related conflict – Community has not experienced any land-related conflicts. • Livelihood activities – The main livelihood activities are farming, livestock production, and poultry production. • Livelihood challenges – The community has challenges with procurement of farm machinery and inputs such as tractors, combined harvesters, and feed for livestock and poultry. • Community population – The community has a population of about 800. • Ethnic groups – Members of the community belong to the Mole-Dagbani ethnic group. • Migrant population – There are migrants in the community belonging to the Fulani ethnic group. • Vulnerable groups – There are no vulnerable people who may be poor or have limited access to land. There are no disabled persons in the community. • Religion – The community's major religions are Islam (90%), Christianity (5%) and Traditionalists (5%). • Women-headed households – There are about 6 women headed households in the community. • Indigenous people – There are no indigenous groups in the community. • Support for the less privileged – There is no support for the less privileged in the community. The months of May and June are the most difficult in terms of having money. • Key decision-makers – Chief and elders, opinion leaders, youth and women are among the key decision-makers. Through the MP, assembly member, the Unit committee and the community chairman, the community gains representation in government decision making and the community is satisfied with their representation. • Women in leadership – Women are involved in community decision making. • Local groups – WSAM committee in charge of water and sanitation exists in the community.

Stakeholder/ Institution/ Location	Contact Person(s)	Role	Contact No.	Date	Concerns Raised/ Information Received
					• Appointment of community leadership– The community appoints its elders/leaders through succession and elections. People forbidden from being leaders include: thieves, women, and untrustworthy people. • Existing traditional/Cultural groups – The following cultural groups exist for entertainment purposes in the community: ‘Kyera’, ‘Bamaya’, and ‘Simpa’. • Festivals and sacred events/sites – The Fire festival, the Damba Festival, and the Yam festival celebrated during the initial yam harvest are celebrated in the community. The shrine may be impacted by the project. • Health care – There are no health facilities in the community. The nearest hospital is located in Tamale and the nearest clinic in Vittin. • Educational facilities – The community has a basic, a primary and a junior high school, but no senior high school. The nearest Senior high school is located in Pagama-Wawale. • Water and sanitation – The community has a dugout, boreholes and shallow wells. • Utility services – Charcoal, electricity and fuelwood are the main sources of energy. The community has access to 3 mobile phone networks. • Quality of life – The community has a peaceful and social working environment. The community's life is made positive by the availability of land for farming, availability of basic school, and nearness to major road networks. The provision of potable water such as pipe borne water, clinic/hospital, storage facilities, SHS, and a market facility would enable a better quality of life for the community. • Community needs/priorities – Potable water, healthcare facility and a good price for farm produce are the top 3 needs of the community to improve the community.
Cheshei, Tamale Metro	Fati Mohammed Sanatu Adam Amina Issah Yabpaga Fuseini Azara Fuseini	Chairperson Vice-chair Member Member Member		22/11/2021	• Community awareness of project – The community is not aware of the project and would need further insight about the project. • Land acquisition and involuntary resettlement – Community is aware there may be land acquisition but not aware of any resettlement as a result of the project. • Project impact on Community – Because the initiative is related to agriculture, the community believes it will benefit them as a farming community. The community is concerned about the project's total duration as well as its overall impact. • Land Ownership – About 98% of community land is stool land and the remaining 2% being government land.

Stakeholder/ Institution/ Location	Contact Person(s)	Role	Contact No.	Date	Concerns Raised/ Information Received
	Memunatu Imoro	Member			• Land use – The land is mainly used for farming. • Land right and access - The land can be accessed through a request from the chief. There are squatters present who may be affected by any land acquisition. • Land-related conflict – Community has not experienced any land-related conflicts. • Livelihood activities – The main livelihood activities are farming, petty trading and livestock rearing. • Livelihood challenges – The community has challenges with water, lack of toilet facilities, and road networks. • Community population – The community has a population of about 3000. • Ethnic groups – Members of the community belong to the Mole-Dagbani ethnic group. • Migrant population – There are migrants in the community belonging to the Binoba, Gonja and Fulani ethnic groups. • Vulnerable groups – There are vulnerable people who may be poor or have limited access to land. There are disabled persons in the community. • Religion – The community's major religions are Islam (70%), Christianity (20%) and Traditionalists (10%). • Women-headed households – There are about 20 women headed households in the community. • Indigenous people – There are indigenous groups in the community. • Support for the less privileged – There is no support for the less privileged in the community. The months of May and June are the most difficult in terms of having money. • Key decision-makers – Traditional leaders, opinion leader, and assembly member, are among the key decision-makers. The MP, assembly member and the Unit committee serve as government representatives, of which the community is satisfied with their representation. • Women in leadership – Women are involved in decision making through the women's representative known as 'Magasia'. • Local groups – VSLA groups for savings and loans purposes also exist in the community. • Appointment of community leadership– The community appoints its elders/leaders through succession and elections. People forbidden from being leaders include: thieves, women, and non-indigenous people. • Existing traditional/Cultural groups – Warrior groups, the 'Longsi' and Fetish priests are among the traditional groups in the community.
	Sanatu Damamani	Treasurer			
	Sanatu Issahaku	Member			
	Sanatu Saiybu	Member			
	Zelia Abu	Organiser			
	Azara Zakaria	Member			
	Rabi Sumani	Member			
	Fuseini Abiba	Member			
	Sanatu Inusah	Member			
	Rahadia Yahaya	Member			
	Abdulai Zuwera	Member			
	Fatimata Iddrisu	Member			
	Fati Seidu	Member			
	Memunatu Sayibu	Member			

Stakeholder/ Institution/ Location	Contact Person(s)	Role	Contact No.	Date	Concerns Raised/ Information Received
					• Festivals and sacred events/sites – The Fire festival, the Damba Festival, ‘Bamaya’ and the Yam festival celebrated during the yam harvest are celebrated in the community. Rrituals such as the ‘Shirin’ sacrifice is also undertaken. Sacred or important sites like shrines and cemetary may be impacted by the project. • Health care – There are no health facilities in the community. The nearest hospital is located in Detoyili. • Educational facilities – The community has a basic, a primary and a junior high school, but no senior high school. The nearest Senior high school is located in Bisco. • Water and sanitation – The community has a dugout, and very few pipes. • Utility services – Charcoal, electricity and fuelwood are the main sources of energy. The community has access to 3 mobile phone networks. • Quality of life – The standard of living in the community is low. The community's life is made positive by the availability of land for farming and food availability all year round. Provision of social amenities such as potable water, good roads, a SHS, and toilet facilities will improve the quality of life for the community. • Community needs/priorities – Good roads, Potable water, and a Senior High School.
Pagaza/Tugu, Tamale Metro	Hon. Alhassan Imero	Assembly member	0547695406	17/11\2021	• Community awareness of project – The community is not aware of the project and would need further insight about the project. • Land acquisition and involuntary resettlement – Community is aware there may be land acquisition but not aware of any resettlement as a result of the project. • Project impact on Community – Because the initiative is related to agriculture, the community believes it will benefit them as a farming community. The community is concerned about the project's total duration as well as its overall impact. • Land Ownership – About 92% of community land is stool land and the remaining 8% being government land. • Land use – The land is mainly used for farming and livestock production. • Land right and access - The land can be accessed through a request from traditional authorities. There are squatters present who may be affected by any land acquisition. • Land-related conflict – Community has not experienced any land-related conflicts. • Livelihood activities – The main livelihood activities are farming, petty trading and livestock production.

Stakeholder/ Institution/ Location	Contact Person(s)	Role	Contact No.	Date	Concerns Raised/ Information Received
					• Livelihood challenges – The community has challenges with changes in rainfall pattern, lack of ready market and post-harvest losses. • Community population – The community has a population of about 1000. • Ethnic groups – Members of the community belong to the Mole-Dagbani ethnic group. • Migrant population – There are migrants in the community who belong to the Fulani ethnic group. • Vulnerable groups – There are vulnerable people who may be poor or have limited access to land. There are about 20 disabled persons in the community. • Religion – The community's major religions are Islam (94%), and Traditional (6%). • Women-headed households – There are about 70 women headed households in the community. • Indigenous people – There are indigenous groups in the community. • Support for the less privileged – There is the soya bean production support by RING for the less privileged in the community. The months of May through August are the most difficult in terms of having money. • Key decision-makers – Chiefs, Religious leaders, assembly member, and youth groups are among the key decision-makers. The assembly member and the Unit committee serve as government representatives, of which the community is satisfied with their representation. • Women in leadership – Women are involved in decision making by lobbying. • Local groups – There are youth groups responsible for improving the livelihood of the youth in the community. • Appointment of community leadership– The community appoints its elders/leaders through succession and by community appointment. Untrustworthy people, people with specific ailments, and those who are under the age limit are all prohibited from being elders/leaders. • Existing traditional/Cultural groups – There are no traditional groups present in the community. • Festivals and sacred events/sites – The Fire festival, the Damba Festival and the Yam festival celebrated during the yam harvest are celebrated in the community. Land rituals are also undertaken before the onset of rain and as thanksgiving for a bountiful harvest. No sacred or important site may be impacted by the project. • Health care – There are no health facilities in the community. The nearest clinic is located in Vittin and the nearest hospital is located in TTH, Tamale. • Educational facilities – The community has a basic, a primary and a junior high school, but no senior high school. The nearest Senior high school is located in Wawale.

Stakeholder/ Institution/ Location	Contact Person(s)	Role	Contact No.	Date	Concerns Raised/ Information Received
					• Water and sanitation – The community has a dugout, and salty wells. • Utility services – Charcoal, electricity and fuelwood are the main sources of energy. The community has access to 3 mobile phone networks. • Quality of life – The standard of living in the community is low. The community's life is made positive by the availability of land for farming and livestock production. Provision of social amenities such as potable water, health facilities, irrigation and storage facilities as well as a ready market for farm produce will improve the quality of life for the community. • Community needs/priorities – Potable water, a healthcare facility, and an irrigation facility.
Futa, Tamale Metro	Mahama Niendow Sayibu Zakaria Mahama Dokurugu Zakaria Muniru Haruna Fuseini Dokurugu Lukuman Alhassan Abdul Karim Alhassan Abdul Latif Haruna Iddrisu Alhassan Nundow Iddrisu Abass Iddrisu Yakubu Alhassan Tahidu Seidu Alhassan		0249814873 0249611412 0553766257 0249875172 0543827720 0240341836 0591808925 0249961917 0249961917 0247614757 0553681257 0548162435 0543336249 0548471643	26/11/2021	• Community awareness of project – The community is not aware of the project and would need further insight about the project. • Land acquisition and involuntary resettlement – Community is aware there may be land acquisition but not aware of any resettlement as a result of the project. • Project impact on Community – The community believes the project will have a positive impact on the community. The community is concerned about how the project will benefit them. • Land Ownership – About 97% of community land is stool land and the remaining 3% being government land. • Land use – The land is mainly used for farming and livestock production. • Land right and access - The land can be accessed through a request from the chief. There are squatters present who may be affected by any land acquisition. • Land-related conflict – Community has not experienced any land-related conflicts. • Livelihood activities – The main livelihood activities are farming, petty trading and livestock production. • Livelihood challenges – The community has challenges with acquisition of machinery and inputs, as well lack of potable water. • Community population – The community has a population of about 800. • Ethnic groups – Members of the community belong to the Mole-Dagbani ethnic group. • Migrant population – There are migrants in the community who belong to the Fulani ethnic group. • Vulnerable groups – There are vulnerable people who may be poor or have limited access to land and a disabled person in the community. • Religion – The community's major religions are Islam, and Christianity, and Traditional.

Stakeholder/ Institution/ Location	Contact Person(s)	Role	Contact No.	Date	Concerns Raised/ Information Received
	Zibbila Seidu Salifu Alhassan Hamidu Abubakari		0248873538 0242702174 0248967486		• Women-headed households – There are only 2 women headed households in the community. • Indigenous people – There are indigenous groups in the community. • Support for the less privileged – There is no support for the less privileged in the community. The months of June and July are the most difficult in terms of having money. • Key decision-makers – Chief and elders, Religious leaders, youth groups and opinion leaders are among the key decision-makers. The assembly member serves as government representative, of which the community is satisfied with their representation. • Women in leadership – Women are involved in decision making through their leader, called “Magazia”. • Local groups – There are youth and women's groups for group development, as well as VSLA for savings. • Appointment of community leadership– The community appoints its elders/leaders through succession and by community appointment. Untrustworthy people, people with specific ailments, and those who are under the age limit are all prohibited from being elders/leaders. • Existing traditional/Cultural groups – The Tora dancers’ group exists in the community. • Festivals and sacred events/sites – The Fire festival, the Damba Festival and the Eid festival are celebrated yearly in the community. Sacred or important sites may be impacted by the project. • Health care – There are no health facilities in the community. The nearest clinic is located in Vittin and the nearest hospital is located in TTH, Tamale. • Educational facilities – The community has a basic and a primary, but no Junior High School and senior high school. The nearest Senior high school is located in Wawale and the nearest JHS in Changnayili. • Water and sanitation – The community has a dugout, and salty wells. • Utility services – Charcoal, electricity and fuelwood are the main sources of energy. The community has access to only one mobile phone network (MTN). • Quality of life – The standard of living in the community is low. The community's life is made positive by the availability of land for farming and livestock production. Provision of social amenities such as potable water, good roads, and a clinic will improve the quality of life for the community. • Community needs/priorities – Potable water, a clinic, and good roads.



SAVANNAH AGRICULTURE VALUE CHAIN DEVELOPMENT PROJECT (SADP)

AIR QUALITY, NOISE ASSESSMENT AND WATER QUALITY ANALYSIS

TAMALE METROPOLITAN
ASSEMBLY (ZORBOGU
COMMUNITY)

January, 2022



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ACRONYMS

GSA	- Ghana Standards Authority
LEQ	- Equivalent noise level
L10	- Nuisance noise level
L50	- Average noise level
L90	- Background noise level
Lmax	- Maximum Noise Level
PCMU	- Project Coordination and Management Unit
PM	- Particulate Matter
SADP	- Savannah Agriculture Value Chain Development Project
SAPIP	- Savannah Zone Agricultural Productivity Improvement Program

1.0 INTRODUCTION

1.1 Background

The Government of the Republic of Ghana with assistance from the African Development Bank, through the Feed Africa Strategy, seeks to develop the savannah areas as part of Government's ongoing efforts in Planting for Food and Jobs (PFJ) and Rearing for Food and Jobs (RFJ) programs. This support is to allow medium scale commercial farmers and their out growers to expand areas under cultivation for rice, soybean and maize under PFJ, which feeds into poultry value chain under RFJ. This integrated approach supports elements of growing at scale and provision of market outlets for smallholder farmers, especially women and youth.

The Savanah Agriculture Value Chain Development Project (SADP) is being implemented to serve as part of post COVID-19 reconstruction efforts aimed at addressing disruptions in food systems of the Government of Ghana.

The proposed project will have three components namely (i) Component 1: Production Development, (ii) Component 2: Integrated Agribusiness and Value Chain Development, and (iii) Component 3: Project Management and Institutional Support.

1) Production Development:

Increase the production of basic (foundation) seeds, production and promotion of certified hybrid maize and improved soybean seed, in collaboration with seed companies, Support to land development and mechanisation services, Training of producers, pack house operators and exporters on sanitary and phytosanitary (SPS) concerns relating to maize and soybeans, Farmer mobilisation and awareness creation, Train project staff and farmers on Integrated Crop and Pest Management (ICPM), including biological control options for the management of Fall Army Worm (FAW) and aspergillus on Maize and Soybeans, Conduct surveillance and collect data on pests affecting Maize and Soybeans in the project zones with specific reference to FAW.

2) Integrated Agri-Business and Value Chain Development:

Promotion of quality standards for maize and soybean production, storage and processing, Support the establishment of small-to-medium scale poultry processing units at district level, Support business development, including improvements in business processes of existing commercial farmers, Enhance access to market information (e.g. quantity, quality, timing and pricing), Expand Commercial Poultry Revolving Fund to finance inputs to small-to-medium scale women/youth poultry farmers, Support Co-Financing Opportunities with Ghana Exim Bank, Agriculture Development Bank, etc.

3) Project Management and Institutional Support:

Development of annual work plan and budget, establishment of results-based monitoring and evaluation system, Conduct Beneficiary Impact Assessment. Conduct Project Mid-Term Review, Conduct Project Completion/Technical Review (PCR), Video and pictorial documentation of

success stories, Support to the coordination and implementation of Rearing for Food and Jobs, undertake relevant studies, including socio-economic surveys, soil suitability surveys etc.

A total of 9 districts have been earmarked for the implementation of the project (**figure 1**).



Figure 1: Map of Ghana showing the 10 districts selected for project implementation

SAL Consult Ltd has been contracted to carry out the Environmental and Social Impact Assessment study which includes a baseline study for air quality, noise assessment and water quality. The field activities were undertaken between 16th January, 2022 and 29th January, 2022 and this report provides the outcome of the field study in Zorbugu community (**Figure 2**) a selected community in the Tamale Metropolitan Assembly.

1.2 Purpose of Environmental Quality Monitoring

The aim of this monitoring is therefore to gather relevant environmental quality data with respect to Ambient Air, Noise Levels and Water Quality to describe baseline conditions at the project site. The data gathered will provide useful information to help monitor its operational impacts on the environment, health and safety of its employees and surrounding neighbors.

1.3 Objective

The objectives of the monitoring are to:

- Measure the concentration of particulate matter (PM_{2.5} & PM₁₀) at selected locations within the project catchment area
- Measure ambient noise levels at selected locations within the project catchment and neighboring communities.
- In-situ testing of nearest water bodies for the following parameters
 - pH;
 - Conductivity;
 - Total Dissolved Solids; and
 - Temperature

1.4 Compliance Criteria

In this report, ambient air quality results are compared with the GSA Standard, Environmental and Health Protection Requirements for Ambient Air Quality and Point Source/Stack Emissions (GS 1236:2019). Noise data is compared with the Health Protection- Requirements for Ambient Noise Control of the Ghana Standards Authority (GS 1222:2018). These standards are provided in the tables below.

Table 1: Environment and Health Protection- Requirements for Ambient Air Quality and Point Sources/Stack Emissions.

#	Air Quality Parameter	Maximum Limits	Averaging Time
1	Carbon Monoxide, µg/m ³	100 60 30 10	15 minutes 30 minutes 1 hour 8 hours
2	Sulphur Dioxide (SO ₂), µg/m ³	150	24hours
3	Nitrogen Oxides (measured as NO ₂), µg/m ³	150	24hours
4	Total Suspended Particulate, µg/m ³	150 100	24hours 1 year
5	PM ₁₀ , µg/m ³	70 70	24hours 1 year
6	PM _{2.5} , µg/m ³	35	24hours

Shaded rows show applicable guidelines to this study

Table 2: Health Protection-Requirements for Ambient Noise Control (GS 1222:2018)

Zone	Description Area of Noise Reception	Noise Level, dB(A)	
		Day (06:00-22:00)	Night (22:00-06:00)
A	Residential Areas	55	48
B	Educational (School) and health(hospital, clinic) facilities, office and law courts	55	50
C	Mixed used (Residential areas with some commercial or light industrial activities)	60	55
D	Areas with some light industry, places of entertainment or public assembly and places of worship	65	60
E	Commercial areas	75	65
F	Light industrial areas	70	60
G	Heavy industrial areas	70	70
<i>Shaded row shows applicable guidelines to this study</i>			

2.0 ENVIRONMENTAL MONITORING METHODOLOGY

The methodology for sampling the various parameters is discussed in this section. Particulate matter and noise were both monitored at the same time; thus, all parameters were monitored under the same weather conditions.

2.1 Sampling locations

Sampling was done within the Zorbogu community in the Tamale Metropolitan Assembly. This community was selected as a beneficiary community of the upcoming SADP project.

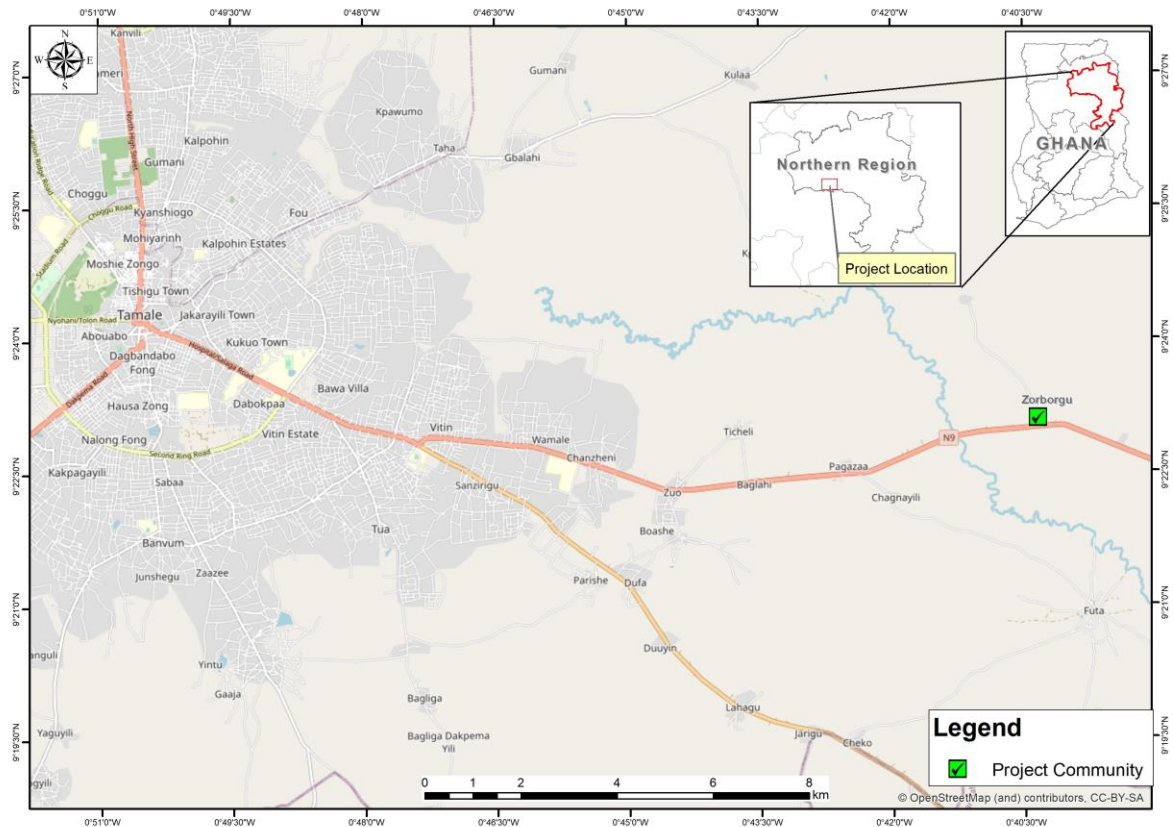


Figure 2: Location Map showing Zorbogu community

2.2 Sampling Location and Weather conditions

Table 3 below shows the details of the weather conditions and GPS locations of the sampling locations

Table 3: Details of Air and Noise sampling, locations and weather conditions.

	DATE AND TIME		WEATHER CONDITION					
	DATE	TIME	Longitude	Latitude	Temp.	Relative Humidity	Atmospheric condition	Wind Direction and Speed
PM ₁₀	17/01/22	24HRS	9.384363	-0.672358	34°C	8%	Clear/dry	NE 18Km/hr
PM _{2.5}	17/01/22	24HRS	9.384363	-0.672358	34°C	8%	Clear/dry	NE 18Km/hr
NOISE ASSESSMENT Daytime	17/01/22	12HRS	9.383866	-0.672284	34°C	8%	Clear/dry	NE 18Km/hr
NOISE ASSESSMENT Nighttime	17/01/22	12HRS	9.383866	-0.672284	21°C	8%	Clear/dry	NE 18Km/hr

Table 4: Details of water testing locations

	Date	Sampling code and description	Longitude	Latitude
WATER SAMPLING	17/01/22	TM – ZORBOGU 1 (Borehole)	9.383384	-0.672963
		TM – ZORBOGU 2(Dugout-Kpanlsi big and small stream)	9.385770	-0.676012

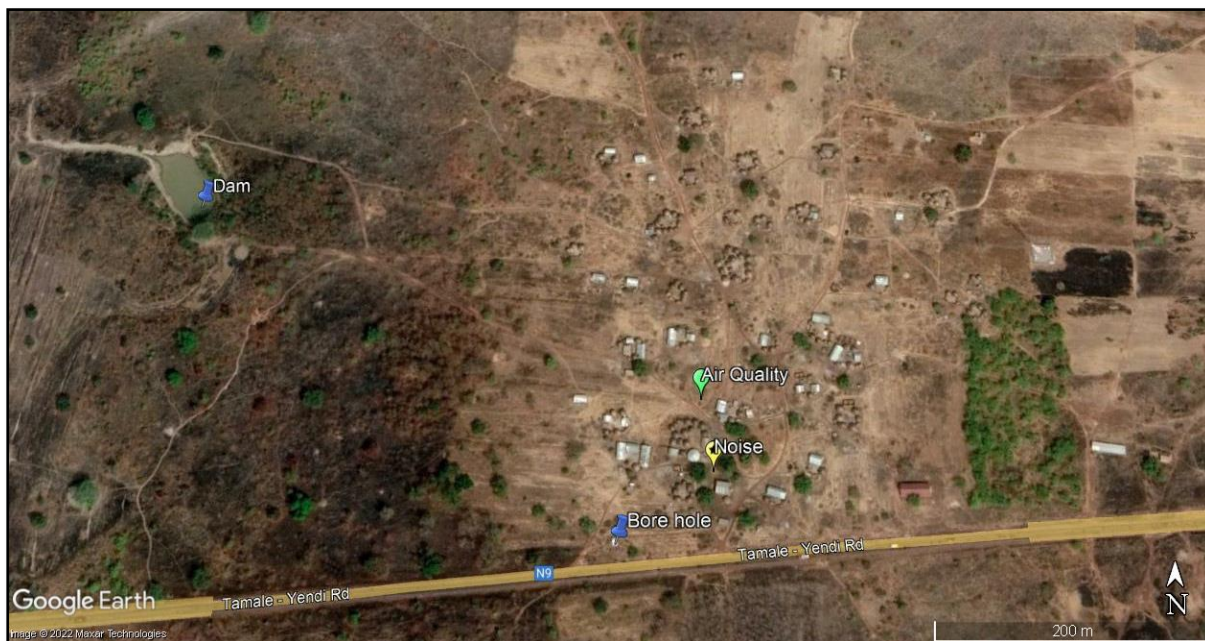


Figure 3:Satellite Imagery showing sampling locations

2.3 Particulate matter monitoring

The sampling and analysis of ambient particulate matter concentrations was done according to the ASTM Test Method D4096-17.

Particulate matter was sampled for 24 hours using ARA N-FRM Air Sampler set to a flow rate of 16.7 L/min. The sampler draws air through the inlet onto a 47mm quartz filter for analysis. The quartz filter paper was stabilized for a minimum of 24 hours before and after sampling in a desiccator.

The ARA N-FRM air sampler is equipped with a RTP profiler, which uses a Plantower light-scattering sensor to provide real-time data for two size ranges approximating PM10 and PM2.5. It shows trends during the sample run, supplementing the filter data.

The fresh quartz filter paper was weighed before sampling. After the 24-hour sampling period, post sampling filters were weighed and the difference in weight (W2-W1) was used to calculate the concentration of the particulate matter in $\mu\text{g}/\text{m}^3$ using the formula below.

$$(PM_{2.5} \& PM_{10}) \mu g/m^3 = \frac{\text{Net dust weight} \times 10^6 \mu g \times 1000L}{\text{Flow rate (L/Min)} \times \text{Sampling time (Min)} \times 1g \times 1m^3}$$

NB: $10^6 \mu g = 1g$ (since the unit of measurement of the balance is in grams); $1000L = 1m^3$ (Since flow rate is in L/min)

Photo of equipment mounted for PM_{10} and $PM_{2.5}$ sampling is provided in Plates 1 below:



Plate 1: Setting up ARA N-FRM sampler for Ambient Air Quality Monitoring

2.4 Ambient Noise

Sound is energy that travels in waves and is measured in frequency and amplitude. Frequency, reported in Hertz (Hz), measures the number of sound vibrations in one second. Amplitude, reported on the decibel (dB) scale, measures its pressure or forcefulness. The more amplitude a sound has, the louder it is.

A decibel (dB) is therefore the unit for the measurement of noise. The zero on a decibel scale is at the threshold of hearing, the lowest sound pressure that can be heard on the scale 20 dB which is a whisper, 40 dB the noise in a quiet office, 60 dB is normal conversation, 80 dB is the level at which sound becomes physically painful.

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:

- Lmax
- Lmin
- LAeq
- L10
- L50
- L90

Photo of equipment mounted at the selected location for noise monitoring is provided in Plates 2.



Plate 2: Noise monitoring in the Zorbogu community

2.5 Water Sampling

Water testing was done at the nearest water sources, Borehole and Kpanlsi dugout in the community. These two sources are within the project area of influence and potential recipients of any pollution impact from the project.

These are relatively clean sources of water based on the insitu testing results and results from CSIR-WRI. (table 8)

However, the community relies mainly on the Kpanlsi dugout for drinking, washing and farming. They hardly use the borehole because of its salty nature.



Plate 3: Kpanlsi dugout

The Borehole and Kpanlsi dugout was tested on the, 17th January 2022 at 11:15am and 11:37am respectively. Parameters including Temperature, pH, TDS and Conductivity were measured in-

situ by means of field kit (Plate 3). Calibration reagents are used to calibrate the Field Test Kit before each use.

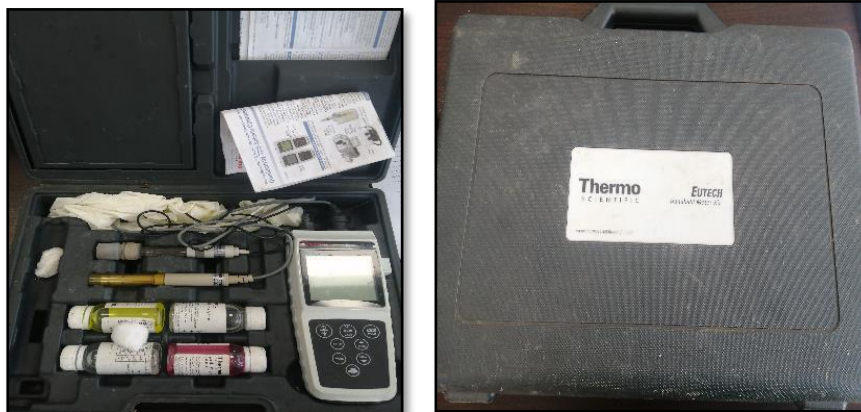


Plate 4:Thermo Scientific EUTECH Handheld Meter Kit



Plate 5 Borehole(left) and Dugout(Right) sampling and insitu testing.

3.0 RESULTS AND DISCUSSIONS

3.1 Air Quality

The ambient air quality and noise monitoring results are provided in Table 3 and 4 below.

3.1.1 Ambient Particulate Matter ($PM_{2.5}$, and PM_{10})

The 24-hour $PM_{2.5}$ and PM_{10} concentrations measured at the Zorbogu community were **15 $\mu\text{g}/\text{m}^3$** and **36 $\mu\text{g}/\text{m}^3$** respectively (See table 3).

Table 5: Summary of Ambient $PM_{2.5}$ and PM_{10} Results Measured at Zorbogu community

Location	$PM_{2.5}$ ($\mu\text{g}/\text{m}^3$)	PM_{10} ($\mu\text{g}/\text{m}^3$)
Zorbogu Community	15	36
Ghana Standards (GS 1236:2019) value for 24-hour ambient air quality for PM_{10} and $PM_{2.5}$	35	70
WHO Ambient Air Quality Guidelines for 24-hour for PM_{10} and $PM_{2.5}$ (Source: www.ifc.org/ehsguidelines)	25	50
Sampling dates: 17 th to 18 th January 2022		

- The concentrations of $PM_{2.5}$ and PM_{10} values are within the Ghana Standards (GS 1236:2019) and WHO Ambient Air Quality Guidelines for 24-hour for PM_{10} and $PM_{2.5}$ IFC guideline values.
- Thus, the ambient air quality at the Zorbogu community complied with the GSA standard.

3.2 Ambient Noise

3.2.1 Daytime Ambient Noise Levels

The Table 4 below shows the measured daytime noise levels at the Zorbogu community. The daytime ambient noise levels (LEQ) recorded was 54.9dB(A). at the Zorbogu Community.

Table 6: Day Ambient Noise Results.

Location	L _{EQ}	L ₁₀	L ₅₀	L ₉₀	L _{MAX}
Zorbogu Community	54.9	51.9	43.9	37.5	81.1
Ghana Standards (GS 1222:2018) for daytime Mixed use (Residential areas with some commercial or light industrial activities) 06:h00-22h00	60				
IFC Noise Level Guidelines for Residential, Institutional, Educational Facilities Day. (07:00-22:00) (Source:www.ifc.org/ehsguidelines)	55				
IFC Noise Level Guidelines for Industrial, Commercial facilities Day (7:00-22:00) (Source:www.ifc.org/ehsguidelines)	70				
Monitoring date: 17 th January 2022					

- From the Table above, the daytime noise levels complied with the GSA standards at the Zorbogu community.
- During the monitoring, the observed sources of noise were from intermittent vehicular movement on the main road 150m away also bleating of goats and some form of chatter amongst community members passing by.

3.2.2 Nighttime Ambient Noise Levels

The Table 5 below shows the measured daytime noise levels at the Zorbogu community. The nighttime ambient noise levels (LEQ) recorded was 45dB(A). at the Zorbogu Community.

Table 7: Night Ambient Noise levels (dBA) recorded.

Location	LA _{EQ}	L ₁₀	L ₅₀	L ₉₀	L _{MAX}
Zorbogu Community	45.00	49.30	41.40	33.70	64.00
Ghana Standards (GS 1222:2018) for nighttime Mixed use (Residential areas with some commercial or light industrial activities) 22h00-06h00	55				
IFC Noise Level Guidelines for Residential, Institutional, Educational Facilities Day. (22:00-7:00) (Source:www.ifc.org/ehsguidelines)	55				
IFC Noise Level Guidelines for Industrial, Commercial facilities Day (22:00-7:00) (Source:www.ifc.org/ehsguidelines)	70				
Monitoring date: 17 th to 18 th January 2022					

- From the Table above, the nighttime noise levels complied with the GSA standards at the Zorbogu community.
- During the monitoring, the observed sources of noise were from the rustling of winds and crickets chirping.

3.2.3 Surface water Quality

The quality of community Borehole and Kpalsini Dugout against WHO drinking guidelines is provided in **table 6**.

Table 8 Comparison of water Quality against WHO drinking water quality guidelines.

Parameter	TM-ZORBUGU 1 (Borehole)	TM-ZORBUGU 2 (Kpalsini Dugout)	WHO drinking water quality guidelines
Ph	7.65	6.43	6.5 – 8.5
Conductivity, µS/cm	22.8	82.9	-
TOTAL DISSOLVED SOLIDS (TDS)	12.17	43.17	1000
TEMPERATURE	31°C	24°C	-
TURBIDITY			-

TOTAL SUSPENDED SOLIDS (TSS)			-
NITRATE-NITROGEN			50
PHOSPHATE-PHOSPHORUS			
ALKALINITY			-
CHLORIDE			250
BOD			-
COD			-
OIL/GREASE			-
IRON			0.300
MANGANESE			0.400
<i>Sampling and Insitu testing date: 17th January 2022</i>			

4.0 CONCLUSION

Air Quality

The Particulate Matter (PM_{2.5} & PM₁₀) concentrations monitored at Zorbogu Community was found to be within the Ghana Standard (GS 1239:2019) permissible values of 35 and 70 (µg/m³). The monitoring team did not observe enough activities in the communities that could have significant influence on the air quality at the time of the assessment.

Noise Monitoring

The ambient noise levels (LEQ values) recorded were compared to their respective Ghana Standard (GS 1222:2018) and IFC guideline values.

The daytime ambient noise level (dBA) for the project site was below the GSA and IFC LA_{EQ} guideline values.

The nighttime ambient noise level (dBA) for the project site was also below the GSA and IFC LA_{EQ} guideline values.

Surface water quality

Parameters analyzed were below the WHO drinking water guidelines, showing that the quality of the Kpanlsi stream is generally good.

Annex 7 Pictures of Engagement

Some photographs taken during the stakeholder engagements are presented below (**Plates 11-1 to 11-3**):



Consultation with MoFA Department of Agriculture,
Tamale



Plate 11- 1: Meetings with Project Proponents in Tamale



Interaction with the Tamale Metropolitan Assembly



Engagement with Tamale Metro Fire Service

Plate 11- 2: Meetings with representatives of Government Institutions at Tamale



Meeting with Commercial Farmers



Meeting with Produce Suppliers



Engagement with Farmer Based Organizations



Plate 11- 3: Private Sector Engagement at Tamale



Chief of Nantong Changnayili



Assembly man of Pagazaa Community



Farmers in Futa Community



Women Group in Chesei Community

Plate 11- 4: Community Engagement