

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA)



**FOR THE PROPOSED NIGER STATE SPECIAL
AGRO-INDUSTRIAL PROCESSING ZONE (SAPZ)
AT AIRPORT CITY BORDER COMMUNITY, BOSSO
LGA, NIGER STATE**

2024



**Submitted By:
PULSE ENGINEERING AND CONSULTING
LIMITED**



**SUBMITTED TO:
FEDERAL MINISTRY OF ENVIRONMENT,
ABUJA**

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LIST OF ACRONYMS AND ABBREVIATIONS

ADPs	Agricultural Development Programmes
CBDA	Chad Basin Development Authority
CBOs	Community-Based Organizations
CHX	Methane
CLO	Community Liaison Officer
Cl-	Chloride ion
Cm	Centimetre
CO	Carbon Monoxide
CO ₂	Carbon dioxide
Cr	Chromium
Cu	Copper
Co	Carbon Monoxide
CP	Critical Points
dB	Decibel
DN	Net Irrigation Depth
EA	Environmental Assessment
EC	Electrical conductivity
ECO	Environmental Control Officer
ED	Executive Director
EHS	Environmental Health and Safety
ESIA	Environmental & Social Impact Assessment
EIS	Environmental Impact Statement
EMC	Environmental Management Classes
EMP	Environmental Management Plan
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESAP	Environmental and Social Assessment Procedures
FAO	Food and Agricultural Organization
FD	Field Drain
FG	Federal Government
FEPA	Federal Environmental Protection Agency
FC	Field Canal

FMARD	Federal Ministry of Agriculture and Rural Development
FME _{env}	Federal Ministry of Environment
FMWR	Federal Ministry of Water Resources
FSL	Full Supply Level
GEF	Global Environmental Facilities
GHGs	Green House Gases
H ₂ S	Hydrogen Sulphide
H ₂ SO ₄	Tetraoxosulphate VI acid
HCs	Hydrocarbons
Ha	Hectare
Hg	Mercury
HN0 ₃	Trioxonitrate V acid
Hg	Mercury
PACs	Project Affected Communities
PCA	Project Command Area
pH	Hydrogen ion Concentration
PHCN	Power Holding Company of Nigeria
PM	Particulate matter
Ppm	part per million
RAP	Resettlement Action Plan
RBDA	River Basin Development Authority
RBOs	River Basin Organizations
SAP	Strategic action plan
SAPZ	Special Agro-Industrial Processing Zone
SCs	Secondary canals
SDGs	Sustainable Development Goals
SO ₂ -	Sulphate ion
SO ₂	Sulphur Oxides
SO _x	Oxides of sulphur
SP	Suspended particulate
SPM	Suspended particulate matter
Sq.km	Square kilometre

TDS	Total dissolved solids
UN	United Nations
UNCED	United Nations Conference on Environment and Development
WHO	World Health Organization
VOCs	Volatile Organic Compounds

UNITS OF MEASUREMENTS

%	Percentage
$\mu\text{S/cm}$	Micro Siemens per grammes
cfu/g	Colony forming unit per millilitre
cfu/ml	Colony forming unit per millilitre
Cm	Centimetre
dB(A)	Decibel
G	Grammes
g/l	Grammes per litre
In	Inches
Km	Kilometre
M	Metre
m/s	Metre per second
m^2	Metre square
mg/kg	Milligramme per kilogramme
mg/l	Milligramme per litre
$\mu\text{g}/\text{m}^3$	Microgramme per metre cubic
mg/m^3	Milligramme per metre cubic
ml	Millilitre
Mm	Millimetre
mS/cm	milliSiemens per centimetre
NTU	Nephelometric Turbidity Units
$^{\circ}\text{C}$	Degrees Celsius
Ppt	Part per thousand
S	Second

GREENALLUVIA ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT TEAM

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EXECUTIVE SUMMARY

ES 1: Introduction

Food is one of the most basic needs of man; thus, humans depend on food production and supply to keep to a healthy well-being. To this, Agriculture is one avenue to ensure food availability; thus, provides the nutrients essential for human life. Insufficient output of even one essential nutrient over a long time will create several social and human health problems.

The deficiency of food production does not only increase food price, but will also increase malnourished population, which might cause social and economic unrest. Agriculture has become a major sector of economic growth and food sustenance. The practice of agriculture in Nigeria is an occupation of the majority, predominantly subsistent practice in the rural areas. Agriculture produces the necessary food for the world's populations under both rain-fed and irrigated conditions. Agriculture is the activity most essential for human survival. It feeds people, produces basic commodities for society and provides gainful employment for the majority.

Nigeria, like any other typical African country, is an agrarian economy in which agriculture and agro-allied enterprises are one of the most popular income-generating activities providing employment for up to 90% of the rural dwellers (World Bank, 1993). One of the most viable agro-product commodities that has become the main food staple for urban and rural people in West Africa/Nigeria which has become a source of contribution to the national and regional economy. The increased importance of agricultural and economic development and in food security particularly in Africa, has given its farming a new attention.

The proposed cultivation project is without its positive and negative impacts, thus the need to carry out Environmental and Social Impact Assessment (ESIA) process to ensure such (integrated production) projects are done with reduced impact on the environment, human health and natural resources; and hence ensure farming and facility-operations concurs with set regulatory-guidelines that encourage environmental sustainability and engender industrial best practices. Hence, the ESIA studies entails the process of identifying, predicting, evaluating and mitigating the bio physical, social and other relevant effects of developmental proposals prior to major decisions being taken and commitments made.

In compliance with regulatory bodies, like the Federal Ministry of Environment (FMEnv) statutory provisions and in accordance to the Environmental Impact Assessment (EIA) Act CAP E12 LFN

2004, Niger State Special Agro-Industrial Processing Zone (SAPZ) Company (the project-proponent) has commissioned an Environmental Consultant (Greenalluvia International Limited) to conduct an EIA Study for the proposed Cultivation Farm Project at Airport City Border Bosso LGA, Niger State.

ES 2: The Project Proponent

The Niger State Special Agro-Industrial Processing Zone company has a mandate to drive agricultural excellence in Niger State. As is the general objectives of all SAPZ across the nation, the Niger State SAPZ seeks to stimulate structural transformation in agriculture by connecting rural and urban development through the zone's ecosystem; integrating smallholder farmers into value chains through logistics and infrastructure, linking them to agro-industrial processors and consumer markets.

ES 3: The Project Contractor

Pulse Engineering and Consulting Limited (The Contractor), is a private limited Company registered with the Corporate Affairs Commission as RC.1187355, on the 28th day of April, 2014, in pursuant to the Companies and Allied matters decree 1990 to engage inter alia in the business of security consulting, agro-industrial developments, railway construction to civil engineering design and consultancy, real estate development and other like construction works.

The Company has since inception successfully completed numerous Projects in both the private and public sectors of the Nigerian economy.

The Head office in Nigeria is at Plot 22, Block 22, Oluyole Extension Estate, Ibadan, Oyo State.

ES 4: Project Location

The identified Special Agro-Industrial Processing Zone is in Bosso Local Government Area of Niger State. The proposed project is within geographical coordinates of 9°40'11.12"N latitude and 6°28'3.99"E longitude. The area has a mild average slope of about 1.5%-2.0% descending from Northeast to Southwest. This slope is good for agricultural development. The proposed project covers an area of about 3000Ha (30km²).

Niger State is a state in the North Central region of Nigeria and the largest state in the country by area. The state was established on 3 February 1976. The state occupies an area of 76,363km² (29,484 sq mi). the state is bounded by the states of Kebbi and Zamfara to the North, Kaduna to

the North and North-East, Kogi to the South-East, and Kwara to the South. The Federal Capital Territory is on Niger state's Eastern border, and the Republic of Benin is its Western border.

ES 5: Policy, Legal and Administrative Framework

The environmental compliance element of the project will be regulated under several statutes. These statutes outline measures that must be implemented to ensure compliance with policy guidelines and legislation. To achieve sustainable development and live in harmony with nature, environmental protection and control have now become an integral part of laws/regulations/policies promulgated at international, national and state/local government levels.

Also, responsible corporate organizations formulate policies that enable them to establish and operate sound environmental management systems. The relevant policies, regulations, laws and guidelines are highlighted in the report.

ES 6: Need for the Project

Agriculture remains the base of the Nigerian economy, providing a major source of livelihood for the majority of its people. The sector is faced with a plethora of challenges, notably an outdated land tenure system that constrains access to land, a very low level of irrigation development (less than 1 percent of cropped land under irrigation), limited adoption of research findings and technologies, high cost of farm inputs, poor access to markets have all combined to keep agricultural productivity low with high postharvest losses and waste (FAO, 2020). Although agriculture still remains the largest sector of the Nigerian economy, employing two-thirds of labour force, the production hurdles have significantly stifled the performance of the sector. As a result, food (crop) production increases have not kept pace with population growth, resulting in rising food imports and declining levels of national food self-sufficiency (FMARD, 2008).

The main factors undermining production includes reliance on rain fed agriculture, smallholder land holding, and low productivity due to poor planting material, low fertilizer application, a weak agricultural extension system amongst others. The Federal and the Niger State Government has given the highest and urgent priority to increasing food supply by improving and strengthening agricultural production system in the country and State respectively

ES 7: Value of the Project

Food security is a critical concern for any nation, the ability to cultivate land all year only increases the chance of providing this basic necessity. The Special Agro-Industrial Processing Zone provides

this advantage to beneficiaries of the project and to Niger State and Nigeria at large. Income generation for the local farming community, especially women farmers shall have a cascading economic effect on household income and the local economy of the Project Affected Communities and the surrounding Airport City Border community.

ES 8: Envisaged Sustainability of the Project

According to the national policy on the environment, cognizance must be taken of the various institutional settings as well as the complex historical, social, cultural, and legal considerations in the identification and implementation of measures designed to solve national environmental problems in any ESIA report. The provisions of the Policy have been duly adhered to in this study. Consequently, this ESIA report aims to provide a rational, coherent and comprehensive approach to the pursuit of the proposed project that is of economic and social benefit in a way that minimizes environmental damages.

ES 9: Project Alternatives

The identification and investigation of alternatives is a key aspect of the ESIA process. Therefore, all reasonable and feasible alternatives were identified and assessed during the scoping phase to determine the most suitable alternatives to consider and assess during the ESIA phase. The preferred project alternatives are highlighted and presented here.

ES 10: Project Overview

The 3,000Hec Agricultural Project by Niger State Special Agro-Industrial Processing Zone (SAPZ) Company includes Veterinary, Grazing, Green house, Processing, Aggregation and Training.

ES 11: Project Waste Management

The proposed project would result in the generation of certain quantities of solid and liquid wastes. production generates huge amounts of waste, which when burned or left to rot, pollute the air, soil and groundwater. In many places, much of the plant, aside the roots, is often discarded and either burned or left to rot, thereby leading to air, land and groundwater pollution. Thus, Niger State Special Agro-Industrial Processing Zone (SAPZ) Company recognises the need to minimise waste generation in the course of the proposed project implementation and to handle such wastes in accordance with industry and international best practices and in line with its policies on health, safety and environment.

ES 12: Environmental Baseline Conditions

Temperature

The key factors that influence temperature in the area are the movement of the sun, wind speed and direction, and land configuration. Temperatures around the Project area are generally high all year round, with the highest temperatures 92°F experienced around the month of February and the lowest values 53°F in December (NIMET, 2012). Further review of data showed average temperatures of 65°F in the wet season and 79°F during the dry season (Uyigue and Agho, 2006).

Sunshine Hours

A general assessment of the sunshine hours for Niger (Okundamiya et al., 2016) revealed that the average earliest sunrise is at 6:02 AM, and the average latest sunrise is 45 minutes later at 6:46. The average earliest sunset is at 5:59 PM, and the average latest sunset is 51 minutes later at 6:49 PM.

Humidity

We base the humidity comfort level on the dew point, as it determines whether perspiration will evaporate from the skin, thereby cooling the body. Lower dew points feel drier and higher dew points feel more humid. Unlike temperature, which typically varies significantly between night and day, dew point tends to change more slowly, so while the temperature may drop at night, a muggy day is typically followed by a muggy night. Niger experiences extreme seasonal variation in the perceived humidity. The muggier period of the year lasts for 6.7 months, from April 3 to October 26, during which time the comfort level is muggy, oppressive, or miserable at least 15% of the time. The muggiest day of the year is June 9, with muggy conditions 60% of the time. The least muggy day of the year is December 21, when muggy conditions are essentially unheard of.

Wind

This section discusses the wide-area hourly average wind vector (speed and direction) at 10 meters above the ground. The wind experienced at any given location is highly dependent on local topography and other factors, and instantaneous wind speed and direction vary more widely than hourly averages. The average hourly wind speed in Niger experiences significant seasonal variation over the course of the year.

The windier part of the year lasts for 5.4 months, from November 11 to April 24, with average wind speeds of more than 7.1 miles per hour. The windiest day of the year is January 22, with an average hourly wind speed of 9.2 miles per hour.

The calmer time of year lasts for 6.6 months, from April 24 to November 11. The calmest day of the year is September 5, with an average hourly wind speed of 5.1 miles per hour.

Wildlife Studies

The wildlife inventory for the study area was carried out by examining the animal footprints, droppings, interview with local hunters, etc. During the course of the fieldwork campaign, birds and some other reptiles were observed and identified. Also, the only local market operating in the study area, the proposed project area was visited to see and identify the predominant wildlife species. Terrestrial fauna that occurs in the study area was sampled. Various visual and assessment sampling methods were used which included analysis of footprints, faecal samples, vocalisations and interviews conducted with local inhabitants.

Land Use

The traditional use of land in the area is mainly agricultural (crop cultivation). Generally, mechanized farming and use of fertilizers is common in the area. There are also sites of cultural and religious significance in the community among which is burial sites. Land in the area is also used for the construction of markets, schools; health posts/centres mosques, and roads. Generally, the land use indicates commercial land use, industrial land use, residential land use and farming land use. The Land use pattern is mainly settlement and agricultural. Over 90% of the indigenes in the project area are involved in various farming activities such as cultivation of rice, millet, wheat, guinea corn, rice, onion, groundnut, animal husbandry among others.

The various land use in the study area include, recreational, transport, agricultural, residential, commercial, religious area, institutional areas, industrial uses and buffer zones point. The land use pattern in study area is diverse, in that urban development around the area has led to population growth, economic development, migration and rapid expansion of urban centres. The below table shows the percentage composition of land use in the area.

ES 12: Associated and Potential Environmental and Social Impacts

The Development, implementation and operation of the SAPZ Project would contribute to the creation of new jobs opportunities, Capacity Building, Skill Transfer, for the skilled, unskilled labour, casual labourer, and by extension the project affected communities.

Employment Opportunities

The project is envisaged to provide direct employment in the SAPZ & other industrial raw material procurement zones including direct employment in Agro industrial zone, farming sector outside the SAPZ. The SAPZ project will also provide indirect employment in primary, secondary and tertiary sectors including banks, logistics, insurance, manufacturing etc. of the Project Area of Influence.

Capacity Building

The project will provision increase capacity building and training in during both construction and operational phases ensuring that the locals, project affected people and their communities are prioritized. During project construction and Implementation, locals and project affected people will be taught, skills enhanced and impacted which will be utilized even after the project life cycle.

Skill Transfer

The project seeks to attract both national and foreign experts and consultants for the development, design, construction and operation of the SAPZ. During these interactions and processes, the locals will have significant benefit through the transfer of relevant technical skills and tools.

Increase Public Revenue

The project will help restore confidence in foreign investors and promote good doing business climate. The project seeks to attract foreign and national investment that help strengthen and decentralize the economy, increase the national treasury through tax payments, and encourage rural and community development.

Food Security

The project will reduce poverty and hunger by restoring hopes and confidence in farmers. Rural and local farmers will be motivated and inspire to grow and produce surplus cash crops and product with the availability of the Special Agro-Industrial Processing Zone. This means farmers and wouldn't have to worry about the available market for purchasing and storing their products.

Economy

The SAPZ will promote production and value-added goods and services for the local and foreign markets thus stimulating industrial and commercial growth. It will eventually Increase in revenue and profitability of the sector thereby encouraging mindset change in youth towards the agribusiness sector. Most importantly, the project promised to raises the competitiveness and efficiency of SME opportunities among youth and significantly increase earning potential and improving health and sanitation.

Infrastructure Development

The Project will stimulate the establishment of major infrastructures for both local and foreign needs considering the county's infrastructure gaps and needs. This infrastructural development will decentralize the country and improve the physical and aesthetic outlook of the county. The project is envisaged to accelerate the infrastructure development in the Airport City Border Community and make the community a notable commercial hub in Nigeria.

NEGATIVE IMPACTS OF THE SAPZ

Impacts on Air Quality

It is important to note that the project takes place in rural areas where air quality is usually good. The current and existing air pollution source along the project area is vehicular traffic (particulates and combustion emissions). Potential air emissions from the project in the form of fugitive dust and emission releases will occur as a result of earth work activities including vegetation clearing, excavation works, and transportation of materials to and from the project sites especially where trucks travel on unpaved portions of tracks and roadways. The local ambient air quality around the project area will be temporarily impacted during construction phase as the result of air emissions generated by construction activities. In addition, pollutant emissions will occur due to the operation of diesel fuel generators, and exhaust emissions form transport vehicles such as material transport trucks and administrative vehicles.

Therefore, the potential impacts of the project activities on air quality is associated with dust emissions and an increase the following combustion pollutant concentration (CO, NOX, SO2 and PM). This impact is localized and not significant.

Impacts on Water Resources

Increased sediments as a result of increased soil erosion due to earthworks can enter surface waters causing increase turbidity and hence impacting aquatic fauna and flora by altering the aquatic environment. In proper handling of lubricants, hazardous substances and hydrocarbons (fuels, gasoline, etc.) may also cause water pollution of surface and ground water. However, the quantities required for used are small and not expected to affect surface and ground water as long as good management practices are applied.

Surface Water

Surface water could be affected during the construction and operation of the SAPZ project. Site clearance, removal of trees and shrubs and site preparatory works would cause a subsequent increase in surface runoff which may, in turn, increase the risk of flooding and soil erosion. Surface water quality could be affected by number of factors during both construction and operations of the SAPZ. Construction activities and operation phase may cause increased soil erosion and sediment loading of nearby streams, while accidental leaks or spills of hydrocarbons (oil, fuel or other substances) can also pollute surface water and impact on ground water. During operations, the major threats to surface water quality is likely to be pollution from pesticides, fertilizers, sewage, effluents from operations and processing plants etc. Gradually seepage of improperly stored materials, chemicals, and products from storage continent may also continue to contaminate surface.

Ground Water

The construction works at the SAPZ may have significant impacts on ground water hydrology and quality. Potential chemicals and improper handling of lubricating slurry, fertilizers and other toxic substances during construction and operation may cause groundwater pollution thus through gradual seepage.

Impacts on Soil Quality

The project area is located within the coastal plain and is generally flat with some undulating rises. The main impacts on soil will occur due to increases erosion potential as a result of vegetation clearing and earth moving activities. Additionally, the increase in potential of erosion, will be a risk of soil contamination from solid waste generated by site activities, as well as liquid waste such as lubricants, slurry, and accidental spills, and leaks occurring from storage and work areas.

Impacts associated with soil contamination may continue long after operations have ceased if mitigation measures are not carefully management.

Impacts From Waste Generation

The Project will produce many types of wastes during both construction phase and operational phase. During mobilization and construction phases, solid materials such as domestic waste, packaging from construction materials, debris, excavation remnants and others will be generated which could contaminate both soil and water resources. Vendors, construction staffers and employees must adhere to strict hygiene practices and correctly dispose waste in adherence the EPA standards.

In addition to these wastes generated during construction phase, the operational phase would produce huge volume of waste from key sectors, zones, processing and value-added streams within the Special Agro-Industrial Processing Zone. Wastes expected to be generated during this period include; raw materials from farmlands, plantations, concessions areas and their cumulative wastes generated as well as effluents and wastewater from the processing and value added streams.

Generally, the Agro-Cluster of the SAPZ will include; 1: Open farms, modern farm clusters, green houses, livestock etc., 2: Collection centers, cold stories, ripening chambers and warehousing; 3: Primary processing hubs; 4: R&D incubation centers, quality control; 5: Agribusiness management institutes; 7: IT support/library, training center; 8: Common infrastructure; 9: Utilities & services including maintenance 10: Environmental monitoring and meteorological system; 11: Integrated agro industrial park; 12: Other agro and food processing zones; 13: Packaging and support services; 14: Commercial trade area; 15: Terminal markets logistics. All these activities would post environmental, social and economic impacts and thus mitigation measures increases the project performance and acceptability.

Impacts from Noise And Vibration

The main source of noise and vibration will be as the result of drilling and other earthmoving activities. Additionally, noise will be generated from transportation activities during construction period which would be much higher than during the operational period. The increased noise level can impact employee's health and safety and reduce performances. Heavy vehicle operators, nearby communities and resident in close proximity to project area of influence are at higher risk of noise nuisance.

Impacts of Visual

Construction activities at SAPZ facility may be include construction of campsites, recruitment and mobilization of equipment and machineries transportation and other operations carried out at both day and night. Lighting at night can result in visual impact on local communities and sensitive fauna species. Unobtrusive lighting disrupts critical behaviour of biodiversity. It can stall the recovery of threatened species and interfere with their ability to undertake long-distance migrations, reduce breeding success and their chances of survival. Lighting should be kept to the minimum requirement for safety at night-time.

Impacts On Fauna and Flora

Construction activities are likely to affect the local vegetation and faunal and flora species directly or indirectly. Site clearing, excavation and initial preparatory works will potentially impact local flora and fauna of the proposed project area. These preparatory site activities will alter the natural habitat of critical species and the ecosystem services they provide. Vegetation clearing and earthwork activities will also result in increased noise and may result in loss in fauna and flora species and by extension affect their reproduction patterns.

Impacts on Health and Safety

Construction works, industrial processes and operations attracts significant numbers of people and professionals from diverse orientations including skilled labourer, unskilled labourer, technical experts, construction works, and operations technicians. Consequently, there is an increased risk of trips, falls, injuries, accidents and spread of diseases amongst these contractors, pedestrians, passengers, and staff at the project level as well as the project's community level.

In addition to the risks of accidents, there is an increased risk of accidental exposure to hazardous materials and substances during construction and operations should said materials not stored and handled in the appropriate manner and form. The risks and impacts on health and safety are increased if contractors and employees do not adhere to the administration of the Personal Protection Equipment (PPEs) relative to their respective scope of work and not equipped with relevant trainings in occupational health and safety procedures.

An internationally trained and experienced safety specialist will be responsible for the preparation, implementation and maintenance of a comprehensive safety program, which will periodically be

reviewed and evaluated. Access to a nearby first aid facility will be provided and a driver and an ambulance will be made available should there be a need to transport patients to another location.

These risk of accidents, injuries and diseases should be minimized by providing regular training and procedures for workers, equipment usage and regular health safety induction protocols to reduce and offset these impacts.

Impacts from Traffic

Project activities will significantly increase the frequency of vehicular traffic congestion and thus increase the risk of motor-vehicle accidents. In addition to the risk of accidents, increase traffic will lead to inconvenience to the public, motorists and chauffeurs, and increase the potential for nuisance in the project area of influence. Mitigation measures will include the development of Traffic Control and Management Plan to minimize or reduce the high level of nuisance and pollution in the area.

SOCIO-ECONOMIC IMPACTS

Employment

The project is expected to provide employment and social livelihood opportunities in the short and long term during both construction and operation phases. Employment opportunities will be tailed on both male and female gender basis and preference will be given workers from the local communities.

As a norm, there would be high influx of people from other region to the project proposed areas for job opportunities which potentially results into social friction an altered social dynamic, and possibly increasing the risks occurrence of diseases and infections. The Project Implementation Unit will work with the Community Liaison Officer and Contractors to put in place appropriate actions that prevent reduce, minimize or offset such impacts.

Impacts to Cultural Resources

Based on the field survey, no activities under the project are expected to take place near any cultural or archaeological resources. Avoiding cultural resources during planning stages and ensuring equal representation and participation of relevant project affected persons and communities in decision making process helps to mitigate impacts to cultural resources. Damage to cultural resources constitute threat to social cohesion and would lead to resentment of the

proposed project. However, should any cultural site or resources be found, the appropriate standard for chance finds will be applied.

ES 13: Environmental and Social Mitigation Measures

Identification and assessment of impacts has been undertaken through a process comprising consultation, modelling, on-site observations, literature review and expert opinion based on experience of similar projects. These modelling and assessment results have been reviewed and verified. The Niger State SAPZ company is committed to the Mitigation Hierarchy for Health and Safety and the Mitigation Hierarchy for Environmental and Social Risks presented respectively below; The general rule in designing such measures is:

- Avoidance of major impacts: major impacts are generally considered unacceptable, certainly ones that would endure into the long-term or extend over a large area; and
- Reduction of major and moderate impacts to as low as reasonably practicable by planning, designing and controlling mitigation measures. This Implies that mitigation measures will be applied up until the limitations of cost-effectiveness and practical application are reached. The limitations are established by best international practice.
- Implementation of good contractor practices for impacts rated as minor, in order to ensure that impacts are management within good reason.

ES 14: Gender Based Violence

The SAPZ project at the Airport City Border Community will involve large civil works and will require a huge labour force and associated goods and services that may not be met locally. As such construction workers will be brought from outside the project area. Construction workers are predominantly male, typically separated from their families on the construction site for extended periods of time. If not carefully managed, an influx of labour can negatively impact a project area, in the context of high acceptability of violence against women and girls.

Additionally, the project area is a Muslim dominated community with most community members practicing polygamy, a risk factor for GBV. Focus group discussions during the project social assessment, shows that forced and early marriage of girls is a common cultural practice, and that women and girls do not freely participate in public consultations.

It's therefore essential for the project to take into consideration the high labour influx, the high levels of poverty, polygamy, harmful cultural practices and norms, violence against women and

girls in the context of refugee hosting districts interacting to exacerbate the risk of GBV/SEA. If not well managed, these factors can lead to further marginalization and abuse of women, girls and children who are already vulnerable.

Definition of GBV/SEA/SH

The Inter-Agency Standing Committee (IASC) defines gender-based violence as “an umbrella term for any harmful act that is perpetrated against a person’s will, and that is based on socially ascribed (gender) differences between males and females. GBV broadly encompasses physical, sexual, economic, psychological/emotional abuse/violence including threats and coercion, and harmful practices occurring between individuals, within families and in the community at large. These include sexual violence, domestic or intimate partner violence, trafficking, forced and/or early marriage, and other traditional practices that cause harm.

The United Nations defines “sexual exploitation” as any actual or attempted abuse of a position of vulnerability, differential power, or trust, for sexual purposes, including, but not limited to, profiting monetarily, socially or politically from the sexual exploitation of another. Sexual abuse on the other hand is “the actual or threatened physical intrusion of a sexual nature, whether by force or under unequal or coercive conditions.” SEA is therefore a form of gender-based violence and generally refers to acts perpetrated against beneficiaries of a project by staff, contractors, consultants, workers and Partners.

Sexual harassment occurs between personnel/staff and involves any unwelcome sexual advance or unwanted verbal or physical conduct of a sexual nature.

ES 15: Grievance Redress Mechanism

The grievance redress mechanism is anchored on the need to provide a forum locally to receive, hear and resolve disputes arising from project implementation in the best interest of all parties to prevent the lengthy process of litigation, which could affect the efficiency and effectiveness of dispute resolution.

Therefore, the setting of grievance redress committee early during the project’s preparation is imperative.

Grievances may not be limited to but can arise from any of the following: 1) involuntary resettlement and compensation issues, 2) violence, 3) exclusion from project benefits and non-compliance of the contractor to the agreement reached with SPIU or the community

ES 16: Environmental and Social Management Plan

The environmental and Social Management Plan involves environmental and social control and mitigation measures, monitoring programs, and responsibilities which must be developed based upon an assessment of environmental and social risks for the proposed project.

The Niger State SAPZ company is responsible for the detailed design, procurement, construction and operation of the Special Agro-Industrial Processing Zone Project. In due course, will issue technical invitation to bid documents for the various elements of the construction work scope.

As Project Owner, the Niger State SAPZ company will have the ultimate responsibility for implementing the ESMP, which will include:

- Management of environmental and social issues as detailed design proceeds
- Monitoring and assessment of the Contractor's' HSE (including labour and working conditions) performance
- Assisting the Contractor in implementing the ESMP and topic special management plans
- Acting as a point of contact for consultation with Authorities and stakeholders
- Environmental and social compliance monitoring and reporting.
- Activities that ensure that Contractors will be deployed in accordance with Project standards and regulations.
- Recording of compliance and non-compliance with the provisions of the ESMP.
- Ensuring the compilation of required periodic environmental reports for submission to the FMEnv
- Ensuring that there are sufficient resources (time, money and people) to manage the implementation of the ESMP.

ES 17: Conclusion and Recommendation

The assessment and identification of potential and eminent environmental, social, cultural and health risks and impacts recommended measures to curb, reduce, offset these impacts to acceptable levels ensures project acceptance by the local affected parties and successful implementation.

Despite the urgent needs of major stakeholders expressed for project approval and implementation, it is eminent to note other descending views and concerns expressed by project affected parties/ stakeholders should be considered to ensure that the project is environmentally sound and socially sustainable.

A detailed assessment was conducted to determine the level and extent of resettlement that may be required. It is important that the Government of Niger State through the Niger State Special Agro-Industrial Processing Zone company, the Federal Ministry of Agriculture & Rural Development, and the contractor (Pulse Engineering and Consulting Limited) enhance efforts in engaging the rural communities and clarify pressing concerns relative to the project development object, land ownership and traditional land, customary land, public and private land ownership.

The overall impacts of the project are minimum and the recommended mitigation measures are effective to address, reduce, and offset these impacts. More importantly, impacts identified during the construction phase range from direct, indirect, short term, temporary, irreversible, and most often under the proponents' control. While those impacts during operations are relatively low and adequate environmental management systems will be employed to address and mitigate them.

Baseline surface and ground water within the proximity of the project area of influence were evaluated to assess its characteristics prior to the implementation of the project activities. Socio-economic survey revealed that the majority of the local and rural people are generally involved with traditional agricultural practices including farming, hunting, charcoal production,

Hence, the Consultant asserts that all environmental and social impacts associated with the Special Agro Industrial Processing Zone Project (SAPZ) have been identified and that the mitigation and management measures herein contained can adequately address the identified impacts when implemented accordingly.

CHAPTER ONE INTRODUCTION

1.0 Introduction

Food is one of the most basic needs of man; thus, humans depend on food production and supply to keep to a healthy well-being. To this, Agriculture is one avenue to ensure food availability; thus, provides the nutrients essential for human life. Insufficient output of even one essential nutrient over a long time will create several social and human health problems.

The deficiency of food production does not only increase food price, but will also increase malnourished population, which might cause social and economic unrest. Agriculture has become a major sector of economic growth and food sustenance. The practice of agriculture in Nigeria is an occupation of the majority, predominantly subsistent practice in the rural areas. Agriculture produces the necessary food for the world's populations under both rain-fed and irrigated conditions. Agriculture is the activity most essential for human survival. It feeds people, produces basic commodities for society and provides gainful employment for the majority.

Nigeria, like any other typical African country, is an agrarian economy in which agriculture and agro-allied enterprises are one of the most popular income-generating activities providing employment for up to 90% of the rural dwellers (World Bank, 1993). One of the most viable agro-product commodities that has become the main food staple for urban and rural people in West Africa/Nigeria which has become a source of contribution to the national and regional economy. The increased importance of agricultural and economic development and in food security particularly in Africa, has given its farming a new attention.

The proposed cultivation project is without its positive and negative impacts, thus the need to carry out Environmental and Social Impact Assessment (ESIA) process to ensure such (integrated production) projects are done with reduced impact on the environment, human health and natural resources; and hence ensure farming and facility-operations concurs with set regulatory-guidelines that encourage environmental sustainability and engender industrial best practices. Hence, the ESIA studies entails the process of identifying, predicting, evaluating and mitigating the bio physical, social and other relevant effects of developmental proposals prior to major decisions being taken and commitments made.

In compliance with regulatory bodies, like the Federal Ministry of Environment (FMEnv) statutory provisions and in accordance to the Environmental Impact Assessment (EIA) Act CAP E12 LFN 2004, Niger State Special Agro-Industrial Processing Zone (SAPZ) Company (the project-proponent) has commissioned an Environmental Consultant (Greenalluvia International Limited) to conduct an EIA Study for the proposed Cultivation Farm Project at Airport City Border Bosso LGA, Niger State.

1.1 The Project Proponent

The Niger State Special Agro-Industrial Processing Zone company has a mandate to drive agricultural excellence in Niger State. As is the general objectives of all SAPZ across the nation, the Niger State SAPZ seeks to stimulate structural transformation in agriculture by connecting rural and urban development through the zone's ecosystem; integrating smallholder farmers into value chains through logistics and infrastructure, linking them to agro-industrial processors and consumer markets.

1.1.1 The Project Contractor

Pulse Engineering and Consulting Limited (The Contractor), is a private limited Company registered with the Corporate Affairs Commission as RC.1187355, on the 28th day of April, 2014, in pursuant to the Companies and Allied matters decree 1990 to engage inter alia in the business of security consulting, agro-industrial developments, railway construction to civil engineering design and consultancy, real estate development and other like construction works.

The Company has since inception successfully completed numerous Projects in both the private and public sectors of the Nigerian economy.

The Head office in Nigeria is at Plot 22, Block 22, Oluyole Extension Estate, Ibadan, Oyo State.

1.2 Project Location

The identified Special Agro-Industrial Processing Zone is in Bosso Local Government Area of Niger State. The proposed project is within geographical coordinates of 9°40'11.12"N latitude and 6°28'3.99"E longitude. The area has a mild average slope of about 1.5%-2.0% descending from Northeast to Southwest. This slope is good for agricultural development. The proposed project covers an area of about 3000Ha (30km²).

Niger State is a state in the North Central region of Nigeria and the largest state in the country by area. The state was established on 3 February 1976. The state occupies an area of 76,363km² (29,484 sq mi). the state is bounded by the states of Kebbi and Zamfara to the North, Kaduna to the North and North-East, Kogi to the South-East, and Kwara to the South. The Federal Capital Territory is on Niger state's Eastern border, and the Republic of Benin is its Western border.

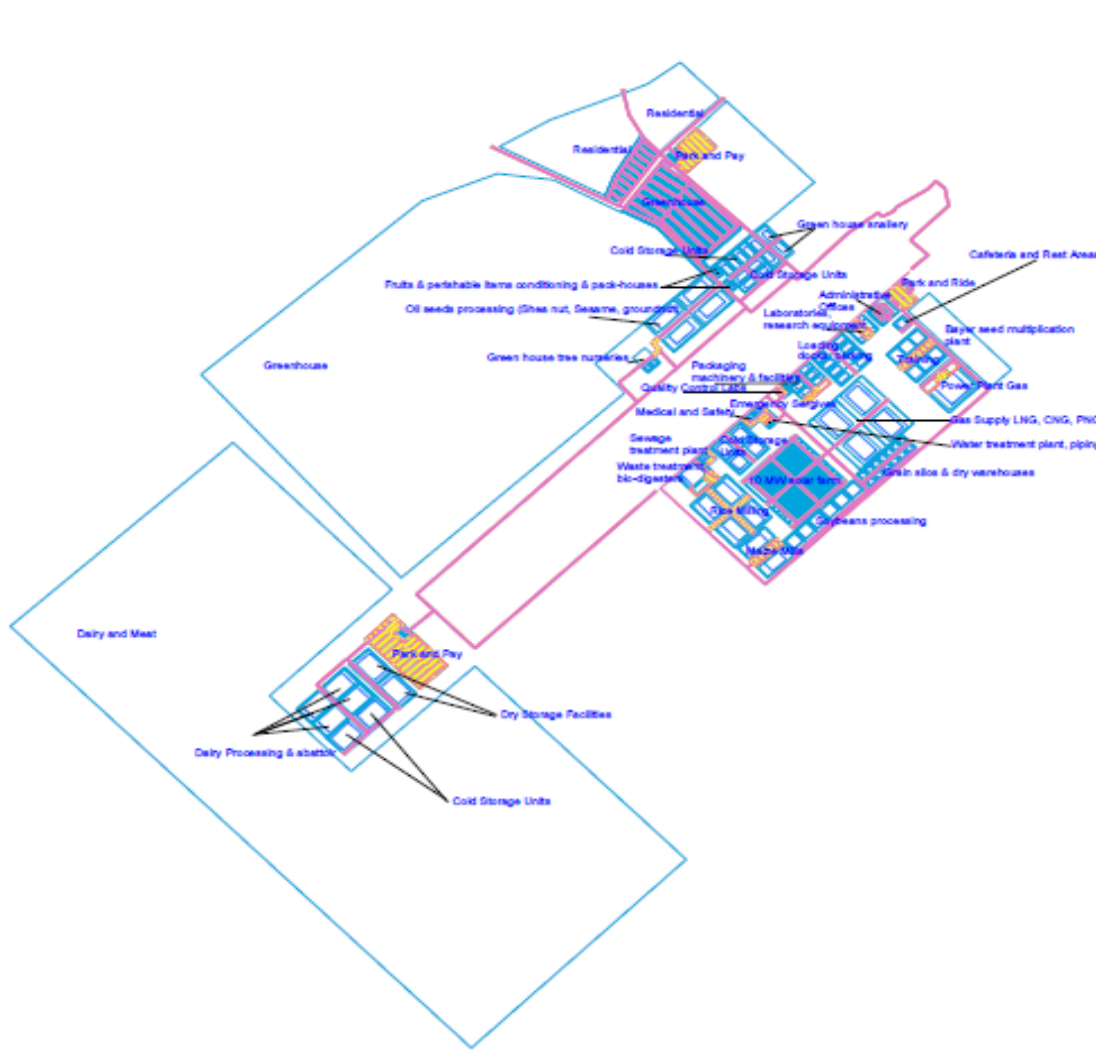


Figure 1.1: Schematic Diagram of Minna Airport Masterplan

1.3 Registration

As a pre-requisite, this ESIA Study has been duly registered with the Federal Ministry of Environment for review and other processes.

1.4 The Contract

The Niger State Special Agro-Industrial Processing Zone (SAPZ) company has commissioned Greenalluvia International Limited (hereafter referred to as the Consultant) to prepare the

Environmental and Social Impact Assessment (ESIA) and Environmental and Social Management Plan (ESMP) for the Airport City Border Community Special Agro-Industrial Processing Zone (SAPZ) in line with the State's safeguards policies and adhering to country environmental standards and approved mechanisms for permit issuance.

1.5 Objectives of the Study

Essentially, Environmental and Social Impact Assessment (ESIA) is the process of identifying, predicting, evaluating and mitigating the bio physical, social and other relevant effects of developmental proposals prior to major decisions being taken and commitments made. It is a process of evaluating the likely environmental impacts of a proposed project or development, considering inter-related socio-economic, cultural and human-health impacts, both beneficial and adverse. Thus, ESIA presents a tool used to identify the environmental, social and economic impacts of a project prior to decision-making.

The objectives of carrying out the ESIA for the proposed project are to:

- identify existing environmental regulations affecting the proposed project and decide on the appropriate operational/functional environmental standards and targets for the project,
- establish the present existing baseline (bio-physical, socio-economic and health) conditions of the project environment and therefore provide basis for measuring future changes and impacts,
- identify potential environmental and socio-economic impacts and hazards that may result from any of the proposed project activities,
- assure effective consultations with the host and adjoining communities of the proposed project and ensure their concerns are properly addressed and their views integrated into the project decision-making processes,
- recommend cost-effective and practical preventive, reduction and control strategies for the significant potential or associated adverse impacts of proposed projects,
- develop a cost-effective Environmental Management Plan (EMP) for ensuring that impact mitigation strategies are implemented,
- provide all necessary data, information and objective evidence required for developing an Environmental Impact Statement (EIS) for the proposed project; and
- provide a tool for managing and addressing third-party claims in relation to the proposed project activities.

1.6 Policy, Legal and Administrative Framework

The environmental compliance element of the project will be regulated under several statutes. These statutes outline measures that must be implemented to ensure compliance with policy guidelines and legislation. To achieve sustainable development and live in harmony with nature, environmental protection and control have now become an integral part of laws/regulations/policies promulgated at international, national and state/local government levels.

Also, responsible corporate organizations formulate policies that enable them to establish and operate sound environmental management systems. The relevant policies, regulations, laws and guidelines are highlighted below:

Niger State Special Agro-Industrial Processing Zone (SAPZ) Company

It is the policy of Niger State Special Agro-Industrial Processing Zone (SAPZ) Company. To conduct its Agri-business in a manner that shall minimize impact on the public, employees, customers and overall environment. The objectives of the policy are:

- Promotion of interest in HSE issues through adequate training that underscores each individual's responsibility for sound company's environmental management.
- Ensuring that HSE matters are in line with management responsibility and shall be given equal importance as other business objectives. Every employee must plan and perform his/her duties in accordance with the policy.
- Implementation of a sound Health, Safety and Environment (HSE) programme.
- Integration of HSE aspects into company's management system.
- Prevention of all avoidable negative impacts on all employees and on the environment through its proactive Environmental Management System.
- Maintaining environmental auditing programme to monitor compliance with company policy and government laws and regulations.
- Collaborating with government agencies and industry groups in developing practical, economically feasible and scientifically based environmental laws and regulations and industry standards.

The Nigerian Constitution, 1999

The Constitution of the Federal Republic of Nigeria 1999 contains elaborate provisions on the protection and improvement of the environment and safeguard of water, air and land, forest and wildlife of Nigeria in its Section 20.

Similarly, Section 16[2] that the state shall direct its policy towards ensuring promotion of a planned and balanced economic development. This provision is also contained in Section 17[2] D of the constitution. The only weakness of the constitutional recognition of the protection and improvement of the environment is that it is categorised under the fundamental objectives and Directive Principles of state policy and therefore non-justice able.

Federal Ministry of Environment (FMEnv) Regulations

Act 58 of 30 December 1988 established the Federal Environmental Protection Agency now Federal Ministry of Environment (FMEnv), as the chief regulatory body for environmental protection in Nigeria. The Act was amended as Act No 86 of 1992. FMEnv is vested with the responsibility of ensuring that all industrial activities, operations and emissions are within the limits prescribed in the National Guidelines and Standards.

The Federal Government of Nigeria established the Federal Ministry of Environmental from the defunct FEPA with an overall mandate to protect, restore and preserve all ecosystem of the Nigerian environment. Twenty-one guidelines for pollution abatement in all categories of industries were laid. Part of the guidelines is a mandatory requirement for environmental auditing of all existing industries and Environmental Impact Assessment (ESIA) of new industries and major development projects. Thus, The Federal Ministry of Environment (FMENV) was created in 1999 to take over the function of the Federal Environmental Protection Agency (FEPA).

Primarily, the Ministry has a mandate to co-ordinate environmental protection and conservation of natural resources for sustainable development.

The Ministry has the following mandate to:

- Prepare a comprehensive National Policy for the protection of the environment and conservation of natural resources, including procedure for environmental impact assessment of all developing projects.

- Prepare in accordance with the National Policy on Environment, periodic master plans for redevelopment of environmental science and technology and advise the Federal Government on the financial requirements for the implementation of such plans.
- Advise the Federal Government on National Environmental Policies and priorities, the conservation of natural resources and sustainable development and scientific and technological activities affecting the environment and natural resources.
- Promote cooperation in environmental science and conservation technology with similar bodies in other countries and with international bodies connected with the protection of the environment and the conservation of natural resources.
- Cooperate with Federal and State Ministries, Local Government, statutory bodies and research agencies on matters and facilities relating to the protection of the environment and the conservation of natural resources,
- Prescribe standards for and make regulations on water quality, effluent limitations, air quality, atmospheric protection, ozone protection, noise control as well as the removal and control of hazardous substances, and
- Monitor and enforce environmental protection measures.

Federal Ministry of Environment through Environmental Assessment Department is mandated to drive environmental impact assessment processes in Nigeria. The Federal Ministry of Environment has developed instruments of intervention to halt environment degradation in form of policies, standards, guidelines, and regulations. These policies/regulations of the ministry are as follows;

National Policy on the Environment (1988)

This policy aims to achieve sustainable development in Nigeria, and in particular to:

- Secure a quality of environment adequate for good health and wellbeing,
- Conserve and use the environment and natural resources for the benefit of present and future generations,
- Restore, maintain and enhance the ecosystems and ecological processes essential for the functioning of the biosphere to preserve biological diversity and the principle of optimum sustainable yield in the use of living natural resources and ecosystems;
- Raise public awareness and promote understanding of the essential linkages between the environment, resources and development, and encourage individuals and communities participation in environmental improvement efforts.

The National Policy on Environment describes guidelines and strategies for achieving the policy goal of sustainable development and environmental sustainability.

National Guidelines and Standards for Environmental Pollution Control in Nigeria

This document was promulgated in March 1991 to serve as a basic instrument for monitoring and controlling industrial and urban pollution. These guidelines were initiated sequel to the promulgation of the National Environmental Policy in 1988.

The guidelines and standards relates to six (6) areas of concern, thus;

- Effluent limitations.
- Water quality or industrial water uses at points of intake.
- Industrial emission limitations.
- Noise exposure limitations.
- Management of solid and hazardous wastes.
- Pollution abatement in industries.

National Effluent Limitation Regulation

The national effluent limitation regulation, S.I.8 of 1991 (No. 42, Vol. 78, August, 1991) makes it mandatory for industries as waste generating facilities (including research institutes, clinics, hotels etc.) to install anti-pollution and pollution abatement equipment on site. The regulation is specific for each category of waste generating facility with respect to limitations of solid and liquid discharges or gaseous emissions into the ecosystem. Appropriate penalties for contravention are specified also in the regulation.

Pollution Abatement in Industries Generating Wastes Regulation

Where and when applicable, the pollution abatement regulation, S.I.9 of 1991 (No. 42, Vol. 78, August, 1991) imposes restrictions on the release of toxic substances and stipulates requirements for pollution monitoring units, machinery for combating pollution and contingency plan by industries; submission of lists and details of chemicals used by industries to FMEnv, requirement of permit by industries for the storage and transportation of harmful or toxic waste; the generator's liability; strategies for waste reduction; permissible limits of discharge into public drains;

protection of workers and safety requirements; for environmental audit (or Environmental Impact Assessment for new industries) and penalty for contravention.

Management of Hazardous and Solid Wastes Regulation

The management of hazardous and solid waste regulation, S.I.15 of 1991 (No. 102, Vol. 7, August, 1991) defines the requirements for groundwater protection, surface impoundment, land treatment, water piles, landfills, incinerators etc. it also describes the hazardous substances tracking programmed with a comprehensive list of acutely hazardous chemical products and dangerous waste constituent. It also states the requirements and procedure for inspection, enforcement and penalty.

Environmental Impact Assessment Procedural Guidelines: Sectoral Guidelines for Agricultural Projects, detailing the ESIA process including a categorization of environmental projects into Categories I, II and III.

National Guidelines and Standards for Water Quality 1999: This Guideline prescribes the National Limit for the Parameters of Water Quality. The Guideline also describes the various Parameters to be analysed for water quality sampling. Test methodology of laboratory analysis is also provided in the guideline.

The Environmental Impact Assessment (EIA) Act, CAP E12 LFN 2004

In 1992, the EIA Act No. 86 was enacted to give legal muscle for the enforcement of the various policy provisions on the need for studies in the environment impacts of both public and private sector projects as such projects are being planned. The EIA Act, being the main law which regulates the implementation of EIA processes in Nigeria, deals with the consideration of environmental impact, in respect to any proposed public and private projects.

The Environmental Impact Assessment (EIA) Act, CAP E12 LFN 2004 contains provisions designed to ensure sustainable development. The act makes an environmental impact assessment mandatory not only for development projects. As the proposed Project will result in emissions (viz. atmospheric emissions, noise emissions etc.) and socio environmental impacts (both positive and negative), an Environmental Impact Assessment (EIA) for the various Project stages (preconstruction, construction, operation and decommissioning) has been undertaken (this study and associated report).

Furthermore, the Act makes EIA mandatory for all new major public and private projects in Nigeria for activities such as road development, metallurgical activities, major building projects, coastal reclamation, etc. the required process involves the preparation of the mandatory EIA report and an assessment by a review panel. The schematic presentation of the EIA procedure in Nigeria is presented below (fig. 1.1).

The Act sets out to:

- i. Consider the likely impacts and the extent of these impacts on the environment before embarking on any project or activity,
- ii. Promote the implementation of appropriate policy in all federal laws consistent with all laws and decision making processes through which goal of this Act may be realized,
- iii. Encourage the development of procedures for information exchange, notification and consultation between organizations and persons when the proposed activities are likely to have significant environmental effects on boundaries or inter-state or on the environment of bordering towns and villages.

This regulatory framework for EIA Implementation in Nigeria confers the mandate on the FMEnv to ensure proponents of all new major development's activities carry out EIA on their proposed projects. Consequently, FMEnv developed a National EIA procedure in response to the promulgation of the EIA Act. The process involves the submission of a project proposal by the proponent to the FMEnv. An initial evaluation of the proposal is done by the Ministry to categorize the project. The proposal is then screened and scoped and the EIA draft report is prepared by the proponent through literature reviews and field data gathering exercises. The report is then passed through a public hearing or review/meditation panel. A review report is then sent to the proponent for allowing the preparation of the EIA final report before approval by FMEnv.

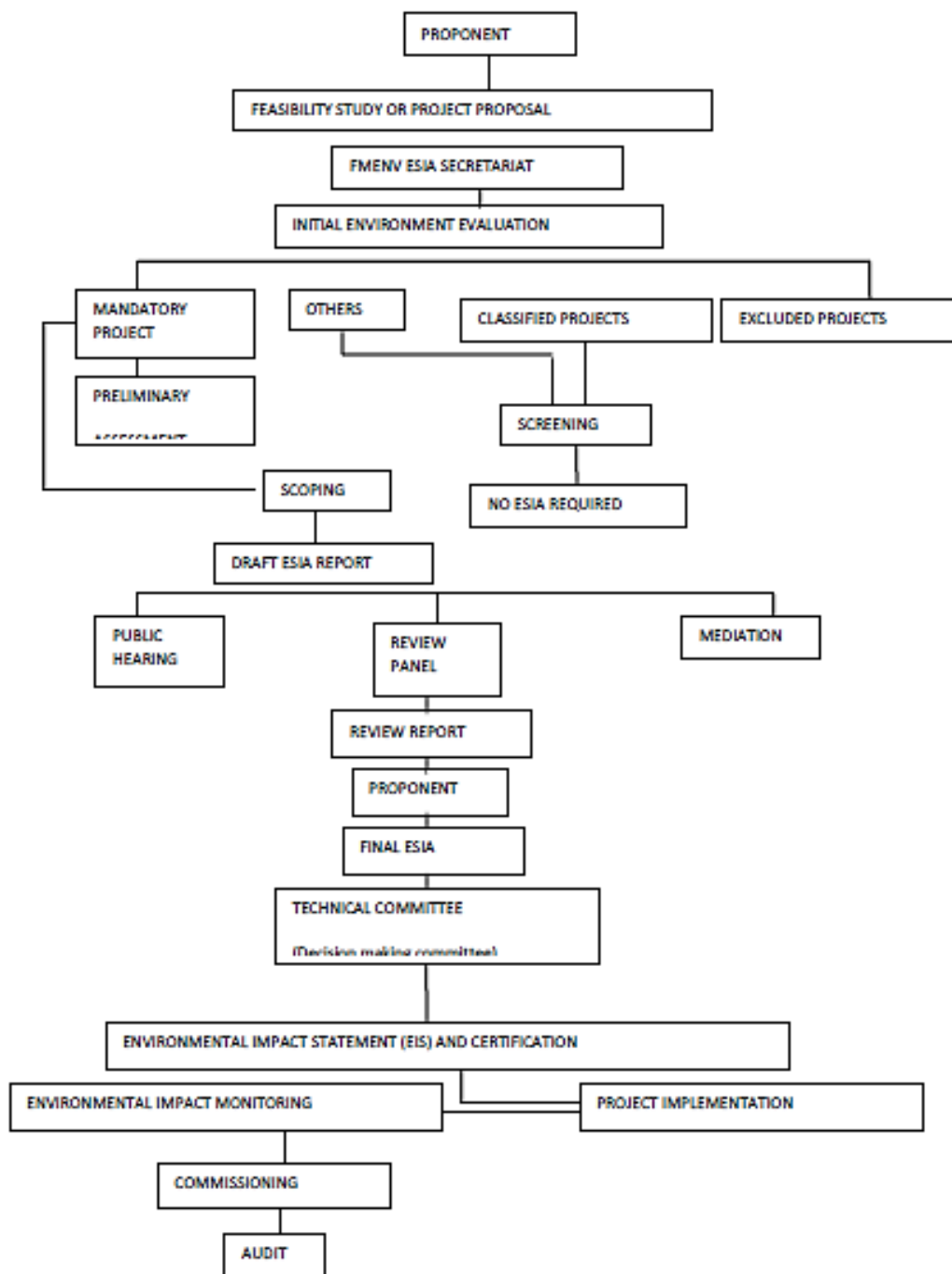


Figure 1.2: Federal Ministry of Environment’s EIA Flowchart

The Federal Ministry of Agriculture and Rural Development (FMA&RD)

The Federal Ministry of Agriculture and Rural Development is responsible for formulating policies on primary agricultural production and practices which cover plants, animals, pests and diseases etc., supervising and overseeing its departments and parastatals i.e. research institutes, colleges of

agriculture, colleges of fisheries etc. This is to also ensure the monitoring of pesticides and improve the quality of soil fertility management for conservation and rehabilitation of the degraded lands.

Agriculture (Control of Importation) Act, 1970

An Act to make provisions for regulating the importation of articles for the purpose of controlling plant diseases and pests.

Examination and sampling

Section 6. (1) Subject to the production of his authority to act, in that behalf, any authorized officer may- (a) enter into any premises or carrier at all reasonable times to examine and take samples of any consignment or part of a consignment of plants, seeds, soil, containers or other item whatsoever suspected of harbouring pests, plant diseases, or noxious weeds imported, or suspected by him of having been imported into Nigeria and for the purpose of such examination may open or require the importer to open any packages in the consignment; (b) search or detain any person, container, carrier, or other item whatsoever imported, offered for import or suspected of having been imported into Nigeria to ascertain whether or not plants, seeds, or soil suspected of harbouring pests, or diseases or noxious weeds are being carried. (2) The failure to permit or allow entry or search under, or generally to comply with any of the requirements of this regulation, shall be an offence under these Regulations.

Penalties for offences

7. Any person guilty of an offence under these Regulations shall be liable on conviction to a fine not exceeding one hundred naira or imprisonment for a term not exceeding six months, or to both such fine and imprisonment; and in addition whether or not a fine is imposed, judgment shall be entered against the person guilty of an offence for all costs incurred by an authorized officer in providing necessary treatment or in the destruction or exportation of any plant, seed, soil, or anything whatsoever imported in contravention of these Regulations.

Short title: 9. These Regulations may be cited as the Plants, etc. (Control of Importation) Regulations.

National Environmental Standards and Regulations Enforcement Agency (NESREA) Establishment Act, 2007

The Federal Government of Nigeria through the NESREA Establishment Act of 2007, has developed about twenty-seven (27) Environmental Regulations which have been published in the

Federal Republic of Nigeria Official Gazette and are now in force. These Regulations are to ensure that our national development agenda is not at variance with the carrying capacity of our fragile environment.

NESREA has responsibility for the protection and development of the environment, biodiversity conservation and sustainable development of Nigeria's natural resources in general and environmental technology including coordination and liaison with relevant stakeholders within and outside Nigeria on matters of enforcement of environmental standards, regulations, rules, laws, policies and guidelines.

NESREA has a mandate to ensure enforcement of all environmental laws, guidelines, policies, standards and regulations in Nigeria. It also has the responsibility to enforce compliance with provisions of international agreements, protocols, conventions, and treaties on the environment.

Niger State Ministry of Environment

The Ministry of Environment was established as a regulatory body saddled with the responsibility of managing the environment on behalf of Niger State. In managing the environment, the Ministry tackles all environmental problems ranging from Waste Management, Flood and Erosion Control, forest depletion and degradation and general environmental and atmospheric pollution.

National Agency for Food and Drug Administration and Control Act, 1992

An Act to establish the National Agency for Food and Drug Administration and Control with the functions, among others, to regulate and control the importation, exportation, manufacture, advertisement, distribution, sale and use of food, drugs, cosmetics, medical devices, bottled water and chemicals.

NAFDAC was established by Decree 15 of 1993 as amended by Decree 19 of 1999 and now the National Agency for Food and Drug Administration and Control Act Cap N1 Laws of the Federation of Nigeria, 2004.

The National Agency for Food and Drug Administration and Control (NAFDAC) is responsible for the regulation and control of the importation, exportation, manufacture, advertisement, distribution, sale and use of food, drug, cosmetics, medical devices, chemicals, packaged water and detergent at Federal and State levels in Nigeria. Appropriate tests are conducted and compliance with standard specifications for the effective control of the quality of food, bottled

water and the raw materials as well as their production processes in factories and other establishments is ensured. The Agency undertakes appropriate investigations into production premises and raw materials for food and establishes relevant quality assurance systems including certification of the production sites and the regulated products and pronounces on the quality and safety of food, bottled water and chemicals. The role of the Agency also includes the inspection of imported food facilities to ascertain relevant quality assurance systems necessary for certification of the imported food product.

As related the Cultivation Project, Food Regulations in accordance to the exercise of the powers conferred on the Governing Council of the National Agency for Food and Drug Administration and Control (NAFDAC) by sections 5 and 30 of the National Agency for Food and Drug Administration and Control Act Cap NI Laws of the Federation of Nigeria (LFN) 2004 and all powers enabling it in that behalf, the Governing Council of the National Agency for Food and Drug Administration and Control with the approval of the Honourable Minister of Health hereby makes the following regulations, amongst other regulations:

- Food Additives Regulations 2005
- Food Fortification Regulations 2005
- Processed Food Registration Regulation 2004
- Pre-Packaged Food Labelling Regulations 2005
- Food Manufacturers Guidelines
- Food Export Guidelines

Food, Drugs and Related Products (Registration, etc.) Act, 1993

An Act to regulate the manufacture, importation, exportation, advertisement, sale or distribution of processed food, drugs and related products and registration thereof.

The Act specifies in Sections:

1. Prohibition of the manufacture, etc., of unregistered processed food, drugs, etc.

(1) No processed food, drug, drug product, cosmetic, medical device or water shall be manufactured, imported, exported, advertised, sold or distributed in Nigeria unless it has been registered in accordance with the provisions of this Act or regulations made under it.

(2) Notwithstanding the provisions of subsection (1) of this section, the National Agency for Food and Drug Administration and Control (in this Act referred to as "the Agency") may grant a permit for the importation or manufacture of a sample of drug, drug product, cosmetic or medical device for the purpose of registration or clinical trial, and the importation or manufacture shall be in accordance with the conditions specified in the permit.

6. Offences

(1) A person who contravenes a provision of this Act or a regulation made under it is guilty of an offence and liable on conviction-

(a) In the case of an individual, to a fine not exceeding N50,000 or to imprisonment for a term not exceeding two years or to both such fine and imprisonment; and

(b) In the case of a body corporate, to a fine not exceeding N100,000.

7. Offences by bodies corporate, etc.

Where an offence under this Act is committed by a body corporate or firm or other association of individuals is severally guilty of that offence and liable to be proceeded against and punished for that offence in the same manner as if he had himself committed the offence unless he proves that the act or omission constituting the offence took place without his knowledge, consent or connivance.

12. Regulations

The Governing Council of the Agency (NAFDAC) may, with the approval of the Minister (of Health), make regulations for the purpose of giving effect to the provisions of this Act.

Pesticide Registration Regulations [1993 No. 15. S.I. 10 of 1996.]

The Regulation specifies Prohibition:

As from the commencement of these Regulations—

- 1) No pesticide shall be manufactured, formulated, imported, exported, advertised, sold or distributed in Nigeria unless it has been registered in accordance with the provisions of these Regulations;

- 2) Notwithstanding the provisions of subsection (1) of this regulation the manufacture, formulation or importation of any pesticide as sample for registration shall be undertaken with the approval of the Agency.

The Labour Act [1st August 1971]

An Act to repeal and replace the Labour Code Act and consolidate the law relating to labour. The Act specifies General Provisions as to Protection of Wages, Contracts of Employment and terms and conditions of employment; Recruiting Procedural arrangement; Special Classes of Worker And Miscellaneous Special Provisions; amongst other Parts.

Similarly, to the Labour Act (LFN 1990), which is the primary law protecting the employment rights of individual workers in Nigeria, the country has also ratified all eight core ***ILO (International Labour Organisation)*** Conventions and enacted laws to enforce the provisions. However, there are indications of restrictions on the trade union rights of workers, discrimination, child labour and forced labour in the country; of which Crest Agro Products Limited will need to put into consideration within the implementation of the Project.

Employee's Compensation Act, 2010 Act No. 13

An Act to repeal the Workmen's Compensation Act CAP. W6 LFN, 2004, and to make Provisions for Compensations for any death, injury, disease or disability arising out of or in the course of employment, and for related matters.

The objectives of the Act are to—

- (a) Provide for an open and fair system of guaranteed and adequate compensation for all employees or their dependants for any death, injury, disease or disability arising out of or in the course of employment;
- (b) Provide rehabilitation to employees with work-related disabilities as provided in this act;
- (c) Establish and maintain a solvent compensation fund managed in the interest of employees and employers;
- (d) Provide for fair and adequate assessments for employers;
- (e) Provide an appeal procedure that is simple, fair and accessible, with minimal delays and,

(f) Combine efforts and resources of relevant stakeholders for the prevention of workplace disabilities, including the enforcement of occupational safety and health standards.

2.—(1) Subject to the provisions of sections 3 and 70 of this Act, this Act shall apply to all employers and employees in the public and private sectors in the Federal Republic of Nigeria. (2) The Nigeria Social Insurance Trust Fund Management Board (in this Act referred to as —the Board) shall have power to implement this Act and the Fund established under section 56 of this Act.

4.—(1) In every case of an injury or disabling occupational disease to an employee in a workplace within the scope of this Act, the employee, or in case of death the dependant, shall within 14 days of the occurrence or receipt of the information of the occurrence, inform the employer by giving information of the disease or injury to a manager, supervisor, first-aid attendant, agent in charge of the work where the injury occurred or other appropriate representative of the employer. (2) In the case of a disabling occupational disease, the employer to be informed of the death or disability is the employer who last employed the employee in the employment to the nature of which the disease was due. (3) The employee shall, if he or she is fit to do so and on request of the employer, provide to the employer particulars of the injury or occupational disease on a form prescribed by the Board, and supplied to the employee or the dependant by the employer.

5.—(1) Subject to sub-section (6) of this section, employer shall report to the Board and the nearest office of the National Council for Occupational Safety and Health in the State within 7 days of its occurrence every injury to an employee that is or is claimed to be one arising out of and in the course of employment.

Furthermore, the Act provides guideline for:

- Employer's obligation to report death, injury or disease of an employee; and Application for compensation
- Part III prescribes guideline for Compensation for Death, Injury or Disease
- Part IV designates various Scale for Compensation and Payment Schedule

The Standards Organisation of Nigeria (SON), Act

Standards Organisation of Nigeria was established by Act. No.56 of 1971 which vested it with the authority for: Standards elaboration, Specifications, Quality assurance system of commodities, Manufactured industrial and imported products and services generally, and Metrology Services.

The Act No. 20 of 1976 which amended the previous one conferred on the Honourable Minister of Industry the power to declare Mandatory Industrial Standards in Respect of products or processes recommended by the Nigerian Standards Council.

The Act. No. 32 of 1984 changed the name of the Organisation to Standards Organisation of Nigeria (SON) from Nigeria Standards Organisation (NSO) to eliminate conflicting identity with the then Nigerian Security Organisation. Finally, the Act No. 18 of 1990 conferred on SON partial autonomy from the Ministry of Agriculture. This amendment gave far-reaching transformation to the Organisation succession and a common seal, and may sue or be sued in its corporate name.

This amendment also provides for the strict enforcement of Powers of seizure, confiscation and premises where defective products are manufactured or stored. Severe penalties for offending manufacturers, importers and sellers of substandard products were also provided for in that Act. The Standards Organisation of Nigeria is responsible for the formulation and enforcement of set standards on the composition of imported and locally manufactured food.

The Nigerian Urban and Regional Planning Act 1992

Act 88 of 1992 established a Development Control Department (DCD) charge with the responsibility for matters relating to development control and implementation of physical development plans at Federal, State and Local Government levels within their respective jurisdiction.

- Approval of the relevant DCD shall be required for any land development
- A developer shall submit a development plan for the approval of the DCD of local Government, State or Federal Government.
- A developer (whether private or government) shall apply for a development permit in such manner using such forms and providing such information including plans, designs, drawings, and any other information, as may be prescribed,
- A developer shall at the time of submitting his application for development submit to an appropriate Control Department a detailed Environmental Impact Statement (EIS) for an application for,
 - A residential land in excess of 2 hectares or
 - Permission to build or expand a factory or for the construction of an office building in excess of four floors of 5000 square meters of a settable space or
 - Permission for a major recreational development.

The Factories Act, No. 16 of 1987, later 1990, now Cap F1, LFN 2004

The Factories Act promotes the safety of workers and professionals exposed to occupational hazards. Under this Act, it is an offence to use unregistered premises for factory purposes.

In particular, Section 13 allows an inspector take emergency measures or request that emergency measures are taken by a person qualified to do so in cases of pollution or any nuisance.

The Factories Act 1990 (FA) is the primary law regulating the health, safety and welfare of workers in the country's factories. The law holds management and staff personally responsible for violations of the provisions in the Act.

With respect to safety, there are general provisions as to the securing, fixing, usage, maintenance and storage of prime movers, transmission machinery, other machinery, unfenced machinery, dangerous liquids, automated machines, hoists and lifts, chains, ropes and lifting tackle, cranes and other lifting machines, steam boilers, steam receivers and containers, and air receivers. There are, in addition to these, standards set for the training and supervision of inexperienced workers, safe access to any work place, first aid boxes, prevention of fire, and safety arrangements in case of fire.

Notable Parts of the Factories Act includes: Part II Health (cleanliness, lighting and sanitary conservation); Part III safety (Construction and maintenance of fencing, vessels containing dangerous liquids, training and supervision of inexperienced personnel, prevention of fire and safety provisions in case of fire); Parts V and VI special provisions and regulations – protective clothing and appliances, notification of accidents and industrial disease.

The law requires that all accidents and industrial diseases be notified to the nearest inspector of factories and be investigated. The Act also prohibits the owner or occupier of a factory from making any deductions from the wages of any employee in respect of anything to be done or provided in pursuance of the Act.

National Health Act [31 October, 2014]

This Act provides a framework for the establishment, regulation, development and management of a National Health System and set standards for rendering Health Services in the federation, and other matters connected therewith, 2014.

The National Health System include: (a) the Federal Ministry of Health; (b) The Ministry of Health in every state and the Federal Capital Territory Department responsible for Health; (c) parastatals under the federal and state ministries of health; (d) all local government health authorities; (e) the

ward health committees; (f) the village health committees; (g) the private health care providers; (h) traditional health care providers; and (i) alternative healthcare providers.

The Act provides clarity on what constitutes the National Health System which is the Federal Ministry of Health, Ministries of Health in the 36 States and their equivalent in the Federal Capital Territory (FCT), parastatals under the Federal and State Ministries of Health, local government health authorities, ward and village health committees, as well as private, traditional and alternative health care providers. It stipulates that the Health system has the responsibility to providing for persons living in Nigeria, the best possible health services and to protect, promote and fulfil the rights of the people of Nigeria to have access to health care services. The Act also provides for the establishment of the Basic Health Care Provision Fund (BHCPF), which is a demonstration of the importance accorded to assuring equity and access to health care services to all categories of people, especially the poor and most in need. It prioritizes the patient by protecting the rights of the client to information and providing for a mechanism for addressing complaints, while stipulating the rights and responsibilities of health personnel. The Act further strengthens our National Health Information and the National Health Research Systems. Collectively these will encourage the institutionalization of evidence-based decision making while promoting development through health research.

Furthermore, the NHAct addresses critical issues of availability, distribution, capacity development, and management of Human Resources for Health in Nigeria. It has also made provisions to ensure availability of quality blood for transfusion purposes in accredited health facilities, protections of the rights to self-determination of the individual on the use of his/her blood or tissue and allowable areas for which, and places at which such blood, tissue or other related products can be used among others. The NHAct also for appropriate sanctions against contraventions of the provisions of the NHAct including those related to use of blood, tissue, and gametes have been provided for to guard against abuse and exploitation.

Criminal Code [Section 247]

Section 247 of the Nigerian Criminal Code makes it an offence punishable with up to six months imprisonment for any person who:

- Violates the atmosphere in any place so as to make it noxious to the health of persons in general dwelling or carry on business in the neighbourhood, or passing along a public way;
- or

- Does any act which is, and which he knows or has reason to believe to be, likely to spread the infection of any disease dangerous to life, whether human or animal.

Land Use Act, 1978

The Nigerian Land Use Act, 1978 was promulgated in March 1978. It vests all land in each state of the federation (except land already vested in the Federal Government or its agencies) in the Governor of the state. It makes the state government the authority for allocating land in all urban areas, for residential, agricultural, commercial and other purposes while it (the Act) confers similar power regarding non-urban areas on the Local Government in such area.

The Governor of a State can revoke a right of Occupancy (Statutory customary) for overriding public interest. The Land-use Act of 1978 states that “it is also in the public interest that the rights of all Nigerians to use and enjoy land in Nigeria in sufficient quality, to enable them to provide for the sustenance of themselves and their families should be assured, protected, and preserved”.

Forestry Act

The Forestry Act 1958 which was amended as the Forestry Law CAP 51, (1994) prohibits any act that may lead to the destruction of or cause injury to any forest produce, forest growth of forestry property in Nigeria. The law prescribes the administrative framework for the management, utilization and protection of forestry resources in Nigeria, which is applicable to the mangrove, and other forests of the Niger Delta.

This Act provides for the preservation of forests and the setting up of forest reserves. It is an offense, punishable with up to 6 months imprisonment, to cut down trees over 2ft in girth or to set fire to the forest except under special circumstances.

Harmful Waste (Special Criminal Provision) Act CAP, LFN 2004

The Harmful Waste Act prohibits, without lawful authority, the carrying, dumping or depositing of harmful waste in the air, land or waters of Nigeria.

The following sections are notable:

- Section 6 provides for a punishment of life imprisonment for offenders as well as the forfeiture of land or anything used to commit the offence.
- Section 7 makes provision for the punishment accordingly, of any conniving, consenting or negligent officer where the offence is committed by a company.

- Section 12 defines the civil liability of any offender. He would be liable to persons who have suffered injury as a result of his offending act.

Endangered Species Act, CAP E9, LFN 2004

This Act focuses on the protection and management of Nigeria's wildlife and some of their species in danger of extinction as a result of overexploitation. These sections are noteworthy:

- Section 1 prohibits, except under a valid license, the hunting, capture or trade in animal species, either presently or likely being in danger of extinction.
- Section 5 defines the liability of any offender under this Act.
- Section 7 provides for regulations to be made necessary for environmental prevention and control as regards the purposes of this Act.

Water Resources Act, CAP W2, LFN 2004

The Water Resources Act is targeted at developing and improving the quantity and quality of water resources. The following sections are pertinent: Section 5 and 6 provides authority to make pollution prevention plans and regulations for the protection of fisheries, flora and fauna.

Section 18 makes offenders liable, under this Act, to be punished with a fine not exceeding N2000 or an imprisonment term of six months. He would also pay an additional fine of N100 for everyday the offence continues.

National Inland Waterways Authority (NIWA) Act No. 13 of 1997

This Act established the National Inland Waterways Authority (NIWA) with a view to improving and developing inland waterways for navigation, providing an alternative mode of transportation for the evacuation of economic goods and persons, executing the objectives of the national transport policy as they concern inland waterways. The Act also prescribes regulations and sanctions on the use and exploitation of resources of inland waterways such as dredging, sand or gravel, and reception of permanent structures within the right-of-way or diversion of water from a declared waterway.

There are also other Nigerian Environmental Laws including:

- Wild Animals Preservation Act Cap 132 LFN 1990,
- River Basins Development Authority Act, 1987; and
- Natural Resources Conservation Act Cap 286 LFN 1990

International Conventions and Guidelines

International Conventions

In addition to the national laws/regulations, the United Nations environmental guidance principles adopted during Stockholm Convention on 16 June 1972 was also used as a key tool for supporting this study. The principal objective of this convention was to provide guidelines (27 in number) for protecting the integrity of the global environment and the developmental system. Guideline/principle 17 specifically states that “Environmental Impact Assessment, as a national instrument shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a component national authority”.

In addition to the national laws/regulations, Nigeria is signatory or party to several international conventions and treaties that support the use of EIA as the key tool for achieving sustainable development. Some of these are listed below.

International conventions to which Nigeria is signatory-to include, but not limited to:

- i. The Vienna Convention on the Protection of the Ozone Layer,
- ii. Montreal Protocol on Substances that deplete the Ozone Layer,
- iii. The United Nations Convention on International trade in Endangered Species of Wild Fauna and Flora (CITES),
- iv. Convention on Conservation of Migratory Species of Wild Animals
- v. The United Nations Guiding Principles on the Human Environment
- vi. United Nations Convention to Combat Desertification
- vii. African Convention on the Conservation of Nature and Natural Resources
- viii. The International Union for Conservation of nature and Natural Resources (IUCN) Guidelines,
- ix. The Basel Convention on the Control of Tran boundary Movements of Hazardous Wastes and their disposal,
- x. Protocol on the 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter,
- xi. The United Nations Convention Concerning the Protection of World Cultural and National Heritage,
- xii. Convention on Biological Diversity; and the
- xiii. The United Nations’ Convention on Climate Change.

International Guidelines and Standards

The aim of following international guidelines and standards is to ensure all issues are considered and managed in line with international best practice. This Section describes the most relevant international guidelines and standards that aim to ensure that all environmental and social issues are considered and managed in line with international good practice. The ESIA has been undertaken in conformance to these international guidelines and standards.

The Equator Principles

The Equator Principles (EPs) are a risk management framework, adopted by financial institutions, for determining, assessing and managing environmental and social risk in projects and are primarily intended to provide a minimum standard for due diligence to support responsible risk decision-making. Equator Principle Financial Institutions (EPFIs) commit to implementing the EPs in their internal environmental and social policies, procedures and standards for financing projects and will not provide Project Finance or Project-Related Corporate Loans to projects where the client will not, or is unable to, comply with the EPs.

In order to facilitate potential access to funding for project development potential borrowing organisations need to consider the EPs and environmental and social risk management as part of the EIA process.

These EPs require that Projects conduct an EIA process in compliance with the IFC Performance Standards on Environmental and Social Sustainability (IFC PSs). To date the EPs are adopted by approximately 87 financial institutions and were updated to version three in 2013.

World Bank Group Operational Policies

The World Bank projects and activities are governed by Operational Policies designed to ensure that the projects are economically, financially, socially and environmentally sound. For projects that are not seeking financing from the World Bank their policies and procedures serve as relevant standards for international good practice.

The World Bank has ten environmental and social Safeguard Policies that are used to examine the potential environmental and social risks and benefits associated with World Bank lending operations.

These safeguard policies include the following (*please note that the safeguard policies in bold are considered relevant to the proposed Project*):

1. Environmental Assessment,
2. Natural Habitats,
3. Forestry,
4. Pest Management,
5. Cultural Property,
6. Indigenous People,
7. Involuntary Resettlement,
8. Safety of Dams,
9. Projects in International Waters; and
10. Projects in Disputed Areas.

CAP-Farms Limited will strive to comply with these standards as well as the World Bank's Safeguard policies. The policies relevant to the proposed Project and associated EIA Study include 1, 2, 4, 5, and 7 and are summarised as follows:

Operational Policy 4.01 - Environmental Assessment (EA) evaluates a project's potential environmental risks and impacts in its area of influence; examines project alternatives; identifies ways of improving project selection, siting, planning, design, and implementation by preventing, minimising, mitigating, or compensating for adverse environmental impacts and enhancing positive impacts; and includes the process of mitigating and managing adverse environmental impacts throughout project implementation.

The EA Policy takes into account the natural environment (air, water, and land); human health and safety; social aspects (involuntary resettlement, indigenous peoples, and physical cultural resources); and trans-boundary and global environmental aspects.

Operational Policy 4.04 - Natural Habitats promotes the conservation of natural habitats. The World Bank therefore supports the protection, maintenance, and rehabilitation of natural habitats. The Bank encourages borrowers to incorporate into their development and environmental strategies analyses of any major natural habitat issues, including identification of important natural habitat sites, the ecological functions they perform, the degree of threat to the sites, and priorities for conservation.

The World Bank expects the views, roles, and rights of groups, including local nongovernmental organizations and local communities, affected by any project involving natural habitats to be taken

into account, and to involve such people in planning, designing, implementing, monitoring, and evaluating such projects. Involvement may include identifying appropriate conservation measures, managing protected areas and other natural habitats, and monitoring and evaluating specific projects.

Operational Policy 4.09 – Pest Management promotes the use of biological or environmental control methods and reduces reliance on synthetic chemical pesticides. The Bank encourages borrowers to incorporate into their development and environmental strategies analyses to address pest management.

The World Bank expects the views, roles, and rights of groups, including local nongovernmental organizations and local communities, affected by any project involving the use of pesticides be taken into account, and to promote and support safe, effective, and environmentally sound pest management.

Operational Policy 4.11 – Cultural Property addresses physical cultural resources, which are defined as movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. Physical cultural resources may be located in urban or rural settings, and may be above or below ground, or under water.

Their cultural interest may be at the local, provincial or national level, or within the international community. Any project involving significant excavations, construction, demolition, movement of earth, flooding, or other environmental changes are to take cognisance of this policy in the EA.

Operational Policy 4.12 - Involuntary Resettlement is triggered in situations involving involuntary taking of land and involuntary restrictions of access to legally designated parks and protected areas. The policy aims to avoid involuntary resettlement to the extent feasible, or to minimise and mitigate its adverse social and economic impacts.

It promotes participation of displaced people in resettlement planning and implementation, and its key economic objective is to assist displaced persons in their efforts to improve or at least restore their incomes and standards of living after displacement.

The policy prescribes compensation and other resettlement measures to achieve its objectives and requires that borrowers prepare adequate resettlement planning instruments prior to Bank appraisal of proposed projects.

IFC Environmental, Health and Safety Guidelines

The Environmental, Health and Safety (EHS) Guidelines are technical reference documents that address IFC's expectations regarding the industrial pollution management performance of its projects. They are designed to assist managers and decision makers with relevant industry background and technical information. This information supports actions aimed at avoiding, minimising, and controlling EHS impacts during the construction, operation, and decommissioning phase of a project or facility. The EHS Guidelines serve as a technical reference source to support the implementation of the IFC Performance Standards.

The Industry Specific EHS Guidelines Applicable to the Crest Agro Products Limited Proposed Project. The EHS Guidelines for Water and Sanitation include information relevant to the operation and maintenance of (i) potable water treatment and distribution systems, and (ii) collection of sewage in centralized systems (such as piped sewer collection networks) or decentralized systems (such as septic tanks subsequently serviced by pump trucks) and treatment of collected sewage at centralized facilities.

International Finance Corporation (IFC) Performance Standards (IFC PSs)

The International Finance Corporation (IFC), a division of the World Bank Group that lends to private investors, has released a Sustainability Policy and set of Performance Standards on Social and Environmental Sustainability (January 2012). These Standards replace the previous July 2006 safeguard policies and are used to evaluate any project seeking funding through the IFC. It should be noted that even for Projects that do not anticipate seeking financing from the IFC; the IFC Performance Standards are typically applied as a benchmark of international good practice.

The Performance Standards are directed towards providing guidance on how to identify risks and impacts, and are designed to help avoid, mitigate and, manage risks and impacts as a way of doing business in a sustainable way, including stakeholder engagement and disclosure obligations of the client in relation to project-level activities. In the case of direct investments for the IFC (including project and corporate finance provided through financial intermediaries), the IFC requires that its clients apply the Performance Standards to manage environmental and social risks and impacts so that development opportunities are enhanced (IFC, 2012).

The eight (8) IFC PSs are as presented in Table 1.1 below.

Table 1.1: International Finance Corporation (IFC) Performance Standards

Performance Standards	Applicability to Project
<p>Assessment and Management of Environmental and Social Risks and Impacts Performance Standard 1 underscores the importance of managing environmental and social performance throughout the life of a project (any business activity that is subject to assessment and management).</p>	<ul style="list-style-type: none"> • To identify and assess environmental and social risks and impacts of the Project. • To adopt a mitigation hierarchy to anticipate and avoid, or where avoidance is not possible, minimize, and where residual impacts remain, compensate/offset for risks and impacts to workers, Affected Communities, and the environment. • To promote improved environmental and social performance of clients through the effective use of management systems. • To ensure that grievances from Affected Communities (either directly or indirectly affected) and external communications from other stakeholders are responded to and managed appropriately. • To promote and provide means for adequate engagement with Affected Communities throughout the project cycle on issues that could potentially affect them and to ensure that relevant environmental and social information is disclosed and disseminated.
<p>Labour and Working Conditions Performance Standard 2 recognizes that the pursuit of economic growth through employment creation and income generation should be accompanied by the protection of the fundamental rights of workers.</p>	<ul style="list-style-type: none"> • To promote the fair treatment, non-discrimination and equal opportunity of workers. • To establish, maintain and improve the worker management relationship. • To promote compliance with national labour and employment laws. • To protect workers, including vulnerable categories of workers such as children, migrant workers, workers engaged by third parties, and workers in the clients supply chain. • To promote safe and healthy working conditions, and health of workers. • To avoid the use of forced labour.
<p>Resource Efficiency and Pollution Prevention Performance Standard 3 recognizes that increased economic activity and urbanization often generate increased levels of pollution to air, water, and land and consume finite resources in a manner that may threaten people and the environment at the local, regional, and global levels.</p>	<ul style="list-style-type: none"> • To avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from Project activities. • To promote more sustainable use of resources, including energy and water. • To reduce project-related greenhouse gas emissions.
<p>Community Health, Safety and Security Performance Standard 4 recognises that project activities, equipment, and infrastructure can increase community exposure to risks and impacts</p>	<ul style="list-style-type: none"> • To anticipate and avoid adverse impacts on health and safety of the Affected Community during the Project life from both routine and non-routine circumstances. • To ensure that the safeguarding of personnel and property is carried out in accordance with relevant

	<p>human rights principles and in a manner that avoids or minimises risks to the Affected Communities.</p>
<p>Land Acquisition and Involuntary Resettlement Performance Standard 5 recognises that project related land acquisition and restrictions on land use can have adverse impacts on communities and persons that use this land.</p>	<ul style="list-style-type: none"> • To avoid, and when avoidance is not possible, minimise displacement by exploring alternative Project designs. • To avoid forced eviction. • To anticipate and avoid, or where avoidance is not possible, minimise adverse social and economic impacts from land acquisition or restrictions on land use by (i) providing compensation for loss of assets at replacement cost and (ii) ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected. • To improve, or restore, the livelihoods and standards of living of displaced persons. • To improve living conditions among physically displaced persons through the provision of adequate housing with security of tenure at resettlement sites.
<p>Biodiversity Conservation and Sustainable Management of Living Natural Resources Performance Standard 6 recognises that protecting and conserving biodiversity, maintaining ecosystems services, and sustainably managing living and natural resources are fundamental to sustainable development</p>	<ul style="list-style-type: none"> • To protect and conserve biodiversity. • To maintain the benefits from ecosystem services. • To promote the sustainable management of living natural resources through the adoption of practices that integrates conservation needs and development priorities.
<p>Indigenous Peoples * Performance Standard 7 recognises that Indigenous Peoples, as social groups with identities that are distinct from mainstream groups in national societies, are often among the most marginalised and vulnerable segments of the population.</p>	<ul style="list-style-type: none"> • To anticipate and avoid adverse impacts of the Project on communities of Indigenous Peoples, or when avoidance is not possible, to minimise and/or compensate for such impacts. • To promote sustainable development benefits and opportunities for Indigenous Peoples in a culturally appropriate manner. • To establish and maintain an ongoing relationship based on Informed Consultation and Participation (ICP) with the Indigenous Peoples affected by a project through the projects life-cycle. • To ensure the Free, Prior, and Informed Consent (FPIC) of the Affected Communities of Indigenous Peoples when the circumstances described in this Performance Standard are present. • To respect and preserve the culture, knowledge and practices of Indigenous Peoples
<p>Cultural Heritage Performance Standard 8 recognises the importance of cultural heritage for current and future generations</p>	<ul style="list-style-type: none"> • Protect cultural heritage by ensuring that internationally recognised practices for the protection, field-based study, and documentation of cultural heritage are implemented. Where relevant this includes the retention of a competent professional to assist in the identification and protection of cultural heritage.

	<ul style="list-style-type: none">• Develop provisions for managing chance finds, requiring any chance find to be undisturbed until an assessment by competent professional is complete and management actions are identified.• Consult with affected communities to identify cultural heritage of importance and to incorporate their views into the decision making process. This should involve national and local regulatory agencies.• Allow continued access to cultural heritage sites for communities that have used the sites within living memory for long-standing cultural purposes.• Avoid or minimize impacts to, or restore in situ, the functionality of replicable cultural heritage.• Not remove any non-replicable cultural heritage unless the following criteria are met: there are no technically or financially feasible alternatives, the overall benefit of the Project outweigh the anticipated cultural heritage loss from removal and the removal of• cultural heritage is conducted using the best available techniques.• Should not remove, significantly alter, or damage critical cultural heritage. In exceptional circumstances where impacts are unavoidable, the Project will use a process of Informed Consultation and Participation (ICP).
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The above listed environmental laws, conventions and protocols provide legal authority for institutions in the country to implement mitigation measures, monitoring and technical supervision, thereby promoting the effective involvement of various concerned groups in development actions.

These regulations will be reviewed and their relevance to this project will be established.

1.7 Structure of the Report

This EIA report is prepared by the guidelines put in place by the EIA Act CAP E12 LFN, 2004. The report has been structured into seven chapters (in addition to the Executive Summary) as prepared hereunder:

- Chapter One - Introduction containing relevant background information and the legal and administrative framework for EIA in Nigeria among other information.
- Chapter Two - Project Justification, its envisaged sustainability, project development options, technology alternatives and alternative materials considered.
- Chapter Three - Project Description, contains a detailed description of the proposed project including its location, overall layout, basis for design, type and specifications of equipment/facilities to be installed and operation/maintenance of the proposed project.

- Chapter Four - Environmental Baseline Description and Assessment, describes the baseline ecological and socio-economic status of the study area respectively. Information on consultation with stakeholders is presented in this chapter.
- Chapter Five – Environmental and Social Impacts Assessment, discusses the identified impact assessment methodology of the proposed project.
- Chapter Six - Mitigation Measures, presents the various mitigation measures proffered against the identified significant impacts.
- Chapter Seven – Environment and Social Management Plan, which would be adopted throughout the project’s lifecycle. It also enumerates the environmental monitoring programme, the waste management programme and the project’s decommissioning/abandonment plan.
- Chapter Eight – Conclusion, concludes the report and requests approval for project implementation.

Other sections of the report include (not in any chronological order) the table of content, the list of references, the list of EIA preparers, the list of abbreviations and acronyms, the acknowledgement page, the executive summary, and various appendices.

CHAPTER TWO

DESCRIPTION OF PROJECT AND JUSTIFICATION

2.1 Need for the Project

Agriculture remains the base of the Nigerian economy, providing a major source of livelihood for the majority of its people. The sector is faced with a plethora of challenges, notably an outdated land tenure system that constrains access to land, a very low level of irrigation development (less than 1 percent of cropped land under irrigation), limited adoption of research findings and technologies, high cost of farm inputs, poor access to markets have all combined to keep agricultural productivity low with high postharvest losses and waste (FAO, 2020). Although agriculture still remains the largest sector of the Nigerian economy, employing two-thirds of labour force, the production hurdles have significantly stifled the performance of the sector. As a result, food (crop) production increases have not kept pace with population growth, resulting in rising food imports and declining levels of national food self-sufficiency (FMARD, 2008).

The main factors undermining production includes reliance on rain fed agriculture, smallholder land holding, and low productivity due to poor planting material, low fertilizer application, a weak agricultural extension system amongst others. The Federal and the Niger State Government has given the highest and urgent priority to increasing food supply by improving and strengthening agricultural production system in the country and State respectively.

Thus, the main objectives of the proposed 3000 hectares Special Agro-Industrial Processing Zone at Airport City Border Community, Bosso LGA are:

- Increase socio-economic development and wellbeing of its population and promote the economic growth of the area.
- Provide a unique window on our bedrock, which is otherwise inaccessible.
- Create a new escarpment which will offer nesting and breeding places for some birds.
- To enhance rapid industrial development in Nigeria.
- To ensure sustainable economic development.
- Generation of employment opportunities.
- To contribute to diversifying the Nigerian economy, among others.

2.2 Value of the Project

Food security is a critical concern for any nation, the ability to cultivate land all year only increases the chance of providing this basic necessity. The Special Agro-Industrial Processing Zone provides this advantage to beneficiaries of the project and to Niger State and Nigeria at large. Income

generation for the local farming community, especially women farmers shall have a cascading economic effect on household income and the local economy of the Project Affected Communities and the surrounding Airport City Border community.

2.3 Envisaged Sustainability of the Project

According to the national policy on the environment, cognizance must be taken of the various institutional settings as well as the complex historical, social, cultural, and legal considerations in the identification and implementation of measures designed to solve national environmental problems in any ESIA report. The provisions of the Policy have been duly adhered to in this study. Consequently, this ESIA report aims to provide a rational, coherent and comprehensive approach to the pursuit of the proposed project that is of economic and social benefit in a way that minimizes environmental damages.

The proposed project will be undertaken according to best industry practice, including standard and time-tested design, standard construction methods, standard operational procedures and fully trained and qualified personnel to man the project. Since the health and welfare of all Nigerians depend on making the transition to sustainable development as rapid as possible, this ESIA report provides strategies for the sustainability of the project and is based on the above premise and the following specific considerations:

- Time-tested standard civil designs. This will improve the life cycle costs, environmental performance and project economics.
- All other works would follow Standard methods of the Niger State Special Agro-Industrial Processing Zone company, and Pulse Engineering and Consulting Limited (the project contractor) to keep the disruption to the environment at acceptable levels.
- The use of the best available technology and effective waste management will be carried out to enhance environmental protection.
- Operation, maintenance, and upkeep of the project by periodic inspection following the operational procedures developed through Niger State Special Agro-Industrial Processing Zone's extensive experience.
- Raise public awareness and promote understanding of the essential linkages between the environment, resources, and development.
- Encourage individual and community participation in environmental improvement efforts.
- Project management by fully trained and qualified personnel who are conversant with the Pulse Engineering and Consulting Limited's HSE policy guidelines.

2.4 Project Alternatives

The identification and investigation of alternatives is a key aspect of the ESIA process. Therefore, all reasonable and feasible alternatives were identified and assessed during the scoping phase to determine the most suitable alternatives to consider and assess during the ESIA phase. The preferred project alternatives are highlighted and presented here.

Alternatives can typically be identified according to:

- a) Technology alternatives.
- b) Site/Location alternatives
- c) Agro-processing Hub type and Structural Alternatives

The preferred alternative was identified based on its technical, environmental, and economic merits relative to the other project alternatives, including the no action alternative. A go- ahead option was chosen with the implementation of the ESMP developed for this EIA.

CHAPTER THREE

PROJECT DESCRIPTION

3.1 Introduction

This Chapter presents description of the Agricultural Project at Airport City Border Community, Bosso Local Government Area. The project overview, project/process description, operating philosophy as well as the overall implementation schedule for the proposed project are described in this chapter.

3.2 Project Site Characteristics

The project site is characterised by different agro-climatic physical features and socio-economical contexts. These are climate, hydrology, topography, soil and land use, land suitability and agricultural practice. These factors are the main determinant factors for the success of the project. Accordingly, this section briefly discusses these issues in relation to the Special Agro-Industrial Processing Zone.

3.2.1 Project Location

The proposed project site of Niger State Special Agro-Industrial Processing Zone (SAPZ) Company is geographically located at Latitude 9°40'11.12"N and Longitude 6°28'3.99"E and it occupies a landmass of 3,000 hectares for the Cultivation. The Government-allocated land is located at Airport City Border Community, Bosso LGA, Niger State, North-Central, Nigeria.

Niger State is a state in the North Central region of Nigeria and the largest state in the country by area. The state was established on 3 February 1976. The state occupies an area of 76,363km² (29,484 sq mi). the state is bounded by the states of Kebbi and Zamfara to the North, Kaduna to the North and North-East, Kogi to the South-East, and Kwara to the South. The Federal Capital Territory is on Niger state's Eastern border, and the Republic of Benin is its Western border.



Figure 3.1: Map of Nigeria Showing Niger State



Figure 3.2: Map of Niger State Showing Bosso LGA



Plate 3.1a: Location Map of Special Agro-Industrial Processing Zone at Airport City Border



Plate 3.1b: Location Map of Special Agro-Industrial Processing Zone at Airport City Border

3.3 Project Overview

The 3,000Hec Agricultural Project by Niger State Special Agro-Industrial Processing Zone (SAPZ) Company includes Veterinary, Grazing, Green house, Processing, Aggregation and Training. The various sections are distributed as follows:

- Veterinary.
- Grazing 1,000 hectares
- Greenhouse 1,000 hectares
- Processing, Aggregation and Training 1,000 hectares

3.3.1 Veterinary

The veterinarian, also known as a bovine veterinarian or large animal veterinarian, is a professional who specializes in the health and well-being of cattle and other large animals. They provide medical care, diagnose and treat illnesses, and offer advice on animal health and welfare specifically for:

- Beef cattle
- Dairy cattle
- Calves
- Heifers
- Bulls

Their work may involve:

- Conducting physical examinations and diagnostic tests
- Administering vaccinations and medications
- Performing surgeries and dental procedures
- Providing nutritional advice and dietary plans
- Educating farmers and herd managers on animal care and welfare
- Monitoring and controlling diseases in herds
- Developing and implementing herd health management plans

Animal veterinarians play a crucial role in maintaining the health and productivity of cattle, ensuring the quality and safety of dairy and meat products, and supporting the overall wellbeing of the agricultural industry.

3.3.2 Greenhouse farming

Greenhouse farming refers to a method of growing plants in a controlled environment, typically within a glass or plastic-covered structure. This approach allows for:

1. Climate control: Regulating temperature, humidity, and light to optimize growing conditions.
2. Extended growing seasons: Year-round production, regardless of external weather conditions.
3. Increased yields: Improved growing conditions lead to higher yields and better crop quality.
4. Reduced pests and diseases: Controlled environment minimizes exposure to pests and diseases.
5. Water conservation: Efficient irrigation systems reduce water waste and conserve resources.
6. Soilless cultivation: Using hydroponics, aeroponics, or other soilless methods to grow plants.
7. Reduced chemical use: Integrated pest management and organic growing practices minimize chemical usage.
8. Year-round production of high-value crops: Such as vegetables, fruits, and flowers.

Greenhouse farming offers many benefits, including:

- Improved crop quality and yields
- Reduced environmental impact
- Increased food security
- Economic benefits for farmers and communities

Some common crops grown in greenhouses include:

- Tomatoes
- Cucumbers
- Peppers
- Strawberries
- Lettuce and other leafy greens
- Herbs
- Flowers (such as roses and carnations)



Plate 3.2: Imageries of Proposed Greenhouse Farming

Source: Netafim, 2024

3.3.3 1000 hectares of Grazing land in Niger State

Niger State offers vast grazing land opportunities for livestock farming. Here's a brief overview of what is expect from 1000 hectares of grazing land project:

- Natural grasses and legumes: The land has various natural grasses and legumes, suitable for cattle, sheep, and goat grazing.
- Water sources: there exists a nearby water sources; streams, which can be used for irrigation and livestock watering.
- Fencing: the grazing area shall be fenced to control the movement of livestock and protect the land from encroachment.

- Land preparation: the grazing area shall be cleared, remove any debris, and prepare the soil for optimal grazing.
- Livestock capacity: The land can support a significant number of livestock, depending on the breed and size. A rough estimate would be:
 - Cattle: 500-700 heads
 - Sheep and goats: 1,500-2,000 heads
- Livestock breeds: consider raising local breeds like the Fulani or Bororo cattle, or introduce exotic breeds like the Holstein or Jersey for dairy production.
- Grazing management: need to implement a rotational grazing system to ensure sustainable land use and maintain soil fertility.
- Market access: Niger State has a growing demand for livestock products, and can explore local markets or export opportunities.

3.3.4 1000 hectares Agricultural Processing and Aggregation

Agricultural processing refers to the transformation of raw agricultural products into higher value products, such as:

1. Food processing: Preserving, packaging, and enhancing the quality of food products (e.g., canning, freezing, baking).
2. Feed processing: Converting grains and other agricultural materials into animal feed.
3. Fibre processing: Producing textiles, yarns, and other products from natural fibres like cotton, wool, and silk.
4. Biofuel processing: Converting biomass into fuels like ethanol and biodiesel.
5. Pharmaceutical processing: Extracting active ingredients from plants for use in medicines.
6. Cosmetics processing: Using agricultural ingredients in personal care products (e.g., soaps, lotions).
7. Bioproducts processing: Creating biodegradable plastics, bio composites, and other innovative products from agricultural materials.

Agricultural processing adds value to raw materials, increases shelf life, and creates new products for various industries. It plays a crucial role in:

1. Improving food security.
2. Enhancing agricultural productivity.
3. Supporting rural development.
4. Reducing post-harvest losses
5. Promoting sustainable agriculture

6. Encouraging entrepreneurship and job creation
7. Contributing to national economic growth

Some examples of agricultural processing being considered include:

1. Tomato paste production
2. Rice milling
3. Sugar refining
4. Palm oil processing
5. Soybean oil extraction
6. Wheat flour milling
7. Juice production (e.g., orange, apple)

By applying various processing techniques, agricultural products can be transformed into a wide range of value-added products, meeting the demands of diverse industries and consumers.

Aggregation

Agricultural aggregation refers to the process of gathering, consolidating, and marketing agricultural products from multiple farmers, ranchers, or producers into a single, larger quantity.

This approach aims to:

1. Improve efficiency
2. Increase bargaining power
3. Enhance product quality
4. Reduce costs
5. Expand market access

Agricultural aggregation can involve:

1. Crop aggregation: Combining harvested crops from various farmers into a single lot.
2. Livestock aggregation: Gathering animals from multiple producers for sale or processing.
3. Dairy aggregation: Consolidating milk production from multiple dairy farmers.
4. Aggregation of other agricultural products: Such as eggs, honey, or wool.

Benefits of agricultural aggregation include:

1. Better prices for farmers
2. Improved product quality and consistency
3. Increased market competitiveness
4. Reduced transportation costs
5. Enhanced traceability and food safety

6. Improved access to financing and insurance
7. Support for sustainable agriculture practices

Agricultural aggregation can be achieved through various models, including:

1. Cooperatives
2. Producer organizations
3. Marketing agreements
4. Private companies
5. Government-supported programs

By aggregating agricultural products, farmers and producers can gain greater control over the supply chain, improve their economic viability, and meet the demands of a rapidly changing agricultural landscape.

Agricultural Training Program

Agricultural Training Section is a structured educational initiative that aims to enhance the knowledge, skills, and competencies of farmers, agricultural workers, and other stakeholders in the agricultural sector. The program's objectives include:

1. Improving agricultural productivity and efficiency
2. Enhancing crop yields and quality
3. Promoting sustainable agricultural practices
4. Encouraging entrepreneurship and innovation
5. Supporting rural development and poverty reduction
6. Fostering climate resilience and adaptation
7. Improving food security and safety

The program's content may cover various topics, such as:

1. Crop management and production
2. Soil science and conservation
3. Irrigation and water management
4. Integrated pest management
5. Livestock production and management
6. Agricultural marketing and entrepreneurship
7. Agroforestry and conservation agriculture
8. Climate-smart agriculture and resilience
9. Agricultural policy and advocacy

10. Technology and innovation in agriculture

The training program may employ various methodologies, including:

1. Classroom instruction
2. Field demonstrations and hands-on training
3. On-farm trials and testing
4. Workshops and conferences
5. Online and e-learning platforms
6. Mentorship and coaching
7. Study tours and exchange programs

The program's target audience may include:

1. Smallholder farmers
2. Commercial farmers
3. Agricultural workers and laborers
4. Extension agents and advisors
5. Agricultural researchers and scientists
6. Policy makers and regulators
7. Agricultural entrepreneurs and business owners
8. Youth and women in agriculture

By providing agricultural training, the program aims to empower participants with the knowledge, skills, and confidence to improve their agricultural practices, increase productivity, and contribute to the overall development of the agricultural sector.

3.4 Proposed Farming Activities Onsite

Planting is majorly (90%) carried out/done through mechanical planters while about 10% of the farming operations, like the harvesting is done manually. Planting material is sourced from stems that are harvested prior to the tuber uprooting. Stems are not to be sourced from external sources. Farming is predominantly done during the rainy season, but first plough can be performed in the dry season in preparation for the rains. Period of Harvest (which is currently proposed to be manually done) after planting activities is completed is usually done/expected from April to December.

Average root yield tons per hectare is 20 tons per hectare. The proposed Agricultural/farm is expected to yield an annual produce capacity of 20,000 tons.

The agronomic practice adopted is a Mechanical/Manual mono-cropping with detailed attention to soil improvement and management. A rotational cropping system will be used once the land is large enough to accommodate fallow periods to allow soils to rejuvenate with nutrients.

Plant cuttings in furrows one meter apart, each cutting set at 0.75 to 1 meter apart between ridges and 0.50 to 0.75m between hills as depicted in Plate 3.2 below shall be adopted.

Replant missing hills 2 weeks after planting shall be encouraged.



Plate 3.3: Cassava Plant Spacing used the Project Site (*for test-running*)

Detailed planting activities and process flow of the farming project is presented as follows:

- i. Land clearing: this is carried out by a bulldozer to remove trees and shrubs from the farmland. The removed trees are moved to a corner of the field, this is called contours. These contours also serve in erosion control.
- ii. Manual removal of stumps and logs: the leftover of stumps and logs of woods on the field are removed manually, in preparing for tillage operation by the bulldozers.
- iii. First plough: This is the first tillage operation on the soil; it is carried out to pulverize the soil. It can be done by a bulldozer and a roam plough or with a tractor and a disc plough.

The primary purpose of ploughing is to turn over the upper layer of the soil bringing fresh nutrient to the surface while burying weeds and weed seed, allowing them to break down. It also aerates the soil allowing it to hold moisture better.

- iv. **Second plough:** This is done after a good time interval (approximately 15 days). The purpose of this second plough is to further loosen the soil and make the field weed free.
- v. ***Harrowing:*** is to break up the lumps of soil and to provide a finer finished a good soil structure that is suitable for seed bed.
- vi. ***Ridging:*** this is hipping of the topsoil to form a good seed bed for seed. It also helps in erosion control and conserves soil moisture.
- vii. ***Planting:*** The planting is carried out manually or mechanically using a tractor mounted row planter. The planting population is an average of 13,000 strands per hectare.
- viii. ***Application of herbicide:*** Two categories of herbicides are applied; preemergence herbicide and post emergence herbicides. The pre-emergence is sprayed immediately after planting to prevent the weed seed from germinating this makes the farm weed free for at least 8 weeks after planting. The post emergence herbicide can either be systemic are contact herbicides, the chemicals are used to kill weeds.
- ix. ***Weeding:*** Manual weeding is also used in combination with the herbicides for weed controls.
- x. ***Fertilizer application:*** Fertilizers inform of solid fertilizer and folia fertilizers are used to boost the yield.
- xi. ***Harvesting:*** root crop therefore harvesting is done by excavating of the underground roots. This can be done manually are mechanically.



Plate 3.4: Imagery Showing Proposed Project Activities at Farm Site

Source: Netafim, 2024



Plate 3.5: Imagery Showing Proposed Project Business Lines

Source: Netafim, 2024

The Planting flow-diagram is as presented in figure 3.4 below.

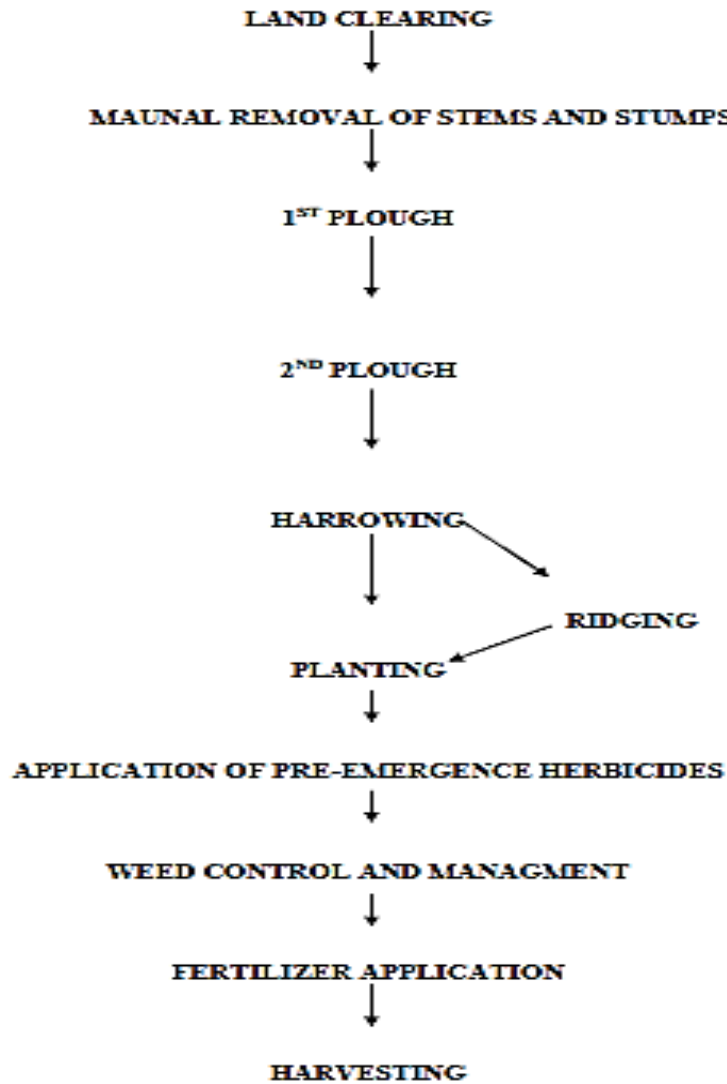


Figure 3.3: Flow diagram of Proposed Project Activities at the Farm site

Table 3.1: Niger State Special Agro-Industrial Processing Zone (SAPZ) Company's Planting Procedures

S/N	Step	Equipment Used	Description	Observations
1.	Bush/Land Cleaning	Bulldozer, anchor chain	Trees and shrubs are removed and moved to corners on the field to form contours; these contours aid erosion control	This activity is necessary on virgin soils. Left over stumps and logs of wood are removed manually
2.	Ploughing	Roam, disc plough, bulldozer, tractor	Upper layer of the soil is loosened to bring fresh nutrients to the surface and bury weeds	First and/or second ploughing depending on the kind of the soil
3.	Ridging	Ridger, tractor	Topsoil is hipped to form good seed beds for the stems; helps control erosion and improves moisture conservation	N/A
4.	Planting	Row planter, tractor	Stems are planted at an average of 1,000 per hectare. The species to be cultivate	Manual or mechanized
5.	Pre-emergence herbicide application	Boom sprayer, knapsack sprayer, tractor	Herbicides are applied within the first week of planting to prevent weeds for up to 8 weeks	Mechanized activity done within the first week after planting, before germination
6.	Weeding	N/A	Weeds are removed manually and mechanically	N/A
7.	Fertilizer Applications	N/A	Fertilizers are applied (manually and mechanically) to boost yields	Carried out 30 days after planting depending of results of soil test
8.	Post-emergence herbicide application	N/A	Herbicides are applied (manually and mechanically) to kill weeds	One or two times during the season
9.	Harvesting	Harvester, Tractor	Stems are cut and root tubers are excavated within 10-15 months after planting	Manual or mechanized

Weeding

Weeding is done both manually and mechanically, depending on the stage of the crop and the nature of the soil. Mechanical spraying is done prior to germination of the planted stem (pre emergence) and then a follow up is done at 6 weeks after the germination (post-emergence). Thereafter manual weeding can be done if necessary; however, the aim is to avoid the need for manual weeding by Proper pre and post emergence mechanical weeding.

Weeds rob plants of nutrients, water, light and space. They also harbour pests/disease causing agents. For effective weed control, CAP-Farms Ltd proposes to do the following:

- Keep the field weed free always, especially in 3-4 months of growth when the canopy is not fully developed.
- The plant shall be weeded within 2 months after planting.

- This is followed by carrying out spot weeding 3-4 weeks after planting to effectively control weeds.
- Weeding shall be done manually using cutlass and hoes and mechanically using government approved pre-and post emergence chemicals in this project.

Fertilizer Application

Ideally, fertilizer recommendation is based on soil analysis and from the study the application of N: P: K 15:15:15 is recommended. Under continuous cultivation in the application of a first dose of 200kg (4 bags) of N: P: K 15:15:15 per hectare or a full small matchbox per plant at 4-6 weeks after planting (June-July) shall be used.

A second dose of 100kg of muriate of potash or a half-full small matchbox per plant at 14-16 weeks after planting (September) shall also be applied.

Application of fertilizer shall be in holes 5 cm deep and 10 cm radius from the plant. Fertilizer shall not be applied if the soil is dry.

Table 3.2: Proposed Chemicals and Fertilizers to be used at the Site

S/N	HERBICIDES/FERTILIZERS	ACTIVE INGREDIENTS
1.	GRAMOXONE SUPER	276g/l paraquate dichloride
2.	TOURCHDOWN FORTE	500g/l glyphosate
3.	DOUBLE FORCE	350g/l diuron, 140g/l paraquate dichloride
4.	CLEAR FORCE	250g/l diuron, 250g/l glyphosate
5.	EXTRA FORCE	250g/l atrazine, 250g/l metlochlor
6.	SURPLUS 500EC	500g/l butachlor
7.	FORCEUP	390g/l glyphosate
8.	N:P:K 15:15:15	Nitrogen, Phosphorous, Potassium
9.	PLANTZYMES	Folia fertilizer
10.	INSECTICIDES	Active ingredient
11.	DIMEFORCE	Dimethoate 40% EC

Pest and Disease Management

A good pest and disease information and management is necessary for high productivity. The best way to control major diseases and pest is the use of resistant or tolerant varieties and disease resistant shall be used in this project. The use of disease or pest free planting material helps in reducing the primary infection or infestation of the crop in the field. Rouging at early stage of diseased plants reduces the spread of the disease in the field.

The main pests of proposed management are:

- The elegant grasshopper: can be treated by killing physically the pests or by using pesticides.
- The mealy bug: can be avoided by using tolerant varieties, with natural enemies (E.Lopezi, Dioms sp.), early planting and crop rotation.
- Termites and Scales: can be avoided with a good planting material selection, crop rotation and pesticides.

The main diseases of are:

- mosaic disease: can be avoided by using disease free planting materials.
- brown streak disease: can be avoid by using tolerant varieties and treated by rouging infested plants.
- bacterial blight: can be treated as for the brown streak disease and with crop rotation.

Niger State Special Agro-Industrial Processing Zone (SAPZ) Company shall ensure the harvested crops is not kept in the field for too long to avoid roots becoming woody and fibrous.

Harvesting should be done piece meal (harvesting only enough for immediate needs), leaving the remaining crop in the field until required. This is because once harvested are highly perishable and cannot be kept in good condition for more than 2 days.

3.5 Basic Project Infrastructures and Workforce

Basic site infrastructures proposed to be put in place include:

- Water overhead Tanks of 4,000 X 2 litres capacity (Irrigation is not proposed),
- Farm Camp/houses (3 buildings with 13 rooms),
- Workshop (located within the farmland with about 5 metres),
- Local Farm roads,
- Construction of a two (2) culvert to control rain (The first culvert is a single row ring culvert, while the second is a single box culvert. Both culverts maintain the original flow of the water and simply allow farm equipment to drive over the covered area);&
- Electricity project (currently, generator sets are proposed).

Basic List of Equipment Proposed for the Project Site includes the following:

- Bulldozers
- Tractors
- Ploughs

- Ridger
- Boom sprayer
- Planters
- Processing plant
- Generator

The First plough is conducted with heavy tillage equipment to turn the soil; the Second plough is conducted with lighter harrow to break up clumps of soil and create a smooth bed for planting.

Workforce:

- Proposed Managerial Staff strength is 45 (currently all Nigerians); with proposed employment of about 200 labourers for the farming project.
- Percentage of the job opportunities (skilled & unskilled) for the community, as proposed will guarantee that community employees represent 50% of unskilled and 33.33% of the entire staff strength of 60.
- It is proposed that accommodation for the contract workers are provided by the company in the host village. Casual workers are not currently proposed to be accommodated by the company.

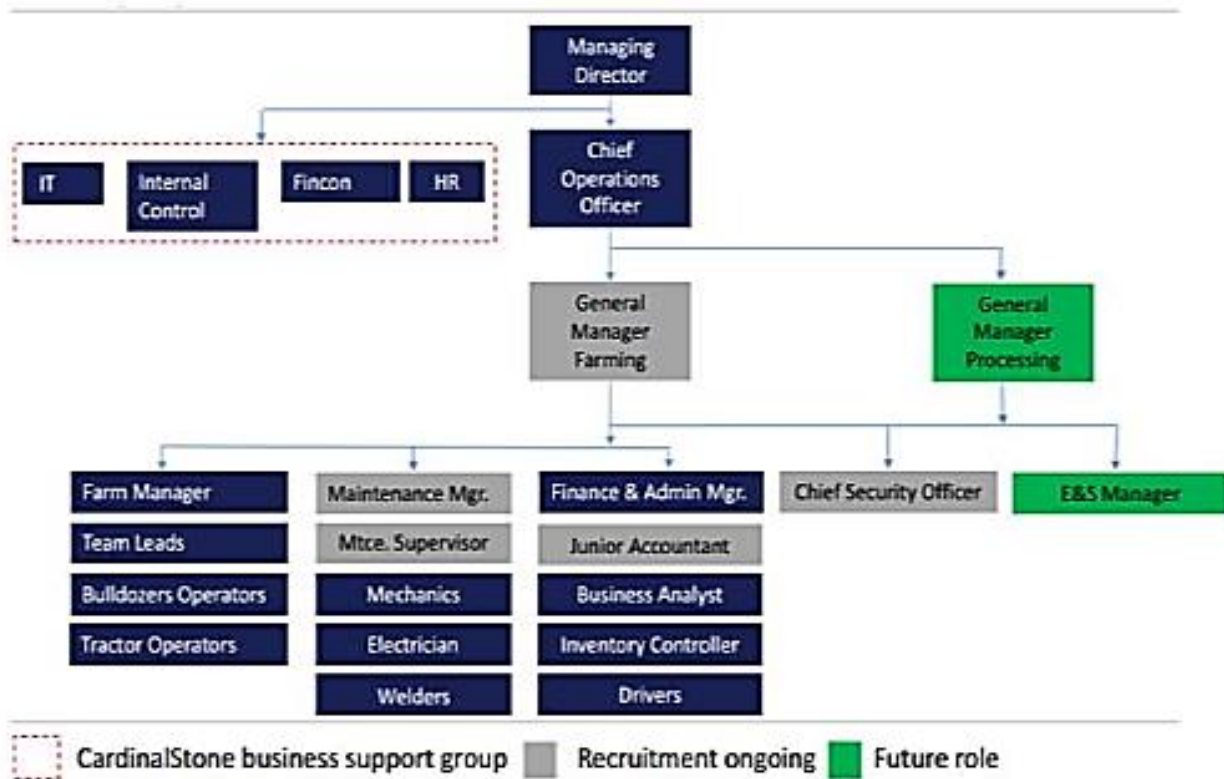


Figure 3.4: Organizational Structure (Organogram) for the Proposed Project

3.6 Project Waste Management

The proposed project would result in the generation of certain quantities of solid and liquid wastes. production generates huge amounts of waste, which when burned or left to rot, pollute the air, soil and groundwater. In many places, much of the plant, aside the roots, is often discarded and either burned or left to rot, thereby leading to air, land and groundwater pollution. Thus, Niger State Special Agro-Industrial Processing Zone (SAPZ) Company recognises the need to minimise waste generation in the course of the proposed project implementation and to handle such wastes in accordance with industry and international best practices and in line with its policies on health, safety and environment.

Construction Waste Management

The proposed farming project would not involve much construction onsite, not even an irrigation structure is proposed for the project, except the farm camp for workers as explained in the basic infrastructures onsite. However, Construction Waste Management Plan will ensure the following:

- Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project Site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
- Except as otherwise specified, CAP-Farms Ltd., will not allow waste materials that are to be disposed of to accumulate on site.
- CAP-Farms Ltd. will remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- CAP-Farms Ltd. will not burn or bury waste materials on or off site.

Throughout the construction phase, the workforce on the construction site will generate a variety of general refuse requiring disposal. This refuse will consist mainly of food wastes, aluminium cans, packaging materials, and wastepaper. Nevertheless, estimates of general refuse generated from the Site Formation works are dependent on the number of workers. It is assumed that about 20 workers on average will work for the Project during formation work, and about 30-40 workers during superstructural works. Based on a generation rate of 0.65kg per worker per day, the daily arising of general refuse during site formation and superstructural works would be approximately 13 kg and 26 kg respectively.

General refuse generated at the construction site would be stored separate from construction and chemical wastes to avoid cross contamination. A reliable waste collector shall be employed by the Contractor to remove general refuse from the construction site on a daily basis where appropriate

to minimise the potential odour, pest and litter impacts. Open burning for the disposal of construction waste or the clearance of the Project Area in preparation for construction work is prohibited.

Operation Waste Management

The separate ESIA Study/Report for the Processing Project as concluded have documented specific waste management proposals, effluent treatment process and key mitigation measures related to the processing operations. However, the following can be attributed to the farming project, which has little waste generation compared to the processing aspect of the project

- Solid waste derived from peel can be used as feed in animal and aquaculture production. Dried leaves and stems can be fed to pigs, poultry, and dairy cattle.
- The leaves can be used as silage, dried for feed supplementation and as leaf meal for feed concentrates. The stem can be mixed with leaves and used as ruminant feed, or dried for feed concentrates. The roots can be chipped or pelletized and used as feed, while the root peel, broken roots, fiber and baggase from starch extraction and garri processing can be dried and used directly as animal feed or as substrate for single cell protein production.
- The log of wood removed from the site is packed into bonds at the edge of the plots that they demarcate and left to decay. After 2 seasons the bonds sufficiently decay to the point that they can be levelled and mixed back into the soil to provide additional nutrients.
- Within the farm project site, CAP-Farms Ltd. will provide a solid waste designated point/centre where all the solid waste will be sorted out to separate the organic from the inorganic waste. The organic waste shall be decomposed on site and used as manure and the inorganic solid waste shall be collected and deposited twice a week by a waste disposal- contractor.
- Engage a Waste Management Coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan. Coordinator shall be present at the Project Site full-time for duration of Project.
- Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project Site. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities. Designate and label

specific areas on Project Site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.

- Recycling and waste bin areas are to be kept neat, and clean, and clearly marked in order to avoid contamination of materials.

Decommissioning/Demolition Waste Management

- Salvaged Items for Reuse in the Work: Clean salvaged items; Pack or crate items after cleaning. Identify contents of containers; Store items in a secure area until installation; Protect items from damage during transport and storage; and Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.
- To ensure the appropriate handling of the Construction & Demolition materials, it is recommended that a Waste Management Plan (WMP), which becomes part of the environmental management plan (EMP), shall be developed by the contractor and incorporated in the Environmental Management Plan (EMP) in accordance with the EIA Study/Report. *See Chapter Seven (7) of the Report.*

In formulating the EMP in respect to waste management, the following hierarchy should be considered:

- Avoidance and minimization to reduce the potential quantity of waste materials generated,
- Reuse of materials as practical as possible,
- Recovery and recycling as far as possible; and
- Proper treatment and disposal in respect to relevant laws, guidelines and good practice.

Table 3.3: Project Schedule Timeline

Environmental And Social Impact Assessment (ESIA) for the Proposed Niger State Special Agro-Industrial Processing Zone (SAPZ) at Airport City Border Community, Bosso LGA, Niger State

S/N	Project Scope of Work	TIME-LINE (MONTHS)																	
		Sept.-Dec., 2023			Jan.-April, 2024				May-Dec., 2025						Jan.-Mar., 2026				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	Survey of the proposed project site																		
2	Acquiring land allocation requirement																		
3	Procurement and supply of farming equipment																		
4	ESIA Planning																		
5	Mobilization of personnel and equipment																		
6	Construction of Channels, etc																		
7	Commencement of preliminary activities (test-running)																		
8	Planting activities (operations)																		

CHAPTER FOUR

ENVIRONMENTAL BASELINE OF THE PROJECT AREA

4.0 Background

Environmental baseline conditions studies involve the quantification of the relevant environmental parameters for the area containing the footprint of the future project as a record of the environmental conditions before any project activities have taken place. This data can be used to monitor differences (impacts) of various environmental and socio-economic parameters during the subsequent development, operational and closure phases of the proposed project.

The environmental baseline (physical, chemical, biological, socio-economic and health) characteristics of the proposed project area are herein presented. The environmental baseline characteristics are required to establish the existing environmental status of the proposed project area and also serve as a reference data for future studies and environmental monitoring. The data will also be used as a baseline for which the anticipated impacts of the project would be determined for appropriate mitigation measures to be put in place.

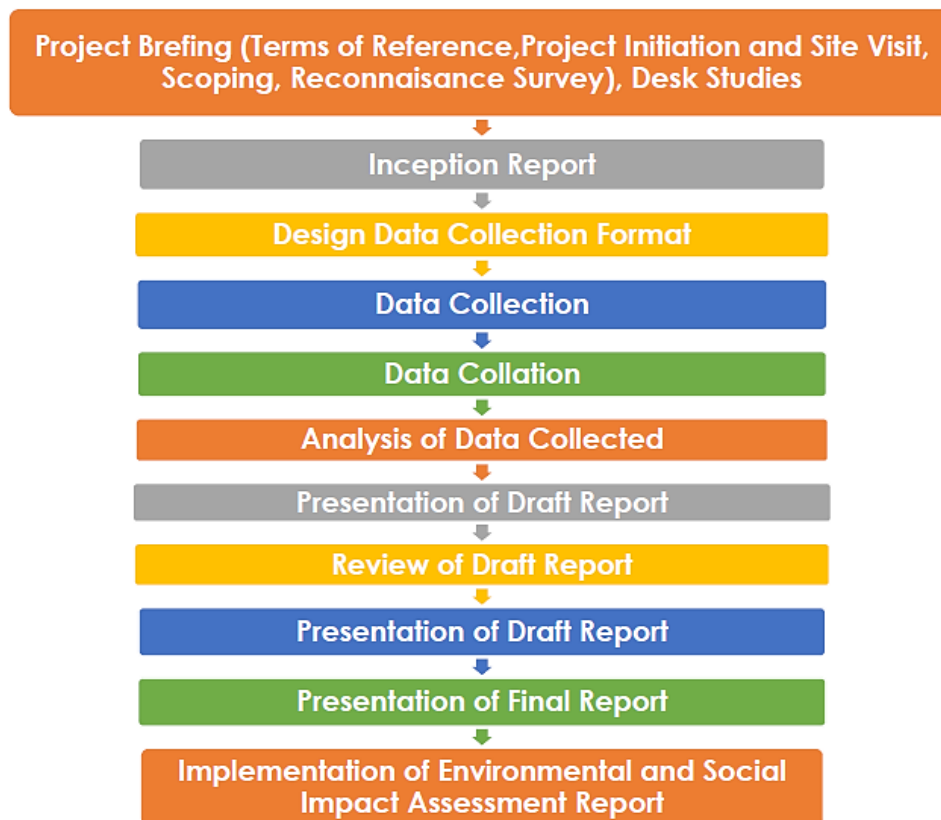


Figure 4.1: Environmental and Social Impact Assessment Process

4.1 Methodology of Study

A multi-disciplinary approach was employed in the acquisition of environmental baseline data of the proposed project area. The environmental baseline data for the proposed project was obtained through desktop research, field observation, sampling, and measurements as well as laboratory analyses of biological, chemical, and physical characteristics of sampled environmental components (surface water, fishery, hydrobiology, sediments, hydrogeology, soil, air and noise, vegetation, and wildlife (biodiversity) socio-economic and health characteristics).

4.1.1 Desktop Research

Desktop research involved a detailed search and review of relevant textbooks, research publications, articles, and previous study reports on the proposed project area. The demographic pattern and biodiversity characteristics were also complemented from information acquired from literature, questionnaires distributed and focus group discussions (FGD). The data generated from this process include maps, demographic data, and meteorological data of the area.

4.1.2 Site Visits

The proposed project site and host community were visited by the EIA study team on several occasions for various studies as outlined in *Table 4.1*. The reconnaissance visit was carried out on 16th May, 2024, to firm up sampling strategies, identify representatives of the host community that will join the team as local labour and identify options for logistic planning in order to have a hitch-free field campaign. The consultation process that has started at the project inception was continued in the reconnaissance visit and was maintained throughout the various phases of the EIA study. The proposed project site verification exercise and scoping workshop were conducted on the 21st of May, 2024 with the participation of relevant regulators. Subsequently, data gathering, and sampling was carried out on 21st and 22nd of May, 2024.

Table 4.1: Site visitation and Activities

Date of Site Visits	Activities
16 th May, 2024	Reconnaissance Visit, Public forum and Disclosure
21 st May, 2024	Site Verification
22 nd December, 2024	Scoping Workshop
16th May, 2024 21st May, 2024 22nd May, 2024	Stakeholder Engagement Programmes
21st – 22nd May, 2023 Data Gathering and Consultations	<ul style="list-style-type: none"> • Surface and Groundwater Studies and Sampling; • Air Quality and Noise Studies; • Soil Studies and Sampling;

Date of Site Visits	Activities
	<ul style="list-style-type: none"> • Health Assessment; • Biodiversity Studies; • Socioeconomic Studies (Questionnaire Administration and Household survey via Kobo tool box) • Stakeholders Engagement Meetings, PAPs In-Depth interview; and • Focused Group Discussions (FGDs)

4.1.3 Sampling Design

The environmental and social field data gathering activities of the proposed project area were carried out from 21st and 22nd of May, 2024 in a bid to capture sufficient environmental data to enable a good impact assessment afterwards, the adopted sampling plan was based on considerations that include, but are not limited to: Sampling to obtain baseline data on the specific environment of the project area; obtaining samples that can give information on the effects of the already existing activities on the environment; capturing the potential effects that may be caused by the proposed project activities and sampling strategy that will allow for good coverage of the project area.

Five (5) sampling stations were established for air quality and noise level determinations (inclusive of control stations). Two (2) soil sampling stations were also established for soil sampling in the project area. The spatial boundary for sampling was within the project site. The study team was grouped into separate teams for the various aspects of the field data-gathering exercise. The different groups were the air quality/climatology/noise studies team; the Soil/biodiversity studies team; and the socioeconomics/Health Assessment studies team. Field assistants/guides (local community members) were also engaged to assist the different teams.

Geographical Positioning

Positioning at each sampling station during the fieldwork activities was achieved with the aid of a handheld Global Positioning System (GPS). At each sampling station, coordinates at which sampling took place were documented (*Table 4.2*).

Table 4.2: Sampling Points Geographic Coordinates

SAMPLES	COORDINATES		ELEVATION (m)
	LATITUDE (N)	LONGITUDE (E)	
AIR QUALITY			
AQ ₁ (Air + Noise)	N9°38'10.97"	E6°25'42.38"	845
AQ ₂ (Air + Noise)	N9°38'01.55"	E6°25'52.56"	838
AQ ₃ (Air + Noise)	N9°37'41.28"	E6°25'52.88"	837
AQ ₄ (Air + Noise)	N9°40'27.03"	E6°27'02.40"	880
AQ ₅ (Air + Noise)	N9°39'55.25"	E6°28'12.27"	884
SOIL SAMPLES			
SS ₁	N9°38'41.38"	E6°26'00.93"	835
SS ₂	N9°40'12.49"	E6°27'54.40"	901
VEGETATION			
VEG ₁	N9°37'41.32"	E6°24'52.94"	879
VEG ₂	N9°38'12.62"	E6°24'39.78"	905

KEY: AQ= Air Quality; SS=Soil Sample; VEG= Vegetation; SE=Socioeconomics

Source: Greenalluvia Fieldwork, 2024

4.1.4 Laboratory Analysis

Samples were transported to Richflood Laboratory Limited, Abuja, (accredited by DPR and FMEnv) for necessary and adequate analyses after the fieldwork exercises. Samples were analysed using standard analytical methods (APHA, 1998; DPR, 2002). The synoptic descriptions of the laboratory analytical methods and procedures employed for the various physical, chemical, and biological parameters as well as the detection limits of these parameters are documented further in this report. Also documented is a synopsis of the QHSE plan adopted in both field data collection and laboratory analysis. (See Appendix for attendance sheet)

Measurement of fast-changing Parameters in Surface and Groundwater Samples:

Dissolved Oxygen, Conductivity, Salinity, pH, Total Dissolved Solids and Temperature of surface water and groundwater samples were measured in-situ using the Multi-Parameter Water Quality Monitor (model 6000 UPG). The samples were collected in 50ml glass beakers and the equipment was used to take the measurements of the parameters directly.

4.1.5 Quality Assurance and Quality Control

The goal of QA/QC in sample collection is to prevent the use of improper methodology or sampling techniques, insufficient sample preservation, inadequate identification, and transportation mode and will further prove the validity of the data from field measurements.

Quality Control (QC) is considered an integral part of Environmental Studies. This section presents the Quality Assurance / Quality Control (QA/QC) measures that were deployed in the course of this study, especially during fieldwork and laboratory analysis.

Sample Chain of Custody: All sampling events were well documented and supported with a Chain-of-Custody form. This ensured that the samples were collected, transferred, stored, analyzed, and destroyed only by authorized persons. The forms were signed, recorded, and dated accordingly. It also included the name of the project, sample collector's signature, sampling location, sampling site, sampling point, date, time, type of sample, number of containers and analysis required. The chain-of-custody was used to track samples from collection through analysis and a sample label was affixed to all sample containers. This is an important part of sample identification. Its label was waterproof, and all of the information was written in waterproof ink. All observations were recorded in a field notebook.

Field Records: The following information was recorded for samples collected:

- Name of sample collector and all personnel participating in the sample collection.
- Date and time of sampling.

Field Conditions: Weather, exact description of the sample site, or any important information necessary for the correct representation of the sample location were also noted. Furthermore, specific descriptions of the sample location address, sample site, and exact sampling points using Global Positioning System (GPS) coordinates were recorded, etc.

Sampling Type: Grab or composite sampling was adopted for sample collection. For composite samples, the record of appropriate time intervals, the volume of the sub-samples, and the duration for which the composition was taken were recorded. The requested analytical parameters, the type and number of containers, and preservatives used were also noted.

4.2 Physical Characteristics of the proposed Project Area

An overview of the climate and meteorological data (relative humidity, ambient air, temperature, rainfall and wind speed/ directions) as well as physical characteristics; Air quality and Noise, Topography, Soil, Biodiversity, Geology, Surface and Groundwater of the project area are herein presented.

4.2.1 Climate/Meteorology

Generally, Nigeria's climate is characterized by the dry and wet conditions associated with the movement of the Inter-Tropical Convergence Zone (ITCZ) north and south of the equator. The Inter-Tropical Convergence Zone (ITCZ) appears as a band of clouds, usually thunderstorms that

circle the globe near the equator and Nigeria is located just north of the equator. When the ITCZ is to the south of the equator, the north-east winds prevail producing the dry-season and whenever it moves into the Northern Hemisphere, the south westerly wind prevails to bring rainfall and the rainy (wet) season.

The climate of the project area is the tropical continental type with alternating wet and dry seasons of varying duration. The seasons correspond to the periods of dominance of the wet tropical continental air masses. The seasonal distribution of rainfall follows the direction of the Inter-Tropical Divergence (ITD) and varies almost proportionally with distance from the coast.

The wet season occurs within seven months from April to October while the dry season lasts from November to March, with a break in rainfall usually in August.

Like most parts of northern Nigeria, Niger State has a wet and dry climate. The wet season lasts on the average, from April to October. Mean annual varies between 1058mm in the north around Niger. The wettest months are August and September.

The dry season lasts from November to March. The driest months are December and January with relative humidity dropping to about 15%. Mean annual temperature around Niger is about 28°C with maximum temperature varying between 30°C and 39.4°C. The minimum temperature range between 15°C to 23°C. Niger has climatic characteristics typical of a temperature climate.

Temperatures are low throughout the year and the rainy season lasts from February to November with a mean annual rainfall of over 1850mm.

Precisely, the state climate is marked by dry and rain seasons. The rain season commences in April and lasts till October. While dry season lasts from November to March. The average rainfall is 1.350mm. The Harmattan; dry, cold and dusty wind is the driest period and occurs from the months of December to February with humidity put at 13%.

Temperature

The key factors that influence temperature in the area are the movement of the sun, wind speed and direction, and land configuration. Temperatures around the Project area are generally high all year round, with the highest temperatures 92°F experienced around the month of February and the lowest values 53°F in December (NIMET, 2012). Further review of data showed average temperatures of 65°F in the wet season and 79°F during the dry season (Uyigue and Agho, 2006).

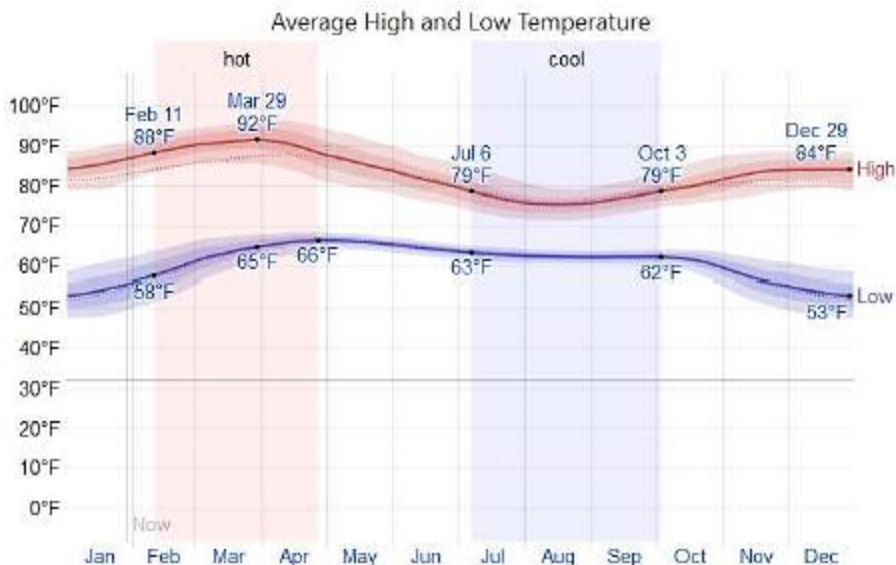


Figure 4.2a: Average High and Low Temperature of Niger State

Source: Weatherspark, 2019

Figure 4.2b below shows a compact characterization of the entire year of hourly average temperatures. The horizontal axis is the month of the year, the vertical axis is the hour of the day, and the colour is the average temperature for that hour and month.

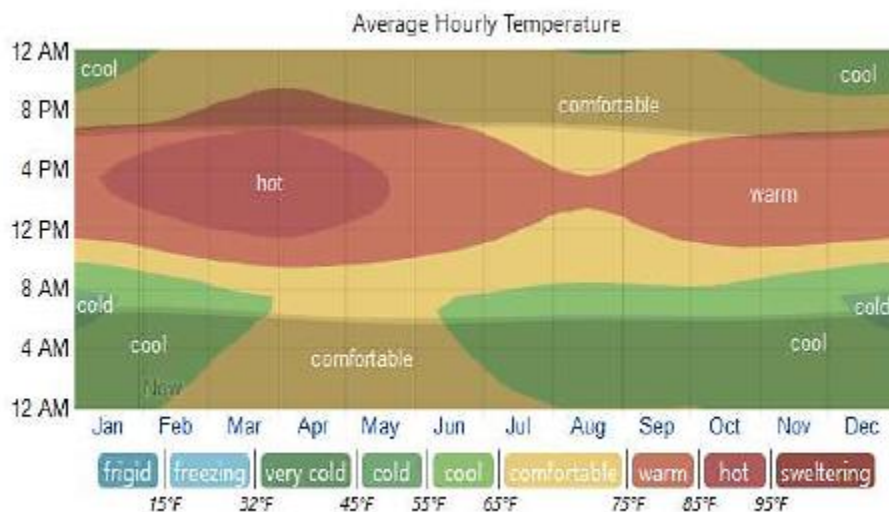


Figure 4.2b: Average Hourly Temperature of Niger State

Source: Weatherspark, 2019

Sunshine Hours

A general assessment of the sunshine hours for Niger (Okundamiya et al., 2016) revealed that the average earliest sunrise is at 6:02 AM, and the average latest sunrise is 45 minutes later at 6:46. The average earliest sunset is at 5:59 PM, and the average latest sunset is 51 minutes later at 6:49 PM.

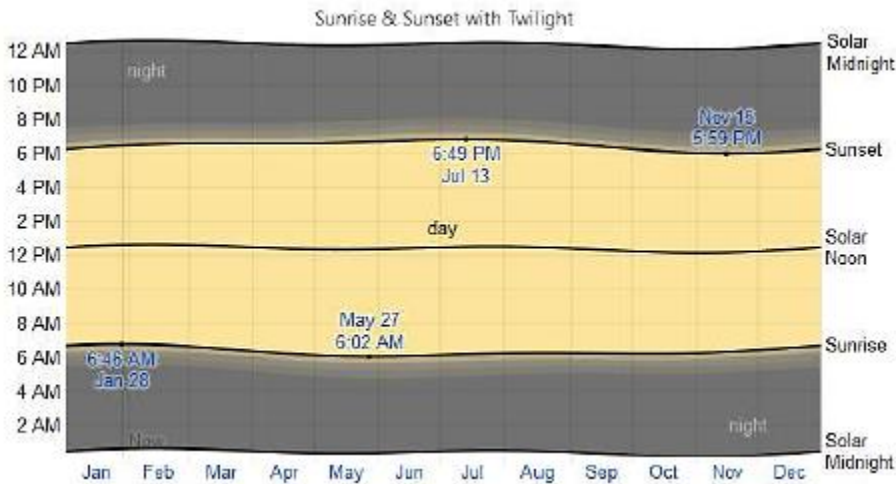


Figure 4.3: Average Monthly Sunshine of Niger State

Source: Weatherspark, 2019

Humidity

We base the humidity comfort level on the dew point, as it determines whether perspiration will evaporate from the skin, thereby cooling the body. Lower dew points feel drier and higher dew points feel more humid. Unlike temperature, which typically varies significantly between night and day, dew point tends to change more slowly, so while the temperature may drop at night, a muggy day is typically followed by a muggy night. Niger experiences extreme seasonal variation in the perceived humidity. The muggier period of the year lasts for 6.7 months, from April 3 to October 26, during which time the comfort level is muggy, oppressive, or miserable at least 15% of the time. The muggiest day of the year is June 9, with muggy conditions 60% of the time. The least muggy day of the year is December 21, when muggy conditions are essentially unheard of.

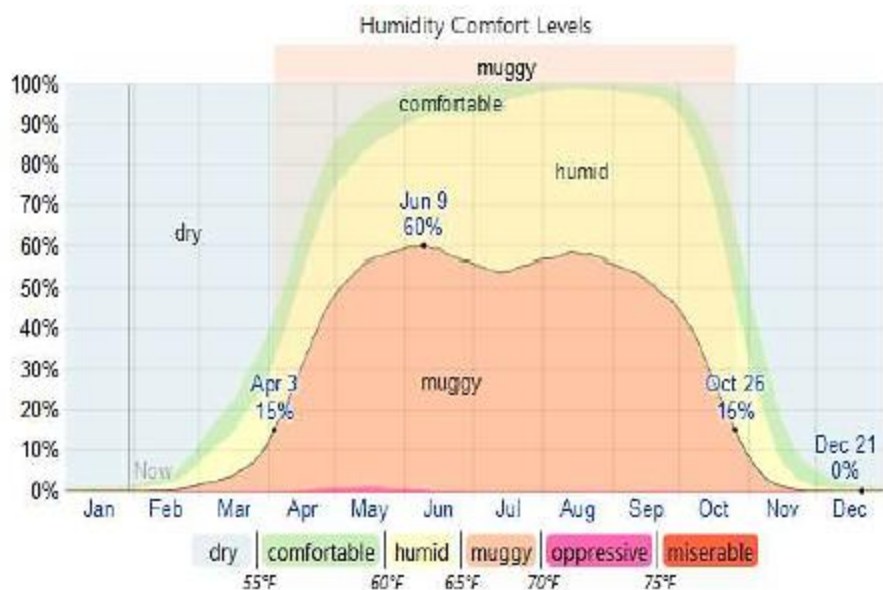


Figure 4.4: Average Monthly Humidity of Niger State

Source: Weatherspark, 2019

Wind

This section discusses the wide-area hourly average wind vector (speed and direction) at 10 meters above the ground. The wind experienced at any given location is highly dependent on local topography and other factors, and instantaneous wind speed and direction vary more widely than hourly averages. The average hourly wind speed in Niger experiences significant seasonal variation over the course of the year.

The windier part of the year lasts for 5.4 months, from November 11 to April 24, with average wind speeds of more than 7.1 miles per hour. The windiest day of the year is January 22, with an average hourly wind speed of 9.2 miles per hour.

The calmer time of year lasts for 6.6 months, from April 24 to November 11. The calmest day of the year is September 5, with an average hourly wind speed of 5.1 miles per hour.

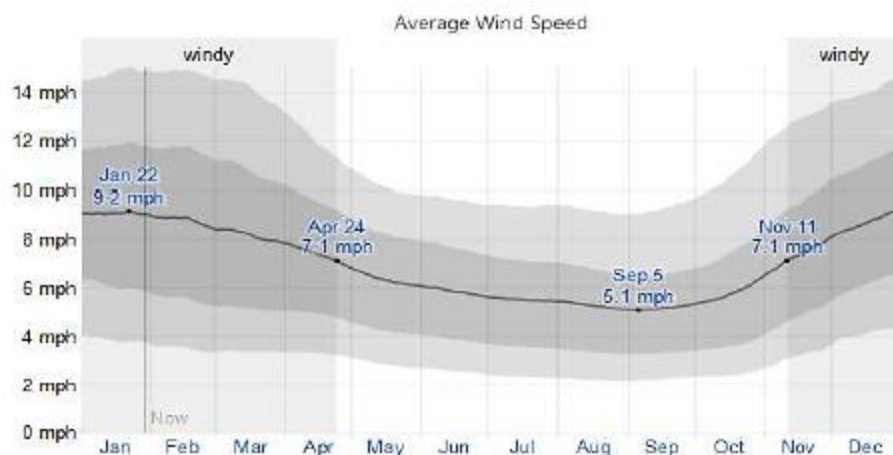


Figure 4.5: Average Monthly wind speed of Niger State

Source: Weatherspark, 2019

The predominant average hourly wind direction in Jos varies throughout the year. The wind is most often from the west for 4.8 months, from April 2 to August 28, with a peak percentage of 51% on July 28. The wind is most often from the east for 7.1 months, from August 28 to April 2, with a peak percentage of 73% on January 1.

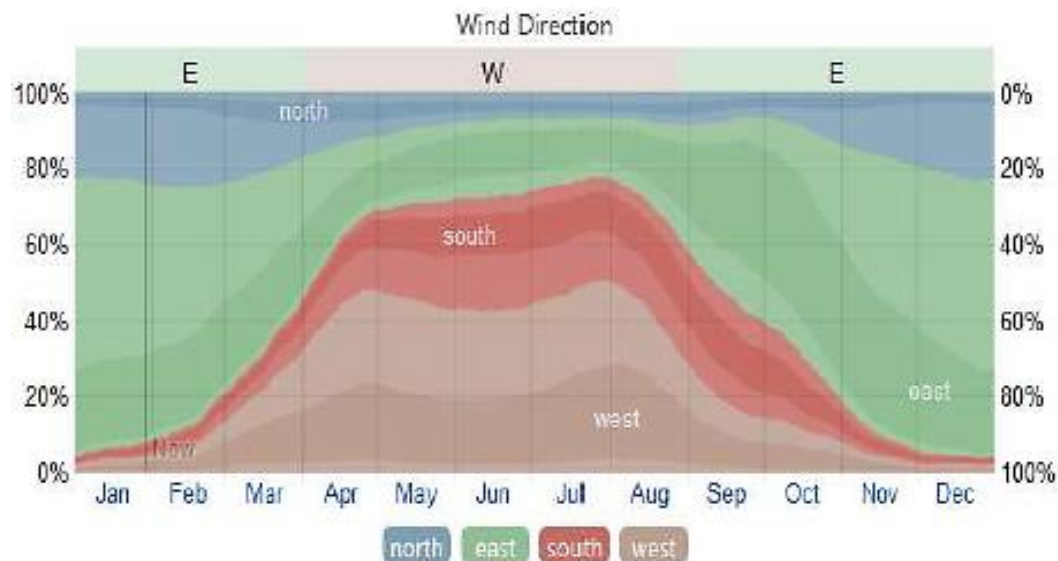


Figure 4.6: Average Hourly Wind Direction of Niger State

Source: Weatherspark, 2019

Field Observation of Meteorological Conditions

In addition to meteorological data obtained from literature, meteorological parameters such as, wind speed, wind direction, humidity, atmospheric pressure, and temperature were observed and the variability in the parameters reflects the weather regime experienced at any given location in Nigeria during the year as is determined primarily by geographical location in relation to the fluctuating position of the Inter-Tropical Convergence Zone.

Table 4.3: Results of On-Site Meteorological Conditions Measurement

S/N	Temp (°C)	Dew Point (°C)	Wet Bulb (°C)	Relative Humidity (%RH)	Atmospheric Pressure (HPA)	Wind Speed (m/s)
1.	28.20	23.00	25.30	49.70	967.8	0.50
2.	29.30	21.90	23.70	51.40	967.7	0.80
3.	29.60	20.40	22.90	43.20	967.8	1.20
4.	28.90	21.30	23.50	43.80	967.8	0.50
5.	30.40	20.70	22.80	39.40	967.7	0.80

4.2.2 Air Quality and Noise Assessment at the Proposed Project Area

Five (5) air quality sampling points (including one control stations) were established within the proposed project area. Portable Aeroqual Air Quality Monitor (Series 500 Model) was employed for air quality determination. Pollutant gases such as Nitrogen oxides (NO_x), Sulphur dioxide (SO₂), Carbon dioxide (CO₂), Hydrogen Sulphide (H₂S), Carbon monoxide (CO), Suspended Particulate Matters (PM_{2.5} and PM₁₀) and Volatile Organic Compounds (VOCs) were determined. The analyzer contains a sensor for each gas and each sensor analyses the quality of the respective gas in the ambient air. It is a digital meter. Measurements were carried out by holding the sensor to a height of about two meters in the direction of the prevailing wind and readings were recorded at stability. The air quality conditions in the project area as expressed in their values are presented in Table 4.4.

Table 4.4: Result for Air Quality and Noise Level Assessment on-site

Sample Points/ Location	O ₃ ppm	CO Ppm	SO ₂ Ppm	NO ₂ ppm	H ₂ S ppm	CO ₂ ppm	NH ₃ ppm	VOCs ppm	SPM (µg/m ³)		Average Noise (dB)
									PM _{2.5}	PM ₁₀	
AQ ₁	0.143	0.00	0.00	0.02	0.00	457.00	0.41	0.843	29.00	43.00	67.40
AQ ₂	0.372	2.00	0.00	0.05	0.00	449.00	0.08	0.017	36.00	49.00	78.90
AQ ₃	0.087	1.00	0.00	0.01	0.00	463.00	0.13	0.431	28.00	37.00	66.40
AQ ₄	0.631	0.00	0.00	0.04	0.00	452.00	0.04	0.248	35.00	53.00	57.40
AQ ₅	0.273	0.00	0.00	0.00	0.00	458.00	0.00	0.097	18.00	32.00	64.60
FMEnv Limits	-	10	0.01	0.04 – 0.06	0.008	-	-	0.2-5.0	-	25	90

Results Discussion of Air Quality in the Proposed Project Area

- **Ozone (O₃):** The Ambient ozone level ranged from 0.087ppm – 0.631ppm.
- **Carbon Monoxide (CO):** The Ambient Carbon Monoxide level ranged from 0.00ppm – 2.00ppm. These values are within the FMEnv Limit of 10ppm.
- **Sulphur Dioxide (SO₂):** Ambient SO₂ levels was constant at 0.00ppm for all sampling points. These values are within the FMEnv value of 0.01ppm.
- **Nitrogen Dioxide (NO₂):** NO₂ ambient level ranged from 0.00ppm – 0.05ppm. These values are within the FMEnv limit of 0.04ppm - 0.06ppm.
- **Hydrogen Sulphide (H₂S):** H₂S ambient level was constant at 0.00ppm for all sampling points. These values are well within the FMEnv Limit of 0.008ppm.
- **Carbon Dioxide (CO₂):** CO₂ ambient level ranged from 449.00ppm – 463.00ppm.
- **Ammonia (NH₃):** Ammonia ambient level ranged from 0.00ppm – 0.41ppm for all sampling points.
- **Volatile Organic Compounds (VOCs):** VOCs ambient level ranged from 0.017ppm – 0.843. These values are well within the FMEnv limit of 0.20ppm – 5.00ppm.
- **Suspended Particulate Matter (SPM):** Ambient PM_{2.5} levels in the study area ranged from 18.00µg/m³ – 36.00µg/m³ across all sampling stations. In addition, PM₁₀ levels in the study area ranged from 32.00 µg/m³ – 53.00µg/m³ across all sampling stations. These recorded values were within the FMEnv Limit of 25µg/m³.
- **Noise Level (dB):** Noise levels were measured at five (5) sampling points (control station inclusive) using a Cole-Parmer Extech Model 407736 Sound Level Meter within the proposed project area. The instrument is hand-held and digital. The equipment measures noise via a microphone probe that generates signals approximately proportional to located sound waves. Measurements were done by directing the probe towards the direction of the prevailing wind and readings recorded at stability. The sound level measured was viewed from the reading on the meter LCD. The noise levels at the sampling stations ranged from 57.40dB – 78.90dB. These values are within the FMEnv permissible exposure limit of 90dB per day for an 8-hour working period (DPR, 2002; FMEnv, 1995). The observed levels of noise in the project area have resulted from operational activities as has been similarly observed (Rim-Rukeh *et al.*, 2007).

4.2.3 Geology

Nigeria belongs to the Pan African mobile belt and about 50% of its landmass is underlain by Precambrian basement complex rocks of variable types and composition ranging from metaigneous rocks and meta-sedimentary rocks, igneous rocks of the older granite suite, which was intruded by younger granites in the Mesozoic and unconformably overlain by younger cretaceous to recent sediments of the five sedimentary basins.

The Precambrian basement rocks are the oldest and most stable rocks of Cambrian to Pre-Cambrian age. These rocks occupy about 40% of the total surface area of Nigeria. These rocks have been affected and altered by orogenic events of Liberian (2800±200 Ma), Eburnean (2000±200Ma), Kibarian (1100±200 Ma) and Pan-African (600±150 Ma) orogenies (Corray, 1972).

The Archaean, Early Proterozoic (Birmian) and Late Proterozoic (Pan-African) shield of Nigeria all have the following features in common:

1. A basement complex dominated by mainly amphibolites-grade gneisses and migmatites and layers and lenses of other rock types such as quartzites, and amphibolites, is made up of rocks that mostly experienced the effects of more than one thermotectonic events.
2. Elongated supra-crustal belts of mainly green-schist to amphibolite facies phyllites, schist and greenstones. The Archaean and the Pan-African both have occurrences of metaconglomerates. These supra-crustal are generally believed to have been deformed and metamorphosed during the last of the thermotectonic events which reactivated their basement; i.e., Liberian, Eburnean and Pan-African thermotectonic events for the Achaean, Birmian and Pan-African supra-crustal belts, respectively.
3. Syn-tectonic to late-tectonic plutonic intrusions which are mainly granites to granodiorites in composition but also include smaller masses of diorites, gabbros, syenites and related rocks. They intrude both basement and supra-crustal. They were emplaced during the last episode of reactivation that affected the basement, i.e., during the deformation and metamorphism of the supra-crustal.
4. The structural grain of the Precambrian rocks generally lies between the N-S and NE-SW trends. This again is defined by the strike of foliation in the schist and gneisses (Obaje, 2009).

The constituent rock types of the basement complex include mainly migmatites, gneisses, quartzite, schists, amphibolites and granites. The broad lithological groups that comprise the basement complex are:

1. The crystalline migmatite - gneiss complex which is wide spread throughout the area.
2. The low to medium grade meta-sedimentary and meta-volcanic rocks folded into synclinal belts within the crystalline basement complex.
3. The older granite emplaced within the migmatite - gneiss complex and the schist belt. The older granites are Late Proterozoic to Cambrian in age (Pan African) and include syn-orogenic to late orogenic granites, minor basic and ultrabasic rocks, dykes, pegmatites and marble.
4. The younger granites are discordant, high-level magmatic intrusions with strong alkaline affinities, they are Mesozoic in age.

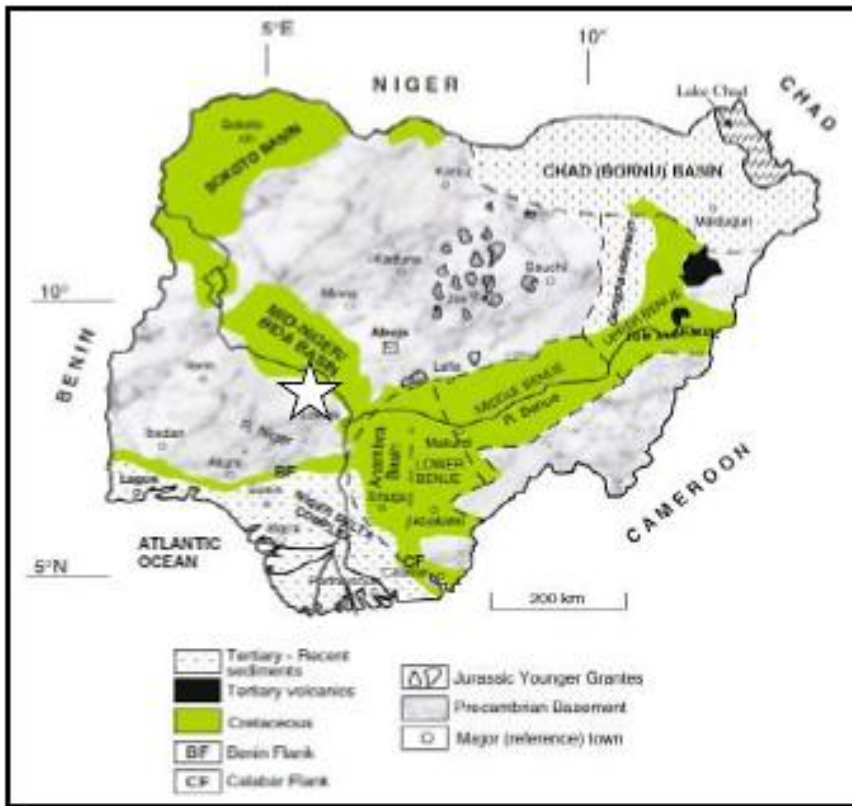


Figure 4.7: Geological map of Nigeria

Source: Obaje, 2009

The study area is underlain by the Basement complex suite which comprises mainly of Migmatite-gneiss complex, older granite and schist belt while the Migmatite-gneiss complex accounts for about 30% of the outcrops. They are composed of migmatite of various structures and composition but predominantly with tonolitic or amphibolitic paleozoic and granitic leucozones having N-S structural grade. The older granite is composed of rocks of predominantly granodiorites

Environmental And Social Impact Assessment (ESIA) for the Proposed Niger State Special Agro-Industrial Processing Zone (SAPZ) at Airport City Border Community, Bosso LGA, Niger State composition which form rugged topography and inselbergs that is exemplified by Minna batholiths around Bosso area (Ajibade, A. C. 1980).

4.2.4 Topography

The study area consists of low-lying terrains and few gentle hills. The southern and central parts of the site are typified of relatively flat and monotonous landscape underlain by biotitehornblende granite as evidence by petrographic analysis. The central part is remarkable for its alternating rugged and undulating landscape.

The rugged topography of the project site with characteristic series of ridges and valleys may be prone to accelerated soil erosion as the area is already witnessing widespread gully landscape.

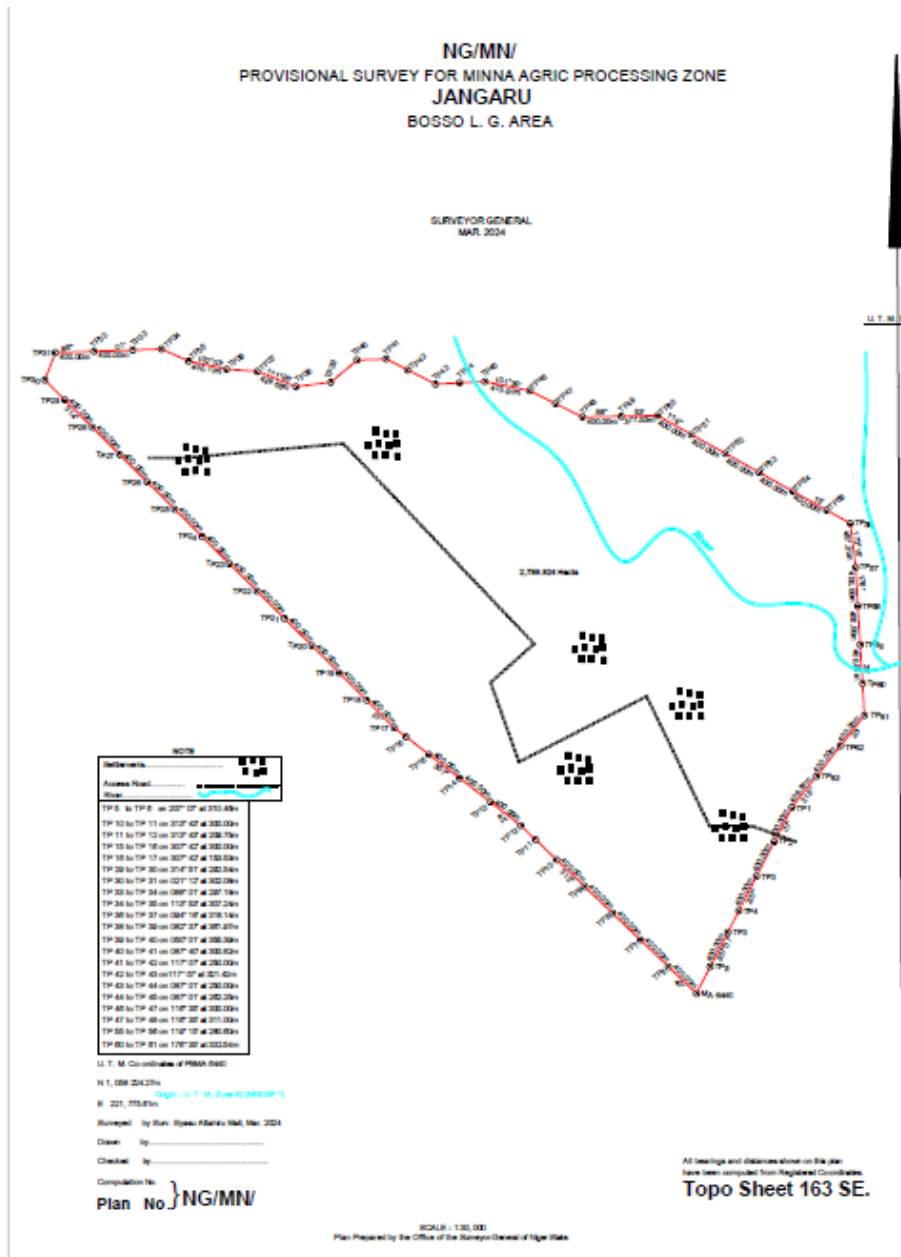


Figure 4.8a: Image Showing Topography of Project Area

the extent, pattern, size, openness and continuity of the fracture, and to the degree to which these fractures are hydraulically connected (Todd et al, 1980).

The drainage pattern in the area is observed to be dendritic and reflects the uniformity of the geology of the area. The names of some of these rivers must have been forgotten due to their dryness. All these minor rivers drain into river Bosso and the direction flow is east to west.

Due to lack of interconnectivity of the joints and fractures in the study area, the weathered aquifer is the most important aquifer utilized. This is because all the pore spaces are well interconnected. Majority of the borehole drilled within the vicinity of the study area tap water from this aquifer in addition to the minor fractures that are encountered in some locations. These aquifers are recharged mainly by the rain water (precipitation) and as a result, during rainy season, the discharges of the boreholes tapping the perched aquifers are higher than during the dry season.

The general trend of groundwater flow in the study area is of northeast southwest direction.

Groundwater and Surface Water in the project area

Groundwater is usually considered potable because of the natural attenuation capacity through filtering and cleaning as water percolates through the overburden before it reaches the pyretic zone. However, this does not guarantee groundwater purity. Problems can arise either due to the natural conditions on the ground or pollution by human activities. There is no groundwater within the project area. Also, there is no surface water within 1km of the project area.

4.2.6 Soil Studies

Physical Properties: Morphology

Soils within the study area are developed in different types of Pre-Cambrian Basement Complex rocks, comprising mostly the granite gneisses, phyllites and metasediments. The soils are predominantly ferruginous, moderately to deeply weathered, brownish to reddish tropical soils, with colours varying from 10YR 4/6 to 5R 2/4 within and around the proposed project location. The soil colours were not significantly affected with seasons.

Lithosols, (very shallow soils with plinthic ironstone pans or bedrocks at depths <100 cm of the surface) are found around the commonly occurring rock outcrops and the inselbergs at the study area. These shallow soils could readily be lost during site preparation involving bush clearing, stumping and land grading prior to the construction phase of the proposed project. However, the predominant soils in the study area are moderately to deeply weathered, moderately ferruginous tropical soils.

The soils are moderately sandy loam (52%–76% sand) on top and a little more clayey in the subsoil. Sandy loam to loamy sand soils are reported to be very porous, highly permeable and well

aerated (Brady, 2002). The soils have common to frequent rock outcrops, with surface boulders, stones, and ironstone capping. However, in view of their sandy loam texture, they have low to very low water holding capacity and high hydraulic conductivity. This implies that aqueous contaminant, such as spent paints, diesel oil and related aqueous contaminants may readily infiltrate into the soils and percolate deeper with little hindrance to possibly pollute groundwater in the unconfined shallow aquifers, if any, within the area of study.

Field protocols were carried out to meet the needs of the baseline study and for information that were adequate and suitable for achieving valuable results. The major considerations for soil sample distribution and sampling pattern are:

- Adequate coverage of representative and / or probable soil morphological types within the study area.
- Capturing the possible effects of existing land use patterns on soil environment and
- Establishing the potential impact(s) of the proposed project on the soil environment, including the land use patterns in the area.

From the field sampling plan, which was based on the project location map and reconnaissance visit to the area, a total of two (2) soil sample stations were established, spreading within and around the project location. At each of the sample stations, at least, three random spots were augered at two depth levels [Top Sample (T), 0 – 15cm; Bottom Sample (B), 15- 30 cm], with the aid of 9cm diameter dutch auger at about the centre of the sample station (Anon., 1986). At each of the sample stations (SS) and soil depth levels (T or B), the soil samples were bulked together to give a composite sample. The soil samples from different sample stations and soil depth levels were, on each occasion, collected in polythene bags and labelled accordingly. For example, soil sample from first sample station (i.e., SS1) and first depth level (0-15cm) (i.e.; T) was coded as SS1T. On the whole, four (4) samples, from the two (2) sample stations, were collected and transported to the laboratory for analyses. Samples for physico-chemical analysis was collected into coded plastic bags, while glass containers with screw cap, lined with Teflon and sterile plastic bottles were used to collect samples for microbiology analysis respectively.

4.2.6.1 Physico-Chemical and Microbial Characteristics of Soil Samples

The physico-chemical and microbial status of the soil samples in the study area as expressed in their values at different levels of sampling are presented in Table 4.5.

Table 4.5: Physicochemical and Microbial Analysis of Soil Samples (SS) at Project Site

S/N	PARAMETER	UNIT	SS1	SS2
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PHYSICOCHEMICAL ANALYSIS				
1.	Colour	Hazen unit	Grey	Brown
2.	Type	-	Sandy	Loamy
3.	pH	-	7.23	7.15
4.	Temperature	^o C	30.10	29.30
5.	Electrical Conductivity	μS/cm	300.00	260.00
6.	Phosphate (PO ₄ ²⁻)	mg/kg	1.37	0.52
7.	Ammonia (NH ₃)	mg/kg	0.30	0.15
8.	Ammonium (NH ₄ ⁺)	mg/kg	0.35	0.18
9.	Ammonia Nitrogen	mg/kg	0.28	0.09
MICROBIAL ANALYSIS				
10.	THB	CFU/g	1.00x10 ²	2.7x10 ³
11.	Total Fungi	CFU/g	2.50x10 ²	1.93x10 ²
12.	Faecal Coliform	CFU/g	TFC	TFC

CFU=Colony forming unit, NG: No Growth, THB= Total Heterogenic Bacteria. TFC= Too Few to Count

Source: Richflood Laboratories; May 2024;

Sample Sources: = Project Site

4.3 Biological Environment Characteristics

The assessment of biodiversity was conducted in order to provide information on some aspects such floristic and faunal composition, status of habitat as well as inventory of economic plants including any crop of medicinal value.

Vegetation Studies

Vegetation, simply defined, is the plant cover of the earth consisting of assemblages of plants. Together with physiography, it constitutes the most observable element of the landscape.

Vegetation refers to the community of different kinds or species of plants growing together in an area and possessing a certain general physical appearance. This physical appearance arises from the relative proportions of the different species and the way in which the different species of plants are arranged in place, both horizontally and vertically. While the species composition (flora), of the community is important, it is the spatial arrangement of the different plants that really defines the vegetation. Two areas may have more or less the same species of plants and yet different types of vegetation because of the differences in the spatial arrangement of the species and so the general physical appearance of the community. Vegetation also expresses and reflects environmental conditions, particularly climate. Broadly speaking, the national vegetation over a geographical area is essentially a response to the climate in that area.

Nigeria's vegetation belts reflect this very close link between vegetation and climate. Nigeria has two broad belts of vegetation types, namely, the forest and savannah types. Niger State falls within the northern guinea savanna zone.

The assessment of vegetation was conducted to provide information on: Floristic composition; Plant species including the presence or absence of species; Profile of the vegetation type and Inventory of economic plants including any crops of medicinal value. Two vegetation types were identified in the study area, namely- the Guinea savannah and Cultivated farmland.

The Guinea savannah

The natural vegetation of the State consists of a Northern Guinea Savannah in the south and southeast. They are characterized by medium-sized trees such as *Parkia Clappertoniana* (locust bean tree) and *Butyrospermum* (Shea butter tree) and *Combretum* species. In the north, the Sudan Savannah consists of open woodland with scattered trees such as *acacia aibi da* (gawo), *Parkia Clappertoniana*, *Porassus* and *dum palms*. The natural vegetation has however been altered in many areas by intensive cultivation, grazing, fuelwood harvesting and bush burning, giving rise to a form of parkland dominated by trees like *Piliostigma*, *Ziziphus*, *Mangifera Indica* and *Tamarindus*, especially in the south. The practice of silvi-pastoralism by herdsmen in addition to browsing and bush fires in the dry season have done damages to Young trees, thereby taking a heavy toll on the Vegetation resources. The most common floral within the project site is *Acacia spp*, *adansoniadigitata* (Mia coca), *Aenogacousleocapus*, *dogoyaro* (neem) Prominent among such trees are *Ceiba pentandra*, *Tamarindus indica*, *Adansonia digitata* and *Mangifera indica*. Others are *Vitex doniana*, *Vitaleria paradoxa*, *Borassus aethiopum*, *Azelia africana*, *Acacia albida*, *Khaya senegalensis*, *Parkia bigloboza*, *Daniellia oliveri*, *Ficus sycomorus*, *Pterocarpus erinaceus*. They are covered with mostly annual grass such as *Rhynchelytrum repens*, *Panicum kerstingii*, *Setaria pallide-fusca*, *Aristida sp.* And *Hackelochloa granulata*. Also found in the area include species such as *Isoberlinia doka* and *I. tomentosa* form the bulk of the scattered woodland. Also found are locust bean tree (*Parkiamfilicoidea*), shea butter tree (*Butyrospermum parkii*) and mangoes (*Mangifera indica*). Most of the tall grasses found in the area include; *Andropogon gayanus*, *Brachiaria decumbens*, *Cenchrus ciliaris*, *Chloris gayanus*, *Cynodon dactylon*, *Cynodon plectostachyus*, *Digitaria decumbens*, *Digitaria smutsil*, *Hyparrhenia rufa*, *Melinis minutiflora*, *Panicum maximum*, *P. maximum Gaton*, *Sorghum alum*, *Tripsacum laxum* etc.



Plate 4.1: Vegetation Pattern as seen at the Project Area, Wet Season.

The appearance of this zone differs from season to season. During the rainy season (this study period), the whole area was green and covered with tall grasses that grow and reach maturity rapidly and thus become fibrous and tough.

The vegetation on the hilly parts of the state is composed mainly of grasses and isolated trees. Trees of economic value, including locust bean, shea butter, mango, citrus are scattered across the state, particularly the lowland areas and southern parts of the state.

Most farmers rely on natural grassland for their grazing animals. Carrying capacity of the natural grassland is very low compared to that of planted fertilized pastures. Productivity of natural grassland is affected by factors such as soil fertility, the amount of browse species available, density of canopy and management practices such as rotational grazing, stocking rate, fertilizer application, burning and the length of the resting period (Ademosun, 1974).

Cultivated farmland

The study area shows the presence of cultivated farmlands. List of some common farmland crops of the area is presented in Table 4.6 below. Tubers like sweet potatoes, yams and cocoyams are grown with an elaborate mound in support to avert the problem of erosion from run-off. The major pests of root crops are vertebrate pests namely – Grass-cutter or Cane rat, *Thryonomys swinderianus*, the ground squirrel, the Brush tailed porcupine, *Atherurus africanus*, the Bush-pig,

Potamochoerus porcus which attack the tubers, and the mealybug (*Pseudococcus sp*) which damages the leaves and stems. Fruit-bats, attack plantain, banana, mango and oranges, particularly when they are sufficiently ripe and rotting.

Table 4.6: List of some common farmland crops grown in the Area

S/N	Common Name	Native Name	Scientific Name
1	Cassava	<i>Rogo</i>	<i>Manihot esculenta</i>
2	Maize	<i>Masara</i>	<i>Zea mays</i>
3	White yam Yellow yam Aerial yam Water yam 3-leaved yam	<i>Doya</i>	<i>Dioscorea rotundata</i> <i>Dioscorea cayensis</i> <i>Dioscorea bubifera</i> <i>Dioscorea alata</i> <i>Dioscorea dumetorum</i>
4	Cocoyam	<i>Gwaza</i>	<i>Colocasia esculenta</i> <i>Xanthosoma sagittifolium</i> <i>Xanthosoma mafaffa</i>
5	Okra	<i>Hubewa</i>	<i>Abelmoschus esculentus</i>
6	Melon	<i>Kankanna</i>	<i>Cucumeropsis edulis</i>
7	Mangoes	<i>Mangoro</i>	<i>Magnifera indica</i>
8	Garden egg	<i>Yalo</i>	<i>Solanum melongena</i>
9	Cucumber	-	<i>Cucumis sativus</i>
10	Groundnut	<i>Geda</i>	<i>Kerstingiella geocarpa</i>
11	Tomato	<i>Timatir</i>	<i>Lycopersicum esculentum</i>
12	Pepper: (Fruit large and sweet) (Fruit small and hot) Long pepper	<i>Bokonu</i>	<i>Capsicum annum</i> <i>Capiscum frutescens</i> <i>Capiscum potentis</i>
13	Sugar cane	<i>Reke</i>	<i>Saccharum officinarum</i>
14	Pineapple	<i>Abaraba</i>	<i>Ananas comosus</i>
15	Soya beans	<i>Waken soya</i>	
16	Carrots	<i>Caras</i>	
17	Onions	<i>Albasa</i>	
18	Guinea Corn	<i>Dawa</i>	
19	Rice	<i>Shinkafa</i>	
20	Millet	<i>Gero</i>	
21	Pawpaw	<i>Kwanda</i>	
22	Vegetable	<i>Aleiho</i>	
23	Gauva	-	

In Plate 4.1 above (wet season) and below (dry season) are picture-representation of vegetation pattern/description of vegetation type at study area, as observed during data-gathering at the project location.



Plate 4.2: Vegetation Pattern as seen at project area, Dry Season

Wildlife Studies

The wildlife inventory for the study area was carried out by examining the animal footprints, droppings, interview with local hunters, etc. During the course of the fieldwork campaign, birds and some other reptiles were observed and identified. Also, the only local market operating in the study area, the proposed project area was visited to see and identify the predominant wildlife species. Terrestrial fauna that occurs in the study area was sampled. Various visual and assessment sampling methods were used which included analysis of footprints, faecal samples, vocalisations and interviews conducted with local inhabitants.

The wildlife survey and interview with the local hunters in the study area revealed the presence of some mammalian, avian, amphibians, mollusks and reptile species. Significant among the species include: insects, Grass cutters, Antelopes, Sunbirds, Weaverbird (*Pleisisositaara spp*), kites, Cattle egrets (*Ardeola ibis*), Doves, Fruit pigeon, Parrot, etc.

Basic animals found in the project communities are: Dog (native name: Kare), Cattle (native name: Shanuke), Chicken (native name: Kazuna), Goat (native name: Akuya), Sheep (native name: Rago), Cat (native name: muskule), Rabbit (native name: Zomo), Turkey (native name: Tolotolo), Rat (native name: Bera), amongst others. Domestic animals like goats, dogs, pigs, ducks, and fowls amongst others were observed.

The study area is occupied by large trees and thick bushes which make a comfortable habitation for wild animals and Birds. During the inspection various species of birds were seen on site, birds such as White Doves, Brown Doves, Hawks, Owls, Bats, Gulls, Osprey, Cattle Egret, Storm petrels and Bush hen etc. Domestic birds such as Hens, Ducks, Guinea fowls, Pigeon and fowls.

The following (Table 4.7 below) is a list of wildlife species classified from observations, interviews and citing of footprint:

Table 4.7: Samples of some faunal composition of the Study Area

Species/Scientific Name	Common Name	IUCN Ranking
Mammals		
<i>Neotragus batesi</i>	Antelope	Least Concern
<i>Hyemoschus aquaticus</i>	Chevrotain	Vulnerable
<i>Cephalopus sylvicultor</i>	Black fronted duiker	Least Concern
<i>Macaca Fascicularis</i>	Monkey	Least Concern
<i>Cercopithecus nictitans</i>	Putty-nosed monkey	Least Concern
<i>Cercopithecus mona</i>	Mona Monkey	Least Concern
<i>Cercopithecus erythrogaster</i>	White throated guenon	Vulnerable
<i>Cercocebus torquatus</i>	Red capped mangabey	Least Concern
<i>Ptilocolobus</i>	Red colobus	Near Threatened
<i>Galagidae</i>	Bush baby	Near Threatened
<i>Perodicticus potto</i>	Bosman potto	Vulnerable
<i>Thryonomys swinderianus</i>	Greater Cane Rat (Grass cutter)	Least Concern
<i>Crecomys gambianus</i>	African Giant Rat	Least Concern
<i>Heliosciurus gambianus</i>	African Tree Squirrel	Least Concern
<i>Xerus erythropus</i>	Striped ground squirrel	Least Concern
<i>Bettongia</i>	Bettong	Least Concern
<i>Didelphimorphia</i>	Possum	Vulnerable
<i>Lepus microtis</i>	Rabbit	Least Concern
<i>Trichechus senegalensis</i>	West African Manatee	Vulnerable
<i>Philantomba maxwellii</i>	Maxwell's Duiker (Antelope)	Least Concern
<i>Manis tricuspis</i>	White-bellied tree Pangolin	Vulnerable
Aves		
<i>Tigriornis leucolopha</i>	White-Crested Tiger Heron	Least Concern
<i>Egretta garzetta</i>	Little Egret	Least Concern
<i>Bubulcus ibis</i>	Cattle Egret	Least Concern
<i>Ardea brachyrhyncha</i>	Yellow-Billed Egret	Least Concern
<i>Ardea cinereal</i>	Grey Heron	Least Concern
<i>Scopus umbrette</i>	Hamerkop	Least Concern
<i>Milvus migrans</i>	Black Kite	Least Concern
<i>Circus aeruginosus</i>	Marsh Harrier	Least Concern
<i>Limosa lapponica</i>	Bar-Tailed Godwit	Least Concern
<i>Streptopelia semitorquata</i>	Red-Eyed Dove	Least Concern
<i>Spilopelia senegalensis</i>	Laughing Dove	Least Concern
<i>Turtur brehmeri</i>	Blue-Headed Dove	Least Concern
<i>Columba livia</i>	Rock Pigeon	Least Concern
<i>Psittacus erithacus</i>	African Grey Parrot	Vulnerable

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<i>Halcyon malimbica</i>	Blue Breasted Kingfisher	Least Concern
<i>Corythornis cristatus</i>	Malachite Kingfisher	Least Concern
<i>Eurystomus gularis</i>	Blue-Throated Roller	Least Concern
<i>Ploceus aurantius</i>	Orange Weaver	Least Concern
<i>Ploceus nigerrimus</i>	Viellot's Black Weaver	Least Concern
<i>Passer griseus</i>	Grey-Headed Sparrow	Least Concern
<i>Nectarinia fuliginosa</i>	Carmelite Sunbird	Least Concern
<i>Pycnonotus barbatus</i>	Common Garden Bulbul	Least Concern
<i>Motacilla flava</i>	Yellow Wagtail	Least Concern
Reptiles		
<i>Varanus niloticus</i>	Nile Monitor Lizard	Not Evaluated
<i>Causus maculatus</i>	West African Night Adder	Not Evaluated
<i>Pelusios niger</i>	West African Black Turtle	Not Evaluated
<i>Naja nigricolis</i>	Spitting Cobra	Not Evaluated
<i>Pleurodelinae</i>	Newt	Not Evaluated
<i>Viperidae</i>	Vipers	Not Evaluated
<i>Hemidactylus frenatus</i>	Gecko	Not Evaluated
Amphibians		
<i>Amietophrynus maculatus</i>	Striped Toad	Least Concern
<i>Pyxicephalus adspersus</i>	African Bullfrog	Least Concern
<i>Tree frogs</i>	Racophorids	Least Concern
<i>Acanthixalus sonjae</i>	African Wart Frog	Near Threatened
Insect		
<i>Culicidae</i>	Mosquitoes	Least Concern
<i>Musca domestica</i>	Houseflies	Least Concern
<i>Glossina</i>	Tse-tse Flies	Least Concern
<i>Psychodidae</i>	Sand Flies	Least Concern
<i>Vespula spp</i>	Yellow Jacket	Least Concern

Source: Richflood Ltd Fieldwork and Literature, 2017



Plate 4.3: Fauna sample onsite: Herds of Cow and oxen, mainly for Cattle rearing

Land Use

The traditional use of land in the area is mainly agricultural (crop cultivation). Generally, mechanized farming and use of fertilizers is common in the area. There are also sites of cultural and religious significance in the community among which is burial sites. Land in the area is also used for the construction of markets, schools; health posts/centres mosques, and roads. Generally, the land use indicates commercial land use, industrial land use, residential land use and farming land use. The Land use pattern is mainly settlement and agricultural. Over 90% of the indigenes

in the project area are involved in various farming activities such as cultivation of rice, millet, wheat, guinea corn, rice, onion, groundnut, animal husbandry among others.

The various land use in the study area include, recreational, transport, agricultural, residential, commercial, religious area, institutional areas, industrial uses and buffer zones point. The land use pattern in study area is diverse, in that urban development around the area has led to population growth, economic development, migration and rapid expansion of urban centres. The below table shows the percentage composition of land use in the area.

Table 4.8: Land Use Types at Project Area

S/N	Types of Land Use	Percentage (%)
1	Agricultural areas	48
2	Residential areas	19
3	Institutional areas	12
4	Industrial areas	5
5	Commercial areas	3
6	Religious areas	2
7	Recreational areas	4
8	Transport areas	2
9	Buffer zones	5

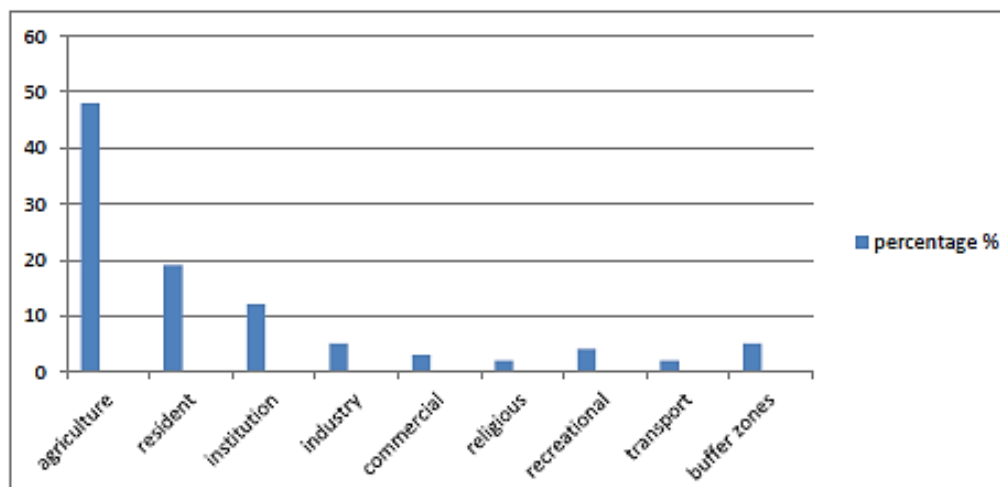


Figure 4.9: Bar chart showing percentage of Land Use in the study area

The major land use in the area is farming and cattle rearing (Grazing) in some place not used for farming activities. The product of rock weathering in the area provided fertile soil and the drainage systems provided soil moisture. These two factors made the area agriculturally lively and very viable. Along the river bands, (Fadama) farming like tomatoes were planted and rice while in other places cereals are planted which are mostly maize and guinea-corn.

More so, farmers, at the study area, are mainly smallholders, practicing Subsistence Farming, which is mainly for family consumption. Most farmland are acquired by Inheritance with 1-5 ha land size common for farming in the area.

In practice, modern or mechanical clearing is profoundly classified as total, selective and wind rowing. Traditionally, agricultural land clearing is predominantly done during dry season. This approach depending on prevailing circumstances in terms of dryness of the vegetation and of course the interest of farmers may include setting the vegetation on fire to burn off all dry matters.

The leaves of trees and shrubs withered and these are then manually removed either by cutting down or digging to uproot them depending on the size and type of tree. Generally, wild cash crop trees such as locust bean trees, shea butter, cashew, orange, mongo trees among others are spared so as to serve as complimentary source of income to the household of farmers especially during off- season period.

The choice of land clearing option is limited to the prevailing cultural practices associated to a given locality. The current practices lacked structured and critical appraisal of appropriate land clearing option related to prevailing nature of vegetation distribution, cost and specific energy requirements. Land Clearing is seldom considered in the strides to mechanizing tillage in Niger State and indeed Nigeria. Farming has been predominantly peasant in nature, up till recent when commercialization of agriculture is being encouraged, despite its huge financial and material requirement. Towards attainment of food sufficiency, adoption of appropriate tillage mechanization with its economic importance of enhancing transition of our farmers from peasant farming to commercial type. Appropriate land clearing is an important prerequisite to effective and efficient use of tillage machinery to enhance easy adoption of tillage mechanization. It leads to cutting off unnecessary costs accrued to tillage practices, eventual reduction in cost of farm produce, enhancement of better productivity and ultimately results in cheaper farm produce thus enlarging the bracket of those that can afford it which will result in hunger reduction.

Small Holder farming system is also said to be most sustainable when manure is applied. Studies of the sustainability levels of small holder farm management practices showed that fallow system is unsustainable because of the persistent grazing by domestic animals. Fallow is supposed to help accumulate soil nutrients and to restore fertility but this never happens when the grass and weed cover is removed by grazing animals. Similarly, the application of inorganic fertilizer is unsustainable; it only increases the level of nitrogen, phosphorus and potassium in the case of NPK

fertilizer but does not add to the sustainability of the practice. However, organic manure is found to be necessary because it improves soil structure and add nutrients through mineralization.

4.4 Socio-Economic Studies and Consultations

4.4.1 Introduction

Consultation is the process of seeking information from parties or persons affected or likely to be affected by the project, or those having environmental responsibilities, concerns or interests about the environmental implications of project activities. Consultation is necessary to more efficiently deliver improved project sustainability and to protect the interests of affected communities, especially the poor and vulnerable. Experience has shown a strong link between project sustainability and effective public consultation.

4.4.2 Consultation Objectives

The objective of the consultation process is to acquire and disseminate information, identify and address legislative, community and environmental concerns and proffer appropriate mitigation options for all identified negative impacts.

The intention would be to:

- Avoid conflict by addressing issues promptly,
- Ensure that any fears or apprehensions about the nature, scale and impacts of the proposed project have been fully addressed; and
- Avoid any misunderstanding about the project.

Consultation is necessary to enlist the participation of groups in the assessment of any project.

For this project, consultation would be carried out at two main levels - public and institutional consultation. Public consultation would be conducted at major towns/villages all along the project area of influence as many would be affected by the project. This would be in the form of interviews with individuals belonging to different social and/or economic categories and concerned local administrative bodies were made. Questionnaires will also be administered to individuals, local or international NGOs that would be available during fieldwork for their opinions on the works with their adverse effects on the environment.

This processing project decision-making process and to assess the key roles that will be played by the different stakeholders in terms of delivering services, goods, works, or other elements in the project.

Mechanisms used for consultation and participation in the project, the main outcomes and recommendations of the consultation process will be incorporated into the project.

Consultations would be approached in the following ways:

- I. A Community Liaison Officer (CLO) would be appointed and charged to:
 - ✓ Identifying and establishing contacts with the respective stakeholders;
 - ✓ Providing a link between the communities and Niger State Special Agro-Industrial Processing Zone (SAPZ) company;
 - ✓ Acting proactively to identify and inform Niger State Special Agro-Industrial Processing Zone (SAPZ) company of various community issues and concern; and
 - ✓ Documenting all contacts and actions and advising on community assistance projects.

Issuance of notice of intent to carry out an EMP for the proposed development project in cooperation with the local regulatory Agencies (Federal Ministry of Environment, State Ministries of Environment Local Government Officials etc.) for a meeting with Niger State Special Agro-Industrial Processing Zone (SAPZ) company and the Project Consultants, where the project would be explained to the people and their cooperation would be solicited for:

- II. Adopting a transparent method of surface right compensation payment to all affected parties,
- III. Sustaining consultation with stakeholders via "Peoples' forum" both before and after the payment of compensation, with explanations of key issues as they arise and affect the people,
- IV. Maintaining effective communication between Niger State Special Agro-Industrial Processing Zone (SAPZ) company and the communities through the Community Liaison Officer (CLO),
- V. Ensuring the full commitment of Niger State Special Agro-Industrial Processing Zone (SAPZ) company to implement all mutually agreed community Assistance Projects.
- VI. The environmental management team has established sound working relationships with FMEnv and the three State Ministries of Environment officials.

Consultation Strategies

The strategy adopted for consultation during fieldwork would be an administration of a structured questionnaire and oral interview. This mode of consultation process shall continue at project commencement and shall ensure that all those identified as stakeholders are continually consulted. Subject to approval by Niger State Special Agro-Industrial Processing Zone (SAPZ) company, the

contractor for the project should share information about the project with the public, to enable meaningful contribution and enhance the successful implementation.

The public consultation will take place through a public forum, seminars, meetings, radio programs, request for written proposals/comments, questionnaire administration, public reading and explanation of project ideas and requirements. The consultation plan would be monitored by relevant regulators who will set their own verifiable indicators to assess the degree of participation of the key stakeholder during all the phases of the project implementation.

Level of Engagement

The level of stakeholder involvement would be based on the project phase, location and expected outcome. Smaller projects need less complicated stakeholder involvement programs as the issues are likely to be less complex and their impacts smaller. This section is a guide to determining the level of stakeholder involvement required.

Specifically, stakeholders' involvement would be based on the following:

- ✓ The project significant impacts, that is, high impacts in one area/location, or relatively small impacts spread out over a large area; and
- ✓ The project significant issues, defining the wider stakeholder that would be affected.

Through these engagement strategies; Niger State Special Agro-Industrial Processing Zone (SAPZ) company would be able to:

- ✓ Clarify the project's objectives in terms of stakeholders' needs and concerns,
- ✓ Identify feasible alternatives (in particular alternative locations) and examine their relative merits in terms of environmental, social and economic factors,
- ✓ Identify and prioritize environmental issues, and establish the scope of future studies; and
- ✓ Identify processes for continued stakeholders' involvement.

Niger State Special Agro-Industrial Processing Zone (SAPZ) company recognizes that early stakeholders' participation in the planning of the proposed project would lead to better mutual understanding and can serve as a basis for proper use of the reclaimed area by the affected community members. Therefore, for this reason, consultation has been put in the centre for decision making for this project and consequently, the following stakeholders have been identified;

- ✓ Regulators (FMEnv, State Ministries),
- ✓ Host Communities and
- ✓ Contractors, distributors, marketers etc.

4.5 Socioeconomic Baseline Characteristics of Project area

Niger State

Niger State is located in the north-eastern part of Nigeria, and its capital is located in the city of Niger, which is also one of the biggest commercial centres in the state

Bosso Local Government

Bosso Local Government Council of Niger State falls within Bida Emirate and was carved out of the then Lavun Local Government Area in September, 1991 with its headquarter at Bosso.

- Location: Bosso Local Government Area is located in Niger State, Northcentral Nigeria, with its headquarters in the town of Maikunkele.
- Population: The population of Bosso LGA is estimated to be around 208,212 people, based on the 2019 projection using the 2006 national population census figures with a 2.5% annual growth rate.
- Languages: The most commonly spoken languages in the area are Gbagyi, Hausa, and Nupe, and many others coexisting peacefully.
- Economy: The natives of the local government area are mainly farmers, who are very hospitable and accommodating, contributing to the socio-economic development of the local government.
- Education: Bosso is home to one of the campuses of the Federal University of Technology Minna, which was originally the main campus before the school moved to the new campus at Gidan Kwano.
- **Climate:** The district experiences yearly highs of 33.5°C, 151.08 days with precipitation, and 130.0 millimetres of precipitation, with a positive trend of rising mean annual temperatures and falling temperatures.
- Area: Bosso Local Government Area covers a total area of 1,592 square kilometres and has two major seasons: the dry and the rainy seasons.
- Temperature: The average temperature of the area is 31 degrees centigrade, while the humidity level averages 31 percent.
- Farming: The majority of the inhabitants of Bosso LGA are subsistence farmers, growing crops such as maize, yam, rice, and millet.
- Market: The area is home to several markets, such as the Kure market and the New Bosso local market, where dwellers of Bosso LGA go to purchase a variety of commodities.

CHAPTER FIVE

ASSOCIATED AND POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS

5.0 Introduction

This section documents the impacts anticipated to be associated with the Proposed Special Agro-Industrial Processing Zone (SAPZ) at Airport City Border Community, Bosso L.G.A., Niger State by Niger State Special Agro-Industrial Processing Zone (SAPZ) Company. Several of these impacts are unlikely to occur due to the implementation of an Environmental Management Plan as would be contained in the ESIA report. These impacts are, however, detailed in this section to inform stakeholders of potential impacts to be considered during the performance of the ESIA.

Assessment of Impacts

An ESIA would be undertaken by following a systematic process that predicts and evaluates the impacts the project could have on physical, biological, socioeconomic (including social, economic and health) resources and receptors and identifies measures that the Project will take to avoid, minimize/reduce, mitigate, offset, or compensate for adverse impacts; and to enhance positive impacts where practicable.

This process includes the definition of the Area of Influence of the Project, description of the baseline conditions, and application of an appropriate impact assessment methodology. These are described further in the following section.

5.1 Defining the Area of Influence (AOI)

The extent of the effect of project activity on a particular physical, biological or social resource will vary and is termed the Area of Influence (AOI).

Specifically, the AOI encompasses the following:

- The area likely to be affected by: the Project, Project activities, and Project facilities (direct AOI); and unplanned but predictable development caused by the Project that may occur later or at a different location (indirect AOI),
- Associated facilities, which are facilities that are not part of the project but are required and would not have been constructed or expanded if the Project did not exist and without which the Project would not be viable; and
- Cumulative impacts that result from the incremental impact on areas or resources directly impacted by the Project from other existing, planned or reasonably defined developments.
- The impact assessment considers that the AOI will vary depending on the type of effect, but in each case, it is defined to include the entire Project area where it is likely that

significant impacts could result. A conservative but reasonable approach is taken in defining the AOI.

Baseline Conditions and Specialist Studies

To provide a context within which the impacts of the Project can be assessed, a description of physical, biological, socioeconomic (social, economic and health) conditions that would be expected to prevail in the absence of the Project is presented. The baseline description includes information on the resources and receptors identified during scoping as having the potential to be significantly affected by the Project.

The baseline information is based on Primary data, site visits interactions with stakeholders as well as specialist studies. Primary information for the baseline would be sourced from publicly available secondary information including current scientific literature, non-technical literature (tourism reports, newspaper articles, other ESIA documents if available), online databases and other data sources. The following specialists' studies would be undertaken in order to describe the baseline conditions of the AOI and to develop and supplement the baseline chapter of the ESIA report:

- Soil;
- Groundwater
- Surface water
- Air Quality
- Noise; and
- Socioeconomics (including social, cultural, economic and health aspects).

Assessment Methodology

Impact identification and assessment starts with scoping and continues through the remainder of the ESIA Process. Interactions with the potential for significant effects were subjected to a detailed impact assessment.

The principal ESIA steps comprise of:

- Impact Prediction: to determine what could potentially happen to resources or receptors as a consequence of the Project and its associated activities.

- **Impact Evaluation:** to evaluate the significance of the predicted impacts by considering their magnitude and likelihood of occurrence, and the sensitivity, value and/or importance of the affected resource or receptor.
- **Mitigation and Enhancement:** to identify appropriate and justified measures to mitigate negative impacts and enhance positive impacts.
- **Residual Impact Evaluation:** to evaluate the significance of impacts assuming effective implementation of mitigation and enhancement measures.

The Possible impacts to the physical environment are likely to include the following:

- Air quality, noise, dust and emissions
- Degradation of aesthetics
- Soil erosion
- Impacts from excavation and disposal of excavated materials
- Impacts on geology, hydrogeology
- Impacts on water resources

Potential impacts to the biological environment may include:

- Reduction of forested lands
- Alteration to dissolved oxygen levels in water
- Changes to wetland areas
- Impacts to the ecosystems food chains
- Loss of Wildlife habitats

Potential impacts to the social and economic structure of the area:

- Economic opportunities during construction
- Economic opportunities after project completion
- Increase in water-related diseases, contagious diseases or pest outbreaks
- Migration of people into the area in search of job
- Possible rise in the cost of living due to inflation
- Pressure on existing resources and infrastructure for health services etc.

The Development, implementation and operation of the SAPZ Project would contribute to the creation of new jobs opportunities, Capacity Building, Skill Transfer, for the skilled, unskilled labour, casual labourer, and by extension the project affected communities.

Employment Opportunities

The project is envisaged to provide direct employment in the SAPZ & other industrial raw material procurement zones including direct employment in Agro industrial zone, farming sector outside the SAPZ. The SAPZ project will also provide indirect employment in primary, secondary and tertiary sectors including banks, logistics, insurance, manufacturing etc. of the Project Area of Influence.

Capacity Building

The project will provision increase capacity building and training in during both construction and operational phases ensuring that the locals, project affected people and their communities are prioritized. During project construction and Implementation, locals and project affected people will be taught, skills enhanced and impacted which will be utilized even after the project life cycle.

Skill Transfer

The project seeks to attract both national and foreign experts and consultants for the development, design, construction and operation of the SAPZ. During these interactions and processes, the locals will have significant benefit through the transfer of relevant technical skills and tools.

Increase Public Revenue

The project will help restore confidence in foreign investors and promote good doing business climate. The project seeks to attract foreign and national investment that help strengthen and decentralize the economy, increase the national treasury through tax payments, and encourage rural and community development;

Food Security

The project will reduce poverty and hunger by restoring hopes and confidence in farmers. Rural and local farmers will be motivated and inspire to grow and produce surplus cash crops and product with the availability of the Special Agro-Industrial Processing Zone. This means farmers and wouldn't have to worry about the available market for purchasing and storing their products.

Economy

The SAPZ will promote production and value-added goods and services for the local and foreign markets thus stimulating industrial and commercial growth. It will eventually Increase in revenue and profitability of the sector thereby encouraging mindset change in youth towards the agribusiness sector. Most importantly, the project promised to raises the competitiveness and efficiency of SME opportunities among youth and significantly increase earning potential and improving health and sanitation.

Infrastructure Development

The Project will stimulate the establishment of major infrastructures for both local and foreign needs considering the county's infrastructure gaps and needs. This infrastructural development will decentralize the country and improve the physical and aesthetic outlook of the county. The project is envisaged to accelerate the infrastructure development in the Airport City Border Community and make the community a notable commercial hub in Nigeria.

NEGATIVE IMPACTS OF THE SAPZ

Impacts on Air Quality

During Project operations, gaseous exhaust (consisting primarily of carbon monoxide and unburned hydrocarbons) would be emitted from Project equipment. Fugitive dust would be emitted from the surface of the site access roads. Dust emissions would be short-term, sporadic, and localized to the access roads. Off-site impacts to ambient air quality would not result. To minimize fugitive dust, access roads can be regularly sprayed with water or another dust suppressant.

It is important to note that the project takes place in rural area where air quality is usually good. The current and existing air pollution source along the project area is vehicular traffic (particulates and combustion emissions). Potential air emissions from the project in the form of fugitive dust and emission releases will occur as a result of earth work activities including vegetation clearing, excavation works, and transportation of materials to and from the project sites especially where trucks travel on unpaved portions of tracks and roadways. The local ambient air quality around the project area will be temporarily impacted during construction phase as the result of air emissions generated by construction activities. In addition, pollutant emissions will occur due to the operation of diesel fuel generators, and exhaust emissions from transport vehicles such as material transport trucks and administrative vehicles.

Therefore, the potential impacts of the project activities on air quality is associated with dust emissions and an increase the following combustion pollutant concentration (CO, NOX, SO₂ and PM). This impact is localized and not significant.

Impacts on Water Resources

Increased sediments as a result of increased soil erosion due to earthworks can enter surface waters causing increase turbidity and hence impacting aquatic fauna and flora by altering the aquatic environment. In proper handling of lubricants, hazardous substances and hydrocarbons (fuels, gasoline, etc.) may also cause water pollution of surface and ground water. However, the quantities

required for used are small and not expected to affect surface and ground water as long as good management practices are applied.

Surface Water

Several water management ponds in addition to a tailings pond may exist at the site during the Project operation. The increased area of surface water bodies will result in increased evaporation in the immediate area of the ponds themselves. This may impact the microclimate of the project area by lowering temperatures in the site area.

Surface water could be affected during the construction and operation of the SAPZ project. Site clearance, removal of trees and shrubs and site preparatory works would cause a subsequent increase in surface runoff which may, in turn, increase the risk of flooding and soil erosion. Surface water quality could be affected by number of factors during both construction and operations of the SAPZ. Construction activities and operation phase may cause increased soil erosion and sediment loading of nearby streams, while accidental leaks or spills of hydrocarbons (oil, fuel or other substances) can also pollute surface water and impact on ground water. During operations, the major threats to surface water quality is likely to be pollution from pesticides, fertilizers, sewage, effluents from operations and processing plants etc. Gradually seepage of improperly stored materials, chemicals, and products from storage container may also continue to contaminate surface.

Ground Water

The modification of surficial soils will influence the water balance in the area since the new surficial soils may be less permeable than those currently at the ground surface and the quantity, physical distribution and time-related recharge of precipitation to groundwater will consequently change. In addition, clearing of the area will change the vegetation cover and may alter groundwater recharge and runoff conditions.

Project operations will intercept groundwater. Project activity will entail excavation below the existing groundwater level. This will interfere with the existing groundwater flow regime and will result in the temporary reversal of groundwater flow direction. This impact would be localized to the pit itself. The pits are very small in comparison to the surrounding area and there would be no impacts on groundwater availability to nearby communities. Groundwater will flow into the excavation during the Project operation. If adequate pumping capacity is not provided groundwater flow into the pit may result in flooding.

After site closure, there would be residual depressions as a result of extraction and removal of overburden. These depressions may eventually produce groundwater filled ponds in the cultivated area. The surface water levels in these ponds will correspond to the new groundwater levels and surface water in the ponds would be fed by groundwater. This will result in disequilibrium of the groundwater flow regime. Groundwater flow may not return to equilibrium for a considerable period of time.

The construction works at the SAPZ may have significant impacts on ground water hydrology and quality. Potential chemicals and improper handling of lubricating slurry, fertilizers and other toxic substances during construction and operation may cause groundwater pollution thus through gradual seepage.

Impacts on Soil Quality

The Project operation will result in the excavation of the soil present at the site. The geology of the area presently consists of a zone of overlying rock in the area to be cultivated. During Project, soils will not be segregated by material type. Project will consequently result in an alteration of the soils present at the site. The excavation and spoil disposal will result in changes in the topographic height, slope relief intensity, degree of shaping and exposure of the area. The Project operation will therefore alter the surficial geology within the area.

The haul roads and access road will alter the existing ground surface slopes in the area. Since roadway slopes must be safe for the passage of equipment and personnel, the new slopes would be less unstable than the natural slopes at the site. Further, surface water management will preclude the saturation of slopes within the area. The slopes created by the operation will therefore be more stable than those currently occurring at the site and the possibility of slope failures would be significantly decreased. However, slope failures may have served as an indirect

The project area is located within the coastal plain and is generally flat with some undulating rises. The main impacts on soil will occur due to increases erosion potential as a result of vegetation clearing and earth moving activities. Additionally, the increase in potential of erosion, will be a risk of soil contamination from solid waste generated by site activities, as well as liquid waste such as lubricants, slurry, and accidental spills, and leaks occurring from storage and work areas. Impacts associated with soil contamination may continue long after operations have ceased if mitigation measures are not carefully management.

Impacts From Waste Generation

The Project will produce many types of wastes during both construction phase and operational phase. During mobilization and construction phases, solid materials such as domestic waste, packaging from construction materials, debris, excavation remnants and others will be generated which could contaminate both soil and water resources. Vendors, construction staffers and employees must adhere to strict hygiene practices and correctly dispose waste in adherence the EPA standards.

In addition to these wastes generated during construction phase, the operational phase would produce huge volume of waste from key sectors, zones, processing and value-added streams within the Special Agro-Industrial Processing Zone. Wastes expected to be generated during this period include; raw materials from farmlands, plantations, concessions areas and their cumulative wastes generated as well as effluents and wastewater from the processing and value added streams.

Generally, the Agro-Cluster of the SAPZ will include; 1: Open farms, modern farm clusters, green houses, livestock etc., 2: Collection centers, cold stories, ripening chambers and warehousing; 3: Primary processing hubs; 4: R&D incubation centers, quality control; 5: Agribusiness management institutes; 7: IT support/library, training center; 8: Common infrastructure; 9: Utilities & services including maintenance 10: Environmental monitoring and meteorological system; 11: Integrated agro industrial park; 12: Other agro and food processing zones; 13: Packaging and support services; 14: Commercial trade area; 15: Terminal markets logistics. All these activities would post environmental, social and economic impacts and thus mitigation measures increases the project performance and acceptability.

Impacts from Noise And Vibration

The main source of noise and vibration will be as the result of drilling and other earthmoving activities. Additionally, noise will be generated from transportation activities during construction period which would be much higher than during the operational period. The increased noise level can impact employee's health and safety and reduce performances. Heavy vehicle operators, nearby communities and resident in close proximity to project area of influence are at higher risk of noise nuisance.

Impacts of Visual

Construction activities at SAPZ facility may include construction of campsites, recruitment and mobilization of equipment and machineries transportation and other operations carried out at both day and night. Lighting at night can result in visual impact on local communities and sensitive fauna species. Unobtrusive lighting disrupts critical behaviour of biodiversity. It can stall the recovery of threatened species and interfere with their ability to undertake long-distance migrations, reduce breeding success and their chances of survival. Lighting should be kept to the minimum requirement for safety at night-time.

Impacts On Fauna and Flora

Construction activities are likely to affect the local vegetation and faunal and flora species directly or indirectly. Site clearing, excavation and initial preparatory works will potentially impact local flora and fauna of the proposed project area. These preparatory site activities will alter the natural habitat of critical species and the ecosystem services they provide. Vegetation clearing and earthwork activities will also result in increased noise and may result in loss in fauna and flora species and by extension affect their reproduction patterns.

Impacts on Health and Safety

Construction works, industrial processes and operations attracts significant numbers of people and professionals from diverse orientations including skilled labourer, unskilled labourer, technical experts, construction works, and operations technicians. Consequently, there is an increased risk of trips, falls, injuries, accidents and spread of diseases amongst these contractors, pedestrians, passengers, and staff at the project level as well as the project's community level.

In addition to the risks of accidents, there is an increased risk of accidental exposure to hazardous materials and substances during construction and operations should said materials not stored and handled in the appropriate manner and form. The risks and impacts on health and safety are increased if contractors and employees do not adhere to the administration of the Personal Protection Equipment (PPEs) relative to their respective scope of work and not equipped with relevant trainings in occupational health and safety procedures.

An internationally trained and experienced safety specialist will be responsible for the preparation, implementation and maintenance of a comprehensive safety program, which will periodically be reviewed and evaluated. Access to a nearby first aid facility will be provided and a driver and an ambulance will be made available should there be a need to transport patients to another location.

These risk of accidents, injuries and diseases should be minimized by providing regular training and procedures for workers, equipment usage and regular health safety induction protocols to reduce and offset these impacts.

Impacts from Traffic

Project activities will significantly increase the frequency of vehicular traffic congestion and thus increase the risk of motor-vehicle accidents. In addition to the risk of accidents, increase traffic will lead to inconvenience to the public, motorists and chauffeurs, and increase the potential for nuisance in the project area of influence. Mitigation measures will include the development of Traffic Control and Management Plan to minimize or reduce the high level of nuisance and pollution in the area.

SOCIO-ECONOMIC IMPACTS

Employment

The project is expected to provide employment and social livelihood opportunities in the short and long term during both construction and operation phases. Employment opportunities will be tailed on both male and female gender basis and preference will be given workers from the local communities.

As a norm, there would be high influx of people from other region to the project proposed areas for job opportunities which potentially results into social friction an altered social dynamic, and possibly increasing the risks occurrence of diseases and infections. The Project Implementation Unit will work with the Community Liaison Officer and Contractors to put in place appropriate actions that prevent reduce, minimize or offset such impacts.

Impacts to Cultural Resources

Based on the field survey, no activities under the project are expected to take place near any cultural or archaeological resources. Avoiding cultural resources during planning stages and ensuring equal representation and participation of relevant project affected persons and communities in decision making process helps to mitigate impacts to cultural resources. Damage to cultural resources constitute threat to social cohesion and would lead to resentment of the proposed project. However, should any cultural site or resources be found, the appropriate standard for chance finds will be applied.

Table 5.1: Summary of Potential Impacts & their possible Receptors

Impact	Source of Impacts/Risk	Potential Receptors
Biophysical		
Air Quality	<ul style="list-style-type: none"> • Reduce air quality due to increase traffic flow. • Dust emissions form earthworks and transport of materials. • Pollutant emission form fuel generators and transport vehicles. • Reduced air quality due to unsustainable waste management practices. • Air pollution due to open burning of excavated substances • Reduce air quality due to bad smell and odor 	<ul style="list-style-type: none"> • Local communities • Employees/Staff • Local fauna and flora
Water Resources	<ul style="list-style-type: none"> • Degradation of surface water from construction associated activities. • Increase turbidity in surface water from potential soil erosion • Changes in downstream rivers due to water pollution and wetland dumping • Degradation of water quality and indirect negative effects on ecology due to sedimentation of downstream water resources • Potential pollution of surface and ground water resources form waste generation accidental spills/leaks and incorrect handling of lubricants • Potential wastewater and effluent from industrial processing of raw materials • Pollution of water bodies due to surface runoff from construction sites 	<ul style="list-style-type: none"> • Local communities • Water resources
Aquatic Ecology	<ul style="list-style-type: none"> • Alteration of aquatic habitat due to construction waste and oil spills • Loss of downstream aquatic habitat and species due to reduced water quality as the result of flood and erosion from construction and operations • Loss of viable aquatic species due to oil spillages 	<ul style="list-style-type: none"> • Local fauna • Local communities
Terrestrial Ecology	<ul style="list-style-type: none"> • Displacement and loss of fauna due to disturbance from excavation and site clearance. • Loss of vegetation due to construction of the SAPZ • Risk of physical injury to wildlife species 	Local fauna and flora
Biodiversity	<ul style="list-style-type: none"> • Increased pressure on natural resources due to increase ease of access as a result 	<ul style="list-style-type: none"> • Fauna and flora • Local communities

	<p>of construction and operation of new access road</p> <ul style="list-style-type: none"> • Risk of increased incidence of invasive and alien plant species due to construction of the SAPZ and associated activities • Increase level of noise and disturbance that potentially cause involuntary migration of animals' species • Loss of biodiversity and destruction of critical habitat during to excavation and site clearing 	
Soil	<ul style="list-style-type: none"> • Increase erosion from vegetation clearing and earthworks • Risk of soil contamination from waste generation and accidental spills • Increase sedimentation due to construction activities • Impact of change in land use and capability for construction and operation • Loss of fertile soil for the construction of structures within the SAPZ 	<ul style="list-style-type: none"> • Land • Local communities
Noise	<ul style="list-style-type: none"> • Increase risks of noise and vibration pollution due equipment and earthworks operations. • Increase risk of noise from transportation activities. • Potential impacts of noise on fauna and flora from construction and operations. • Potential uninterrupted noise generation both at day and night. • Increase risk of noise due to poorly service machines and equipment 	<ul style="list-style-type: none"> • Communities • Fauna and flora • Employees
Socio-Economic		
Macro-Economy	<ul style="list-style-type: none"> • Increased employment, skills enhancement and local business due to the construction of the SAPZ and association works • Increase opportunities of the project affected communities in capacity building and skills enhancement. • Potential social friction and altered social dynamics form influx of workers from other areas. • Positive impact from employment opportunities arising from the project • Increase risks of occurrence of infectious diseases form influx of workers 	

	<ul style="list-style-type: none"> • Potential negative impacts where project designated area is inhabited by farming activities • Increase infrastructure development and trade activities at the project communities 	
Land and Land Use	<ul style="list-style-type: none"> • Potential for resettlement or relocation where designated site is inhabited by people • Impact of change in land use as result of the construction of the SAPZ 	Local Communities
Waste Generation	<ul style="list-style-type: none"> • Potential soil and /or water contamination form mishandling of generated solid waste, construction waste, operation waste and sewer created by the project • Potential adverse effect from unsustainable management of effluent and wastewater generated from operations 	<ul style="list-style-type: none"> • Local communities • Employees • Fauna and flora
Health and Safety	<ul style="list-style-type: none"> • Increase risk of workers exposure to hazards due to lack of relevant PPEs • Risk of injury during onsite construction, excavation and preparatory work • Risk of fall from high heights during construction and operations • Potential traffic related accidents • Risk of accidental exposure to hazardous materials • Potential of intoxicated workers conducting delicate operations • Increase risk of occurrence of infectious diseases from influx of employees • Risk of injury and accident during operations • Risk of fire explosion due to improper management of hydrocarbons (fuel, gas etc.) • Risk of workers exposure to unsafe and dangerous working environment without PPEs • Risk of workers exposure to high vibrating equipment and substances • Risk of accident from being struck of machinery or moving equipment • Potential risk of lack of safe drinking water and sanitation facilities at workplace • Risk of electrocution due to exposed to faulty electrical devices 	<ul style="list-style-type: none"> • Employees • Local communities • Fauna and flora

	<ul style="list-style-type: none"> • Lack of emergency treatment for injured workers and contractors • Risk of child abuse and child labor • Potential threats to workers as the result of raising workplace concerns • Potential risks of failure to investigate accident and unsustainable activities • Risk of discrimination on the basis of religion, race, ethnicity or creed • Lack of awareness among workers on ESHS risks and requirements of the project 	
Public Infrastructure	Increase pressure on local infrastructure and services including health facilities, water resources, etc.	Local Communities
Cultural Heritage	Risk of loss of Cultural Heritage due to construction of the SAPZ	Local Communities
Accident	<ul style="list-style-type: none"> • Risk of loss of life due to lack of training or application of relevant PPEs • Risk of injury as the result of poor system of operation. • Risk of explosion due to unsafe storage of chemicals. • Potential risks of fall from heights. • Increased risk of vehicular cohesion due to poor maintenance of equipment and machineries. • Risk of fire due to use of faulty cables and plugs. • Oil spills due to leakage of containers. • Risk of accidents from being struck of machinery or moving equipment • Risk of exposed to faulty electrical devices, such as cables, cords, hand tools • Risk of failure to conduct incidents investigations 	

STAKEHOLDER ENGAGEMENT

Consistent with the Niger State Special Agro-Industrial Processing Zone (SAPZ) Environmental and Social Policies and Guidelines, The Environmental Protection and Management Law of Nigeria, Stakeholder Engagement and Consultation is designed to establish an effective platform for productive interaction with the potentially affected parties, disadvantaged groups, and others with interest in the implementation outcome of the Project. The purposed of the stakeholder engagement plan is to provide meaningful stakeholder engagement throughout the project cycle. It is an essential aspect of good project management and provides opportunities to:

- Provide project related information and materials to affected and interested parties,
- Solicit feedback from stakeholders to inform project design, implementation, monitoring, and evaluation,
- Enhance project acceptance by clarifying project objectives and scope at an early stage and manage stakeholders' expectations,
- Assess and mitigate project environmental and social impacts and risks,
- Enhance project benefits,
- Address project grievance.

During the ESIA process, stakeholders from all levels (national, local government and residents in the project affected area) were consulted and views were sought through interviews, group discussions and a number of public meetings.

The strategy that adopted for stakeholders' engagement during the fieldwork will be the application of the structured questionnaire, oral interview, Key Informant Interview, focus group discussion (FGD). The engagement process shall continue at project commencement and shall ensure that all those identified as stakeholders are continually Engaged. Subject to approval by Niger State SAPZ company, the contractor for the project should share information about the project with the public, to enable meaningfully contribution and enhance the successful implementation.

Public consultation will take place through a public forum, seminars, meetings, radio programs, request for written proposals/comments, questionnaire administration, public reading and explanation of project ideas and requirements. The consultation plan will be monitored by relevant regulators who will set their verifiable indicators to assess the degree of participation of the key stakeholder during all the phases of the project implementation.

Level of Engagement

The level of stakeholder involvement would be based on the project phase, location and expected outcome. Small projects would require less complicated stakeholder involvement programs as the issues are likely to be less complex and their input smaller. This section is a guide to determining the level of stakeholder involvement required.

Specifically, the extent of stakeholder's involvement would be based on the following;

- The project is likely to have significant impacts, that is, high impacts in one area/location, or relatively small impacts spread out over a large area; and
- The project involves significant issues, that is, the wider stakeholder may be affected.

Through these engagement strategies, Niger State SAPZ Company would be able to:

- Clarify the project's objectives in terms of stakeholder's "needs and concerns",
- Identify feasible alternatives (in particular alternative locations) and examine their relative merits in terms of environmental, social and economic factors,
- Identify and prioritize environmental issues, and establish the scope of future studies; and
- Identify processes for continued stakeholder's involvement. Niger State SAPZ Company recognizes that early stakeholders' participation in the execution of the proposed project would lead to better mutual understanding and can serve as a basis for proper use of the reclaimed area by the affected community members. Therefore, for this reason, consultation has been put in the centre for decision making for this project and consequently, the following stakeholders have been identified;
 - Regulators
 - a. Federal Ministry of Environment
 - b. State Ministry of Environment
 - Host Community (traditional leaders, CBOs, vulnerable Group, Community Groups, etc.); and
 - Contractors, distributors, marketers etc.

The primary objectives of consultation will be:

- To notify regulatory authorities to work with and meet statutory requirements,
- To explain to both government and host communities the proposed operations in meaningful environmental terms,
- Exchange information to facilitate good working relations; and

- To identify issues and local concerns at an early stage to avoid unnecessary public opposition.

GRIEVANCE MECHANISM

The Niger State SAPZ company will establish a grievance mechanism procedure that will provide a means for the public to communicate problems, file in complaints and relate issues arising from the project for timely and effective. The grievance procedural is conducted as part of the ESIA study. The Contractor will also have a Grievance Mechanism in place to resolve any employment and contractors related grievances.

The strategic objectives of the Feedback and Grievance Redress Mechanism (FGRM) is to identify and address potential problems, prevent recurring or escalating grievances, and ensure timely achievement of the SAPZ Project Development objectives through the promotion of accountability among stakeholders. The purpose of the FGRM is to establish a two-way communication with stakeholders for the maximization of the project benefits for people and country. It is also intended to facilitate safeguarding and mitigation of potential adverse impacts of the project activities on land related issues and concerns and as well as operational activities.

CHAPTER SIX

ENVIRONMENTAL AND SOCIAL MITIGATION MEASURES

6.0 Introduction

This Chapter highlights the environmental mitigation and management measures that must be considered for the project. The Environmental mitigation consists of measures that can mitigate/reduce the negative environmental impacts associated with implementation (construction, operation) of the project. Mitigation measures have been identified that would reduce both existing and potential impacts associated with the project development objectives during bidding phase, construction and operational phases. For each of the identified impacts specific mitigation measures may be defined.

There are numerous mitigation measures and alternatives that shall be implemented to curb the negative impact that are most likely to emanate from the proposed irrigation project and maintain its sustainability, these mitigation measures have been explained in the following sections.

6.1 Mitigation Hierarchy

Identification and assessment of impacts has been undertaken through a process comprising consultation, modelling, on-site observations, literature review and expert opinion based on experience of similar projects. These modelling and assessment results have been reviewed and verified. The Niger State SAPZ company is committed to the Mitigation Hierarchy for Health and Safety and the Mitigation Hierarchy for Environmental and Social Risks presented respectively below; The general rule in designing such measures is:

- Avoidance of major impacts: major impacts are generally considered unacceptable, certainly ones that would endure into the long-term or extend over a large area; and
- Reduction of major and moderate impacts to as low as reasonably practicable by planning, designing and controlling mitigation measures. This Implies that mitigation measures will be applied up until the limitations of cost-effectiveness and practical application are reached. The limitations are established by best international practice.
- Implementation of good contractor practices for impacts rated as minor, in order to ensure that impacts are management within good reason.

Table 6.1: Mitigation Hierarchy for Planned Project Activities

<p>Avoid at Source; Reduce at Source Avoiding or reducing at source is essentially ‘designing’ the project so that a feature causing impact is designed out (e.g. pipeline re-route) or altered (e.g. reduced working width). Often called minimization.</p>
<p>Abate on Site This involves adding something to the basic design to abate the impact- pollution controls fall within this category. Often called end-of-pipe.</p>
<p>Abate at Receptor If an impact cannot be abated on-site then measures can be implemented off-site. An example of this would be to instruct authorities in affected schools to increase the level of supervision of their pupils during the period of civil works.</p>
<p>Repair or Remedy Some impacts involve unavoidable damage to a resource, e.g. agricultural land during pipeline construction. Repair essentially involves restoration and reinstatement type measures.</p>

6.2 Environmental, Health and Safety Management

The ESIA and various E&S studies have identified key E&S aspects, risk and impacts requiring mitigation and control. Identification and assessment of impacts has been undertaken through a process comprising consultation, modelling, on-site observations, literature review and expert opinion based on experience of other similar projects. The Niger State SAPZ company will develop an Environmental and Social Management Plan that represents the policies, procedures and standards for all of its operations. This ESMP will accommodate the role of an Environmental Management System (EMS) in the absence of a fully developed EMS for the SAPZ Project.

The Environmental Management System (EMS) is a set of processes and practices which enables an organization to manage the impacts of its organizational activities on the environment and also to increase its operating efficiency. It is a framework which helps the organization to achieve its environmental goals through consistent control of its operations. The framework includes organization’s environmental programs in a comprehensive, systematic, planned and documented manner and includes the organizational structure, planning and resources for developing, implementing and maintaining organizational policy for the protection of the environment. It provides a structured approach to planning and implementation of the environment protection measures.

6.3 Elements of an Ems

The Environmental Management System (EMS) encourages the organization to continuously improve its environmental performance. The basic elements of an EMS are as follows:

- The organization commits initially to an environmental policy.

- It includes review of the present status and future environmental goals of the organization.
- Analysis of the environmental impacts and the legal requirements.
- Keeping environmental policy as the basis, the organization sets the environmental objectives and targets for reducing environmental impacts and for complying with the legal requirements.
- Establishment of plans for improving the environment performance and also for meeting the objectives and targets of the organization.
- Monitoring, measuring and evaluating the progress for achievement of the objectives.
- To ensure environmental awareness and competence of the employees of the organization.
- To take corrective actions if the objectives and targets are not being met.
- To have regular review of the progress of the EMS and to make improvements on continuous basis.

6.4 Mitigation Measures ---Bidding Phase

6.4.1 Bidding Phase--- Procurement of Contractor

The Contractor (Pulse Engineering and Consulting Limited) and the Niger State Special Agro-Industrial Processing Zone Project (SAPZ) will include the following Environmental, Social, Health and Safety (ESHS) conditions in the bidding documents to ensure that the mitigation measures proposed in this ESIA/ESMP are effectively implemented.

- Past performance of the Contractor on ESHS aspects including sexual exploitation and abuse and gender-based violence,
- ESHS Staff with the Contractor,
- Performance security,
- Mitigation measures to address construction impacts (*Table 6.2*)
- Code of conduct of Contractor's Personnel,
- Management Strategies and Implementation Plans (MSIP) to manage the ESHS Risks.

Table 6.2: ESHS Conditions in the Pre-Construction Phase

Condition	The rationale for inclusion of this condition in the contract	Specifications to be included in the Bidding Documents	Responsibility
1. Preparation of Contractor's Environmental and Social Management Plan (C-ESMP)	The Contractor shall submit site-specific management plans to address ESHS risks following the ESMP requirements and MSIP proposed in the bid documents.	<p>The Contractor to submit for approval and subsequently implement their Environment and Social Management Plan (C-ESMP). The C-ESMP should be submitted prior to the commencement of construction works and no construction activities will be carried out under the project until approval of the C-ESMP. The C-ESMP will include the following site-specific management plans on:</p> <ul style="list-style-type: none"> • Occupational health and safety management plan • Community health and safety management plan; • Waste management plan • Wastewater discharges management plan; • Air and noise emissions management plan; • Hazardous material management and spill control plan • Water supply and sanitation management at the worksites and workers' accommodations • Management of labor influx and facilities for the foreign workers • Labor recruitment procedures and labor management • Traffic management plan • Training plan for ESHS risks including HIV/AIDS, sexual exploitation and abuse, and gender-based violence • Emergency Response Plan • Grievance Redress Mechanism • Demobilization plan after completion of works 	Contractor/SAPZ
2. Mobilization of ESHS Specialist	The ESHS Specialist should be mobilized during preconstruction for preparation of C-ESMP	The Contractor shall submit the CV of ESHS Specialist for SAPZ review and approval. The ESHS Specialist should be present at the site throughout the construction period.	<ul style="list-style-type: none"> • Contractor • SAPZ • Environmental Specialist
3. Require Permits/ License for disposal of Commercial waste	Government permits/licenses are required for disposal of	Contractor shall obtain relevant permits and license from government authorities	<ul style="list-style-type: none"> • Contractor • SAPZ

	commercial wastes generated from the construction activities at the government operated landfill site.	relating to waste disposal and construction authorization	<ul style="list-style-type: none"> • Environmental Specialist
4. The hiring of Construction Labor	OS 5: Labor Conditions, Health and Safety – This safeguard establishes the Bank’s requirements for its borrowers or clients concerning workers’ conditions, rights and protection from abuse or exploitation. It covers working conditions, workers’ organizations, occupational health and safety, and avoidance of child or forced labor.	Contractor to develop and implement labor management procedures following the Operational Standard 5 for the hiring of construction workers. The procedures will include terms and conditions of employment including hours of work, wages, overtime, compensation and benefits, holidays, leaves, and so on. The procedures will set out measures to prevent and address harassment, intimidation And or exploitation.	<ul style="list-style-type: none"> • Contractor • SAPZ
5. Temporary storage facilities and construction yard	The contractor will need areas for setting up temporary storage areas and construction yards.	Contractor shall set up temporary storage facilities and construction yard within the project area.	<ul style="list-style-type: none"> • Contractor • SAPZ

It is the sole responsibility of the Project Proponent to identify various Environmental and Social Impacts and Risks arising from the project activities and thus ensuring that adequate management and mitigation measures are employed to reduce, alleviate or offset them. Summary of proposed mitigation measures are provided in the below table:

Table 6.3: Adverse Environmental and Social Risks, and Mitigation Measures

Receptor	Summary of Mitigation Measures During Construction
Biophysical	
Air Quality	<ul style="list-style-type: none"> • Ensure adequate maintenance and repair equipment & machineries. • Adopt a traffic management plan while avoiding congest routes. • Ensure that vehicles and machines are switched off when not in use • Water surfaces to control dust emissions • Avoid burning of materials resulting from onsite clearance. • Ensure that persons working in areas prone to dust are provided PPEs. • Ensure the use of high quality diesel for generators and vehicles • Maintain minimum traffic speed on-site and on access roads. • Ensure that construction materials and hazardous substances are well handled. • Cover all vehicles hauling materials likely to give off excessive dust emissions • Regularly water spray surfaces to control dust emissions
Water Resources	<ul style="list-style-type: none"> • Ensure to install sediment and erosion control measures • Follow guidelines and procedures for immediate cleanup of spillages (oil, fuel, chemicals) • Cover open stockpiles of construction materials on site with tarpaulins during rainstorm events to prevent the washing away of construction materials • Install natural or synthetic liners beneath chemical storage tanks • Compact earthworks as soon as the final surfaces are formed to prevent erosion especially during the wet season • Ensure to grade gravel roads for maintenance of existing drainage patterns • Ensure the protection of riparian areas • Ensure to avoid dumping of construction waste into water bodies • Ensure that proper storage of chemicals and onsite materials
Aquatic Ecology	<ul style="list-style-type: none"> • Schedule construction activity to avoid heavy rainfall • Ensure that hazardous materials are not discharge in aquatic ecosystems • Ensure to construct fence at the perimeter of construction site to avoid cross pollution with aquatic resources • Ensure to prevent dumping of oil, filter cans and other substances into aquatic ecosystem
Terrestrial Ecology	<ul style="list-style-type: none"> • Cautions must be accorded during vegetation clearing to minimize species loss and destruction • Ensure that all species of conservation values are enumerated, conserved and reported to the designated conservation authority
Wastewater	<ul style="list-style-type: none"> • Ensure to obtain required permit for discharge of effluent and chemical wastes • Ensure that all effluent and chemical wastewater meets at acceptable levels for discharging. • Ensure that the point of discharge of effluent and wastewater is approved prior to any discharge.

	<ul style="list-style-type: none"> • Ensure to adopt good house keep during construction phase and operation phase. • Ensure that washing water from vehicles is drained in a sand/silt
Biodiversity (Fauna and flora)	<ul style="list-style-type: none"> • Ensure that no flora species classified as Vulnerable on the IUCN Red List are removed or cleared • Ensure that no tree greater than 200 mm diameter at breast height is damaged • Promote plantation of trees and green corridors along the project facility • Ensure that no species discovered during excavation are traded for commercial value • Minimize vegetation clearance • Prevent any hunting activities • Ensure to report fauna species of high conservation value • Avoid all direct and indirect impact on areas of high ecological • Ensure that sustainable management of solid and liquid waste emanating from construction and operation activities • Ensure outdoor construction lighting is unobtrusive and turn off when not required
Soil	<ul style="list-style-type: none"> • Landscape the excavated areas in a suitable way to allow native vegetation to regrow naturally • Suspend activities during extreme rainfall events • Ensure to Provide drainage channels and silt traps for all parts of the topsoil storage areas • Ensure to rehabilitate areas with topsoil and revegetate after completion of activities • Install sediment and erosion controls • Use non-toxic and readily biodegradable chemicals on-site where feasible • Install natural or synthetic liners beneath chemicals storage tanks • Grade unpaved roads
Hydrocarbons and Hazardous Materials	<ul style="list-style-type: none"> • Ensure that disposal of obsolete chemicals, fertilizers, and other industrial processing chemicals occurs according to the EPA’s standards • Ensure that all chemicals are clearly label and stored in accordance with their respective Material Safety Data Sheet (MSDS) • Ensure to store hazardous materials separately from non-hazardous materials • Use oil traps • Ensure to hydrocarbons in a separate area that has an impermeable floor, adequate space, ventilation and roof to prevent rainfall from seeping • Carefully fuel/refuel vehicles, and machineries to avoid spillage
Noise	<ul style="list-style-type: none"> • Choose inherently quiet equipment • Keep equipment speed as low as possible • Minimize idling time for pickup trucks and other equipment • Limit site working hours where feasible • Ensure that all workers exposed to noise emanating environment ae equipped with hearing protection and relevant PPEs • Schedule noisy activities during the morning hours • Enforce noise monitoring. • Inform the locals when noisy activities are planned. • Utilize and properly maintain silencers or mufflers that reduce vibration on construction equipment.

	<ul style="list-style-type: none"> • Operate only well-maintained mechanical equipment on-site
Socio-Economic	<ul style="list-style-type: none"> • Ensure to set up a formal compliant register system which responds to complaints about nuisances in a timely manner • Adopt policies for recruiting locally and hiring local sub-contractors as much as possible • Include local communities in the consultations and participation process throughout the project activities • Ensure high rate of local employment to minimize influx of foreign workers • Ensure equal employment opportunities • Adhere to prohibition of child labor • Prohibit discrimination in any form or manner such as religion, ethnicity, tribe, creed etc. • Adopt a grievance mechanism to enable the communities and employees to relate concerns that arise from the Project or Contractors
Macro-Economy	
Land and Land Use	<ul style="list-style-type: none"> • Conduct assessment to verify if project do not trigger relocation/resettlement • Conduct thorough assessment of project area of influence to understand and address relevant environmental and social risks • Utilize alternative designs to reduce and minimize land use impacts • Adopt Chance Find Procedures for unanticipated discovery of finding of archaeological or historical significance
Waste Generation	<ul style="list-style-type: none"> • Promote recycling and reuse of general refuse • Ensure that disposal of obsolete chemicals, fertilizers, and other industrial processing chemicals occurs according to the EPA’s standards • Prohibit the burning of refuse on the construction and operation site • Ensure to obtain required authorization from the EPA for disposal of hazardous waste generated onsite • Segregate chemical wastes and properly store and dispose hazardous waste according to the EPA’s standards • Recycle onsite whenever feasible • Fence construction site to prevent flying materials to deposit in nature • Ensure that vehicles transporting wastes are fully covered • Ensure adequate onsite waste segregation • Adopt good housekeeping practices during all phases of the project • Prohibit all forms of littering on-site
Health and Safety	<ul style="list-style-type: none"> • Provide surveillance and active screening of workers • Provide health care benefits to workers • Ensure that hazardous substances are kept in suitable, safe, adequately marked and locked storing place • Conduct health awareness initiative • Restrict access to the operation sites • Ensure that employee/workers/ contractors are informed about the risks and prevention methods for Corvid 19, Ebola, HIV, STDs and others • Conduct firefighting and leak checks training drills for staff • Ensure that workers are qualified, well trained and instructed in handling their equipment, including PPEs • Install warning signs at the entrance of the site to prohibit public access

	<ul style="list-style-type: none"> • Provide appropriate PPE (impermeable latex gloves, working overalls, safety boots, safety helmets, safety goggles, hearing protein devices for workers exposed to noise levels exceeding 90 dBA, and lifesaving vests for sites near water bodies) • Develop and implement an Emergency Preparedness & Response Plan • Ensure containers of hazardous substances are clearly marked and that MSDS's are available • Designate an area where contaminated materials and hazardous can be stored for proper disposal according to the EPA's standards • Provide training to personnel on occupational health and safety and safety procedures prior to beginning work at sites • Ensure that sensitive and dangerous areas with high risks are clearly designated • Ensure that presence of an onsite first aid treatment facility • Adopt good housekeeping practices for ensuring hygiene on site • Ensure the presence of firefighting equipment such as dry powder extinguisher • Ensure that safety specialist is recruited to manage the preparation, implementation and maintenance of a comprehensive safety program • Ensure to eliminate pools of stagnant water, which could serve as breeding grounds for infectious diseases • Install warning signs at places where dangerous and high risks operations are ongoing • Ensure that protective materials are use at all times
Traffic	<ul style="list-style-type: none"> • Properly plan and develop traffic control plan • Notify the affected communities regarding the operation schedule and consult with them about potential traffic issues • Provide traffic re-rooting plan for the construction phase • Limit the movement of heavy machineries to off-peak hours and provide prior notification to local communities • Repair any road damage caused by increased traffic due to operations • Pave road where heavy use is expected • Speed limitation should be enforced for instance, onsite 10km/h, through towns and villages 35km/h and on the highway 80km/h • Ensure safety of motorists through adequate warning, signing, delineation and channeling at least 500 m down and up-gradient form the construction site • Ensure the prohibition of passenger siting on the back of trucks working for the Contractor/sub-contractor • Ensure that all drivers are licensed and obey traffic rules and regulations
Visual Amenity	<ul style="list-style-type: none"> • Ensure that site cleanliness and sanitation is maintained • Ensure outdoor construction lighting is unobtrusive and turn off when not required
Accident	<ul style="list-style-type: none"> • Ensure that all accidents and incidents are report and investigated • Ensure that all workers are qualified, ell trained and instructed in handling their equipment, including health protection equipment • Implement speed limits for trucks entering and exiting the construction facility • Ensure that vehicles transporting wastes are fully covered

	<ul style="list-style-type: none"> • Ensure adequate onsite waste separation • Adopt good housekeeping practices during all phases of the project • Ensure the presence of an onsite First Aid Provider • Ensure that safety specialist is recruited to manage the preparation, implementation and maintenance of a comprehensive safety program • Adopt good housekeeping practices for ensuring hygiene on site • Ensure the presence of firefighting equipment such as dry powder extinguisher • Ensure that safety specialist is recruited to manage the preparation, implementation and maintenance of a comprehensive safety program • Ensure to eliminate pools of stagnant water, which could serve as breeding grounds for infectious diseases • Install warning signs at places where dangerous and high risks operations are ongoing • Ensure that protective materials are use at all times • Provide surveillance and active screening of workers • Provide health care benefits to workers • Ensure that hazardous substances are kept in suitable, safe, adequately marked and locked storing place • Conduct health awareness initiative • Restrict access to the operation sites • Ensure that employee/workers/ contractors are informed about the risks and prevention methods for Corvid 19, Ebola, HIV, STDs and others • Conduct firefighting and leak checks training drills for staff • Ensure that workers are qualified, well trained and instructed in handling their equipment, including PPEs • Install warning signs at the entrance of the site to prohibit public access • Provide appropriate PPE (impermeable latex gloves, working overalls, safety boots, safety helmets, safety goggles, hearing protein devices for workers exposed to noise levels exceeding 90 dBA, and lifesaving vests for sites near water bodies) • Develop and implement an Emergency Preparedness & Response Plan • Ensure containers of hazardous substances are clearly marked and that MSDS's are available
Cultural Heritage	<ul style="list-style-type: none"> • Ensure to apply the standard Procedures for Chance Finds

6.5 Gender Based Violence

6.5.1 Introduction

Nigeria is one of the African countries plagued with rising cases of Gender-Based Violence. This rise of GBV is increasingly violating capacity for the fulfilments and protection of citizen's fundamental human rights. GBV's increasing incidences, patterns and persistence are rooted in the series of gender inequality practices linked to social norms and power dynamics. Women and girls are the most vulnerable and affected.

Sexual Exploitation and Abuse, sexual exploitation means any actual or attempted abuse of a position of vulnerability, differential power, or trust, for sexual purposes, including, but not limited to, profiting monetarily, socially or politically from the sexual exploitation of another, while sexual abuse means the actual or threatened physical intrusion of a sexual nature, whether by force or under unequal or coercive conditions.

Harassment is defined as any inappropriate and unwelcome behaviour by an individual or group of individuals that is directed at and offensive to another person and that the individual(s) knew, or reasonably should have known, would cause offense or harm to that person. And, sexual harassment is any unwelcome sexual advance, request for sexual favour, verbal or physical conduct or gesture of a sexual nature, or any other behaviour of a sexual nature that could reasonably be expected or be perceived to cause offence or humiliation to another, when such conduct interferes with work, is made a condition of employment or creates an intimidating, hostile or offensive work environment.

As a global problem that must be addressed, the SAPZ projects are capable of exacerbating GBV risk if no appropriate GBV Mitigatory measures are not in place GBV has a significant negative impact on individuals, households, and communities. This action plan is articulated to focus on the prevention and mitigation of GBV within the community where the Niger State SAPZ project is implemented. It seeks to ensure full compliance with SAPZ company ESF requirements.

6.5.2 Situational Analysis

GBV is a global public health problem that poses challenges in human health, with a higher prevalence in developing countries. (International Journal on environmental and public health) It is estimated that one in three women experience either physical or sexual intimate partner violence or non-partner sexual violence in their lifetime. In Nigeria, a third of women and girls (30 percent) age 15-49 reported having ever experienced physical or sexual violence by any perpetrator.

The prevalence of child marriage is high as almost half of the girls (48 percent) are married off before their 18th birthday, and 22 percent are married before they turn 15. Forty-six percent of women justify wife-beating for at least one reason. Almost of half (45 percent) of women who have experienced physical or sexual violence perpetrated by a partner or a non-partner perpetrator, almost half (45 percent) have never sought help nor told anyone about it.

Nigeria ranks 118 out of 134 countries on the Gender Equality Index. Women's disadvantaged position and lack of decision-making power in the social, economic, and political spheres are

reflected in policies, laws and resource allocation that thwart progress towards gender equality in the country.

More than 70 percent of women are impoverished, and the maternal mortality rate is among the highest in the world at 576 per 100,000. Girl child enrolment in school lags boys' and represents about one quarter to one-third of classroom participants depending on the state; and two-thirds of the 10.5 million out-of-school children, are girls. Harmful practices and norms such as child marriage are prevalent in Nigeria, with 43 percent of girls married off before the age of 18, while 20 per cent of women aged 15 to 49 have undergone some form of Female Genital Mutilation. Insurgency and protracted conflict have only served to exacerbate the occurrence of GBV in the North.

The situation in Nigeria reflects the global trend of increased gender-based violence occasioned by the pandemic. GBV is reported to have significantly increased since the lockdown began in the three most affected areas (Lagos State, FCT and Ogun State) on 30 March 2020. The Lagos State Domestic and Sexual Violence Response Team reported a three-fold increase in the number of telephone calls received through their hotlines in one month. In particular, service providers have reported sharp increases in cases of intimate partner violence and domestic violence. Other states have implemented similar lockdown measures, resulting in the increased incidence of GBV (Figure 1). GBV risk have been elevated by the COVID-19 pandemic, with widespread evidence that GBV has sharply increased since the beginning of the pandemic.

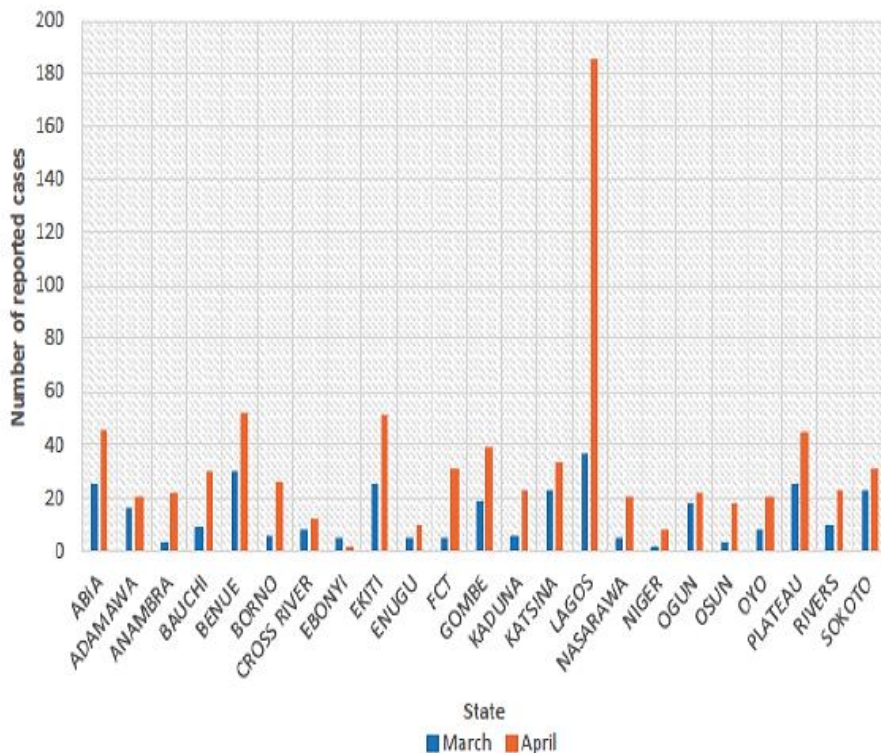


Figure 6.1: 23 states affected by COVID19 with increased cases of GBV

Contextual GBV Risks

The SAPZ project at the Airport City Border Community will involve large civil works and will require a huge labour force and associated goods and services that may not be met locally. As such construction workers will be brought from outside the project area. Construction workers are predominantly male, typically separated from their families on the construction site for extended periods of time. If not carefully managed, an influx of labour can negatively impact a project area, in the context of high acceptability of violence against women and girls.

Additionally, the project area is a Muslim dominated community with most community members practicing polygamy, a risk factor for GBV. Focus group discussions during the project social assessment, shows that forced and early marriage of girls is a common cultural practice, and that women and girls do not freely participate in public consultations.

It’s therefore essential for the project to take into consideration the high labour influx, the high levels of poverty, polygamy, harmful cultural practices and norms, violence against women and girls in the context of refugee hosting districts interacting to exacerbate the risk of GBV/SEA. If

not well managed, these factors can lead to further marginalization and abuse of women, girls and children who are already vulnerable.

Definition of GBV/SEA/SH

The Inter-Agency Standing Committee (IASC) defines gender-based violence as “an umbrella term for any harmful act that is perpetrated against a person’s will, and that is based on socially ascribed (gender) differences between males and females. GBV broadly encompasses physical, sexual, economic, psychological/emotional abuse/violence including threats and coercion, and harmful practices occurring between individuals, within families and in the community at large. These include sexual violence, domestic or intimate partner violence, trafficking, forced and/or early marriage, and other traditional practices that cause harm.

The United Nations defines “sexual exploitation” as any actual or attempted abuse of a position of vulnerability, differential power, or trust, for sexual purposes, including, but not limited to, profiting monetarily, socially or politically from the sexual exploitation of another. Sexual abuse on the other hand is “the actual or threatened physical intrusion of a sexual nature, whether by force or under unequal or coercive conditions.” SEA is therefore a form of gender-based violence and generally refers to acts perpetrated against beneficiaries of a project by staff, contractors, consultants, workers and Partners.

Sexual harassment occurs between personnel/staff and involves any unwelcome sexual advance or unwanted verbal or physical conduct of a sexual nature.

6.5.3 Highlights of Key Issues of GBV

Gender-Based Violence (GBV), is one of the most oppressive forms of gender inequality, posing a fundamental barrier to the equal participation of women and men in social, economic, and political spheres. GBV affects both men and women, but women are much more vulnerable because violence reflects and reinforces existing gender inequalities.

Gender-Based Violence (GBV) is a common social problem in Nigeria especially in the Northern parts of Nigeria. There has been an increase in cases of domestic violence, sexual exploitation, forced early marriage, and rape of minors since the spate of Boko Haram insurgency.

Nigeria has experienced persistent armed conflicts and criminalities in recent decades, resulting in a dramatic increase in the number of IDPs streaming into different parts of northern states from the Boko Haram ravaged northeast. The disruption in the socio-economic lives of women and girls

in this region places them at a high risk of all forms of abuse from the insurgents, the security agents and other members of the community.

Apart from the influx of the IDPs into the northwest geopolitical zone of Nigeria, the zone has continued to witness peace and security challenges relating to armed banditry, farmer-herder conflicts, sectarian violence and terrorists' attacks. Notably, while insurgency continues to thrive, delivering protection and support for women and girls has been an ongoing challenge in the humanitarian response, since social structures and support systems are broken down. Moreover, the advent of Covid-19 has also impacted negatively in the northern region. Ranging from tensions in families, stress and depression, increased poverty and the dire need to survive, they have all resulted in underage girls being forced by their guardians and even parents to pay the price for the family; in situations where the girls then return bearing foodstuffs, money, and other supplies from which they benefit. The vulnerable groups are not spared from the harsh reality of slipping from poverty to extreme poverty. Unaccompanied girls and adolescents, single heads of households, child mothers, child spouses, women and girls living with disabilities because of socio-economic difficulties, will do anything to earn a living hence are potential victims for sexual exploitation, survival sex, transactional sex, human trafficking, forced and child marriage. Therefore, social protection and well-being must be seen from a perspective of universalism that is sensitive to difference.

Using the GBV Risk Assessment Tool, the GBV risks on the project is rated as substantial. Anticipated risk factors in the Niger State SAPZ project include; child labour and labour influx; insecurity challenge; lack of capacity of institutions to handle GBV issues; increase in sexual exploitation and abuse; high poverty incidence; and women's potential exclusion from Niger State SAPZ projects due to cultural barriers and religion.

Before now, existing gender-based violence issues found in the northern parts of Nigeria range from early and forced marriages, female genital mutilation, gender inequality and male dominance in households resulting to physical, mental and sexual assaults (rape, coercion and human trafficking). Despite the heightened poverty, illiteracy, unemployment, insecurity and now, blatant abuse of health and reproductive rights of women and girls in the region, gender-based violence continues to increase and remains underreported because of strict gender norms, culture, social stigmatization, religious beliefs, ignorance/illiteracy and lack of capacity of institutions to handle the issue.

Nigeria is one of the most populated countries in Africa with a fairly large number of women illiterates particularly in the northern part of the country. Education's relevance to social and economic development cannot be overemphasized. It improves capabilities and is strongly associated with various socioeconomic variables such as lifestyle, income, and fertility rate for both individuals and societies.

More importantly, in the past, one major factor amongst many militating against girl child education is cultural biases. Strong cultural expectations dictate that women ascribe to certain gender roles. For example, they are not allowed to participate in certain physical activities, meetings, livelihoods etc; all of which reduces their right to make decisions. Notably, the Demographic Health Survey 2018 (DHS) report showed that women's participation in decision making increases with increasing education and wealth.

In 2003, Nigeria passed a Child's Rights Act that was designed to incorporate into its laws all the rights guaranteed in the United Nations Convention on the Rights of the Child. Though the U.N. convention was signed and ratified by Nigeria as a nation and its provisions incorporated into federal law, all but one of the states that have not incorporated the U.N. convention into its local laws are in northern Nigeria, where child labour is common. Also, laws against gender-based violence such as the Violence Against Persons Prohibition (VAPP) Acts have not been passed by most of the Northern states hence weak legal sanctions for perpetrators is a challenge.

The prevalence of child labour is a major concern as child-headed households and orphans have increased over time. The presence of Alimajiri and out of school children also poses a greater risk for child labour on bank projects mainly because "Those subjected to child labour are under the control and mercy of their masters as they rarely have access to education and are subjected to physical, sexual and psychological abuse. Also, sex for trade is not ruled out for the underage girls by their guardians and even parents, where the girls then return bearing foodstuff, money, and other supplies from which they benefit. Other project risks factor for SAPZ includes the use of security agency and lack of capacity for Niger State SAPZ company to effectively address GBV risks on the project. Project contracting a security agency creates a very risky power differential where armed personnel can engage in harmful behaviour to exploit women and children.

Existing Risk Management Systems/Gaps

Based on the experience, the Niger State SAPZ company already has developed several measures to ensure the protection of people and communities it works with, including mechanisms to limit,

report and respond to potential cases of sexual exploitation and abuse and sexual harassment cases as outlined below:

- a) ***Niger State SAPZ policies on SEA/SH:*** The Niger State SAPZ has policies that provide for protection of workers and the community against SEA/SH. Contractors are required to have in place a social safeguard Policy that protects workers and community members against SEA, sexual harassment, gender, child abuse, recruitment and anti-retaliation. Any act of SEA constitutes serious misconduct and is a ground for disciplinary measures, including summary dismissal and referral to enforcement authorities for criminal prosecution, where appropriate. The policies on SEA cover acts which occur at or away from the workplace, during or outside working hours, including sexual relations with children (under the age of 18), survival sex, sex for employment, goods assistance or services for sex, including prostitution. Implementation of SEA/SH activities on the SAPZ project will be guided by these policies and the established systems and procedures. It will be a contractual requirement for the contractor to have in place a policy on SEA/SH for regular compliance monitoring. It will also be a responsibility of the supervision consultant to ensure that applicable policies on SEA/SH are in place, monitor compliance with the policy provisions and apply penalties as provided for in the contract in case the contractor does not comply.
- b) ***Code of Conduct:*** It is mandatory for all contractors to ensure all workers sign a Code of Conduct (CoC) that specifies appropriate behavioural conduct, responsibility and penalties for non-compliance with SEA/SH, among other social misconducts. The Niger State SAPZ company supports contractors to develop CoCs with clauses on SEA/SH compliance and ensures that they enforce the codes. The CoC prohibits sexual relations with minors, subordinates, vulnerable groups, and protects them against various forms of sexual harassment in the workplace. The CoC is translated into local languages and explained to workers in languages that they understand. Communities will also be made aware of the CoC provisions during sensitizations.
- c) ***Gender Mainstreaming Management:*** Gender mainstreaming is intended to uplift the social and economic status of both men and women. This would be based on gender impacts identified by the project and will include gender enhancement and mitigation measures. It would also include assessment of vulnerable groups within the communities, the Project Affected Persons and the proposed differentiated impact mitigation and

enhancement measures to be put in place. To ensure ‘gender equality is sustainably anchored within Hub as part of all regular procedures and a culture,’ key questions have been developed to serve in screening investors towards gender mainstreaming.

Table 6.4: Key Questions for SAPZ company’s Gender Mainstreaming

Issue	Guiding Question
Gender mainstreaming support structure	<ul style="list-style-type: none"> o Does the organization already have a gender mainstreaming support structure? o If so, is it capable of fulfilling all its tasks successfully (e.g., regarding its structure, resources, competences, position within the organization)? o If not, what structure is appropriate in terms of its tasks as well as the resources available? o Which approach works best to successfully establish an effective support structure?
Gender equality Objectives	<ul style="list-style-type: none"> o Does the organization have established and well-defined gender equality objectives? o Which gender equality objectives are both ambitious and realistic for the organization to pursue? o What is the most effective and practicable way of developing and agreeing on gender equality objectives?
Communicating gender Mainstreaming	<ul style="list-style-type: none"> o Are all staff members aware of the intended process of organizational change? o Are they well informed about both the planned activities, the reasons behind these and the aims of this process? o What ways of communicating gender mainstreaming work best to ensure transparency and commitment? o Is the Organization’s public relations work gender sensitive in terms of language and illustrations?
Gender mainstreaming methods and tools	<ul style="list-style-type: none"> o Have gender mainstreaming methods and tools already been developed and applied? o What has worked well and what hasn’t? o In accordance with the Organisation’s regular practices, what are suitable methods for implementing gender mainstreaming? o How and by whom should respective tools be developed? o What are potential ways to introduce these?
Gender equality Competence	<ul style="list-style-type: none"> o Are all staff members committed to gender mainstreaming? o Are they performing their respective tasks and following the rules of procedure to effectively implement gender mainstreaming? o Do all staff members have the gender expertise and methodological skills they need to fulfil their responsibility for implementing gender mainstreaming? o Which skills and knowledge need to be developed? o What is the best approach to developing gender equality competence that will serve to strengthen commitment?
Gender information	<ul style="list-style-type: none"> o Is information on gender issues available and easily accessible for staff members?

management system	<ul style="list-style-type: none"> o What information is needed but missing? o Are all statistics produced or used by the organization gender disaggregated? o What is an effective way of collecting and disseminating all information and data that is needed to ensure the well-substantiated implementation of gender mainstreaming?
Gender equality action Plans	<ul style="list-style-type: none"> o Have all units of the organization analyzed gender issues in their fields of activity, operationalized gender equality objectives and developed approaches for addressing gender issues? o What is an appropriate way to initiate and develop gender equality action plans to achieve this?
Equal opportunities within the organization's Personnel	<ul style="list-style-type: none"> o What is the gender balance among staff throughout the organisations different levels and fields of activity? o Does the organization have an equal opportunity plan to promote equal opportunities among its staff? o What is an efficient strategy to promote equal opportunities within the organization?
Monitoring and steering organizational change	<ul style="list-style-type: none"> o Does the organization have regular methods and procedures for monitoring and? o steering organizational processes? o How will the process of organizational change towards gender mainstreaming? o be steered, and the progress monitored in an effective way?

d) ***Establishment of a reporting mechanism:*** The Niger State SAPZ company has developed a strong SEA/SH reporting protocol that provides for timely and safe reporting of SEA/SH incidences. The protocol, guided by a survivor centric approach outlines professional standards and work ethics for the protection of women and children, including confidentiality, consent, safety and also outlines the roles and responsibilities of the key actors i.e. The Niger State SAPZ company, supervising consultant, contractor and other government line ministries and NGOs. Any dedicated Grievance Redress Mechanism (GRM) entry point/person who receives information on alleged incidence of SEA/SH must report to the appropriate authorities within 12 hours of the receipt. The Niger State SAPZ is to update and adopt referral pathways for the project area. These will be promoted and adopted by the proposed project.

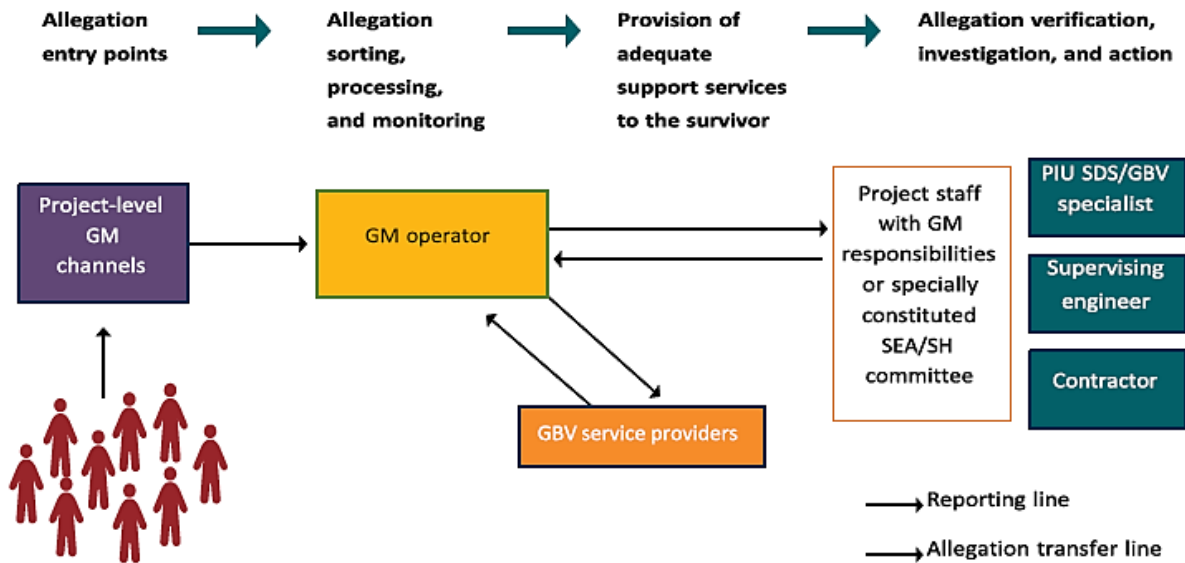


Figure 6.2: Reporting Mechanism

ACTION PLAN

This section details the specific measures for mitigating SEA/SH risks under the SAPZ project. These include the mitigation measures already in place as well as steps to be undertaken to further mitigate and respond to risks and cases/allegation of GBV/SEA in the project sites.

Table 6.4: GBV Including SEA/SH Prevention and Response Action Plan

S/N	Activity to Address SEA/SH risk	Steps to be taken	Timelines	Responsible	Monitoring (Who will monitor)	Output indicators	Estimated Budgets (Naira)
1.	<i>Sensitize the IA on the importance of addressing SEA/SH on the project, and the mechanisms that will be implemented</i>						
	Training Project (Management/leadership) on SEA/SH to include a. Accountability and response framework b. Responsibilities and reporting c. Confidentiality and whistle blower protection clauses	<ul style="list-style-type: none"> • Develop ToR • Secure technical expertise, • Prepare the training module and materials • Conduct training for targeted members of the management team and members of the project • Include SEA/SH as an agenda in quarterly meetings 	Quarter 1 following signing of the works contract Quarterly (Throughout Project implementation.)	<ul style="list-style-type: none"> • SAPZ • Regulators 	SAPZ	<ul style="list-style-type: none"> • Number of training conducted • Number of Project (Management/leadership) members trained 	20,000,000
2.	<i>Conduct GBV/SEA assessment at project site</i>						
	Conduct a GBV/SEA risk assessment in project area to inform risk mitigation strategies	<ul style="list-style-type: none"> • Regulatory bodies to conduct the assessment • Conduct a desk review of GBV/VAC in refugee hosting districts for hosting communities. 	First quarter after signing works contract	<ul style="list-style-type: none"> • SAPZ • Regulatory bodies • Environmental consultant 	SAPZ	GBV/SEA risk report	25,000,000
3	<i>Map out GBV/SEA prevention and response service providers</i>						
a.	Delivery GBV/SEA/SH interventions by a qualified service provider	<ul style="list-style-type: none"> • Develop TOR for the Regulatory bodies • Procure qualified service providers to conduct the assessment 	First quarter after signing works contract	SAPZ	SAPZ	GBV/SEA Nominated service provider in place	100,000,000 The budget is for the NSP (NGO services)
b.	Map out and review capacity and quality of GBV/SEA/VAC service Providers in the project area	<ul style="list-style-type: none"> • Review World Bank and UNHCR reports on existing and capacity service providers • Conduct field visits to identify and map out key actors and service providers on GBV/SEA 	First quarter after signing works contract First quarter as part of the baseline data	<ul style="list-style-type: none"> • NSP • SAPZ project staff • Contractor • GBV/SEA Specialist 	SAPZ	Status Report	NSP Budget

		in project area and collect data at the community/sub county level.					
c.	Stakeholder consultations	<ul style="list-style-type: none"> • Develop interview/ facilitation guides • Conduct stakeholder meetings/FGDs • Conduct regular SEA/SH safety audits • Prepare field visit reports 	<p>Prior to initiating construction.</p> <p>Maintained throughout Project implementation.</p>	<ul style="list-style-type: none"> • SAPZ Project Staff • Contractor 	SAPZ	Number of stakeholder consultations done	Contractor's Budget
d.	Develop and or/update a multi-sectoral GBV/SEA referral pathway(s) in line with the National Systems and guidelines developed.	<ul style="list-style-type: none"> • NSP to undertake a review of guidelines for referral of GBV cases • On the basis of mapped GBV/SEA prevention and response service providers develop/update a GBV/SEA/VAC referral list for service providers. • Disseminate the referral pathway/list to stakeholders including service providers 	<p>First quarter after signing works contract</p> <p>Maintained throughout project implementation.</p>	Contractor	SAPZ in strong coordination with Niger state and national systems.	<p>Referral pathway developed/updated</p> <p>Number/type of GBV/SEA preventive and response services available.</p> <p>No. of referrals of SEA/SH incidents to the project GRM by other service providers</p>	Contractor's budget
4.	<i>Strengthen Institutional capacity for GBV/SEA risk mitigation and response</i>						
a.	Engage/hire a GBV/SEA Specialist in SAPZ company to supervise and provide technical support for the implementation of GBV/SEA Action Plan	Procure services of a qualified and competent GBV/SEA specialist to supervise and provide technical support for the implementation of GBV/SEA in projects. SAPZ has social development specialists that have been supporting GBV activities in its projects and these will support initial phases of the project	In the first Quarter after contract signing	Project Management	SAPZ	Qualified GBV specialist hired	-

		before the GBV specialist is hired					
b.	Support capacity of local systems to prevent and respond to GBV/SEA (police, health, legal, CDO's, CBO's) i)Strengthen the reporting mechanisms & procedures of local systems ii)Strengthen a survivor centered referral and response. iii)Strengthen coordination for better services with local/national GBV/SEA service providers	<ul style="list-style-type: none"> Identify key stakeholders to engage Develop training plan Develop training material/content using global/national standards, human rights and survivor centered approaches Conduct training and mentoring Conduct regular coordination meetings with service providers for effective referrals 	Maintained throughout Project implementation.	Project Management Specialized NGOs	SAPZ in coordination with relevant authorities	<p>Number of trainings conducted</p> <p>Number of coordination meetings conducted</p> <p>Level of satisfaction of GBV/SEA survivors with services received</p> <p>Level of Community awareness about GBV and SEA referral pathway</p>	50,000,000
5.	<i>Integrate GBV/SEA risk management in Contractors' Environment and Social Implementation Plan (ESIP)</i>						
a.	Incorporate GBV/SEA risk in the Contractor's Environment and Social Implementation Plan (ESIP)	<ul style="list-style-type: none"> Integrate GBV/VAC considerations in the Contractor's Environment and Social Implementation Plan (ESIP) 	Quarter 2 after signing of the works contract during project implementation.	Contractor	SAPZ	Updated ESIP with GBV	Contractor's budget
b.	Develop and establish/review SEA/GBV response and accountability framework to include: Allegation Procedures to report SEA/GBV incidents and internally for case accountability procedures which should clearly lay out confidentiality	<ul style="list-style-type: none"> Develop/review SEA/GBV Allegation Procedures to report SEA/SH issues Inform employees and the community on how to report cases of SEA/SH, CoC breaches to the GRM, and how such cases are handled Develop mechanisms to hold accountable alleged perpetrators; disciplinary action 	<p>Quarter 2 after signing of works contract</p> <p>During project implementation</p>	SAPZ Project Staff Contractor	SAPZ	An established and functional accountability framework	

	requirements for dealing with cases	for violation of the CoC by workers.					
6	<i>Review the IA's capacity to prevent and respond to GBV/SEA</i>						
a.	Review for attention to GBV/SEA: a. Human resource manuals and staff capacity. b. Existing GBV/SEA Policies and procedures. c. Project code of conduct.	<ul style="list-style-type: none"> Capacity assessment of implementing agency Review SAPZ ESMS and procedures/Guidelines Review the SAPZ Referral Pathways and reporting mechanisms Review Project Frameworks to identify GBV/SEA policies and procedures. 	<p>During the first Quarter of Contract signing</p> <p>To continue during Project Implementation</p>	Project Management GBV Specialist	SAPZ	GBV/SEA prevention and mitigation measures addressed in policy documents Establish how the referral pathway will be strengthened	To be financed as internal SAPZ activity
7.	Establish partnerships with CBOs/CSO's and local government institution	<ul style="list-style-type: none"> Identify and select partners and officially inform them Engage partners, conducting joint community meetings and awareness raising 	<p>Quarter 1 of contract signing</p> <p>Maintained throughout Project implementation</p>	SAPZ Project staff GBV Specialist	SAPZ	Number of partnerships formed	GBV Specialist's budget
8.	Develop/Review GRM for specific GBV/SEA/SH procedures	<ul style="list-style-type: none"> Undertake internal review of GRM for GBV/SEA mitigation Integrate GBV/SEA entry points within the GRM with clear procedures 	Quarter 1 after signing of works contract	SAPZ	SAPZ GBV/SEA Specialist	GRM with GBV/SEA procedure integrated In the GRM	
9.	Incorporate GBV/SEA/Requirements and expectations in the contractor and consultants' contracts.	<ul style="list-style-type: none"> Ensure that GBV/SEA issues are incorporated in all contracts signed by contractors and consultants 	During project implementation.	SAPZ	SAPZ	GBV/SEA standards in procurement/contract document	
10.	Provide separate facilities for men and women and display signs, posters and pamphlets around the project site that signal to workers and the	<ul style="list-style-type: none"> Provide separate facilities Design and print pamphlets and posters. Distribute the pamphlets and posters to the project site 	<p>In quarter of Contract signing</p> <p>During project implementation</p>	Contractor	SAPZ	Separate toilet and shower facilities for men and women Display signs/IEC materials	Covered under Contractor's Cost and IEC materials

	community that the project site is an area where GBV/SEA is prohibited	<ul style="list-style-type: none"> • Install signage on the facilities Visit Project gangs/camps to check on the availability and usability of separate sanitary facilities. 					
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6.6 Grievance Redress Mechanism

6.6.1 Introduction

The grievance redress mechanism is anchored on the need to provide a forum locally to receive, hear and resolve disputes arising from project implementation in the best interest of all parties to prevent the lengthy process of litigation, which could affect the efficiency and effectiveness of dispute resolution.

Therefore, the setting of grievance redress committee early during the project's preparation is imperative.

Grievances may not be limited to but can arise from any of the following: 1) involuntary resettlement and compensation issues, 2) violence, 3) exclusion from project benefits and non-compliance of the contractor to the agreement reached with SPIU or the community.

6.6.2 Setting up a Grievance Redress Committee

Channel 1: GRC at the Site/community Level:

The first channel for filing grievance shall be the district heads. The underlying merit is that the community heads leadership system has proven a cordial and notable channel for conflict resolution in the project areas. The district head shall head this committee while membership of the committee will consist of:

- The community head or a person appointed by him from his council,
- Secretary to the district head
- The village/ward head,
- The Woman leader in the community or her secretary,
- 2 Representatives of PAPs in the project,
- 2 members of the road maintenance committee

GRC at the SPIU Level:

The second channel for filing grievance shall be at the level of the project's SPIU. The state project coordinator shall constitute a team within the SPIU to receive, hear and address complaints that are not resolved by district level GRCs at district level. The team will be headed by the Social and Livelihood Officer. The SPC shall head this committee while membership of the committee shall be as follow:

- Social Safeguard Officer,
- Communication officer/ Public relations officer,

- Environmental officer,
- Monitoring and Evaluation officer, and
- The project Engineer
- A witnessing NGO

Informing Parties on Levels and Channels of Grievance Uptake

Community members have been sufficiently informed during public consultation meetings held across the project areas that there will be 3 levels at which aggrieved persons can channel his/her complaints for redress. Grievance redress shall be funded by the SPIU so that there shall be no cost to the aggrieved/complainant for redress. These shall include: 1) the project site/community level, 2) the State Project Implementation Unit level and 3) the State Project Monitoring Committee level. PAPs have also been informed that it is their right to seek redress in the court of law as the last resort, if they felt dissatisfied with the judgments obtained from the grievance redress committees set up by this project.

Grievance Redress Procedure

The procedure for addressing potential grievance arising from this project shall involve the steps described in the grievance log shown below:

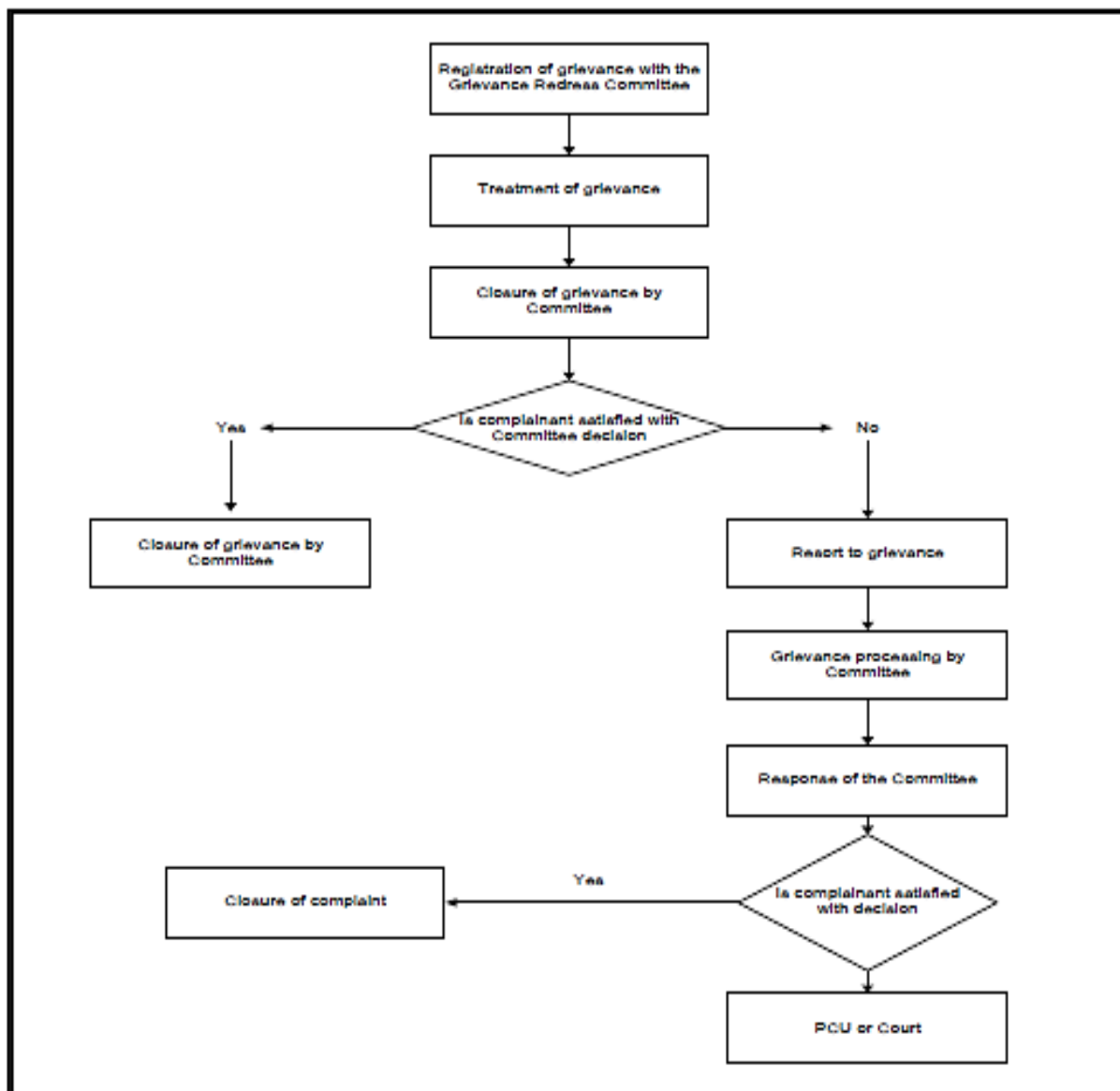


Figure 6.3: Grievance Log showing steps for grievance redress

As shown in the grievance log, an aggrieved PAP will have the opportunity to lodge complaint with the GRC at the residence or palace of the community district head. That will be the first channel of grievance uptake. It is expected that the matter should be addressed and determined within 10 days from date of receiving the complaint. If a complainant feels dissatisfied with the outcome of the closure of the matter by the community GRC, he/she is encouraged to go to the higher channel for redress.

Steps for grievance redress shall involve:

i. Registration

The secretary of the committee will receive grievance from the complainant, register and acknowledge receipt of grievance to the grievant within 2 days. The registration will capture the following data: name of the complainant, date of the grievance, category of the grievance, persons involved, and impacts on complainant life, proofs and witnesses. A registration form will have all these bits of information.

ii. Treatment of Grievance

This involves the verification of grievance to determine among other things whether the matter has relationship with the project activities, and whether the matter can be handled/resolved at the level where it is presented. This will determine if the matter should be referred to the next level or not. Part of the investigations may also be to assess the cost of lost or risk involved in the grievance.

iii. Closing of the Grievance or the Processing of the matter

This involves options and approach taken to resolving the case. This may involve site visit for physical inspection and determination of the claim, negotiation with the aggrieved PAP and feed back to the parties involved.

iv. Feed back

All responses to the complainant in a grievance redress process that moves beyond a unit level must be communicated in writing and/or by verbal presentation to the complainant. This will include a follow up on the corresponding authority where cases are referred, to ascertain the status of reported cases.

Feedback on outcome of each case should get to the complainant through the secretary of committee or social contact/safeguard person as the case may be. It is expected that reported complaints at each level will be resolved and determined within 10 days from date of receipt of the complaint.

Financing of the Grievance Redress Mechanism and Cost of Remediation

The proponent shall be responsible for the funding of logistics for the GRC as well as the eventual compensation or resettlement remediation that aggrieved party may be entitled to. The proponent will also be responsible for the cost of the judicial process for cases that result to court for adjudication. The anticipated cost of GRM is 5% of the project mitigation cost. The implementation plan for the GRM is shown in *Table 6.5*.

Table 6.5: Implementation plan for grievance mechanism

Steps	Process	Description	Completion Time Frame	Responsible Agency/Person
1.	Receipt of complaint	Document date of receipt, name of complainant, village, nature of complaint, inform the SPIU	1 day	Secretary to GRC at project level
2.	Acknowledgement of grievance	By letter, email, phone	1-2 days	Social safeguard officer at SPIU
3	Screen and Establish the Merit of the Grievance	Visit the site; listen to the complainant/community; assess the merit	5-10 days	GRC & social safeguard officer & the aggrieved PAP or his/her representative
4	Implement and monitor a redress action	Where complaint is justified, carry out resettlement redress in line with the entitlement matrix/OP 4.12	14 days or at a time specified in writing to the aggrieved PAP	PC-PIU and Social safeguard Officer
5	Extra intervention for a dissatisfied scenario	Review the redress steps and conclusions, provide intervention solution	10 days of receiving status report	PC-PIU
6	Judicial adjudication	Take complaint to court of law	No fixed time	Complainant
7	Funding of grievance process	GRC logistics and training, redress compensation, court process	No fixed time	The proponent

CHAPTER SEVEN

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

7.1 Introduction

The environmental and Social Management Plan involves environmental and social control and mitigation measures, monitoring programs, and responsibilities which must be developed based upon an assessment of environmental and social risks for the proposed project.

7.2 Objective of the ESMP

The main objective is to provision a framework for implementation of the measures identified in the impact assessment analyzed in order to avoid, mitigate or offset adverse environmental and social impacts and to minimize and manage risks on the environment, project personnel and local communities. The following are detailed objectives of the environmental and social management Plan targets;

- Defining Contractors roles and responsibilities,
- Outlining how Niger State SAPZ will monitor, review and supervise Contractor's performance,
- Ensuring environmental protection of the highest achievable level,
- Ensuring high standard in working conditions,
- Assisting the Contractor,
- Implementation of mitigation measures
- Preventing possible environmental damages or damages to third parties' properties
- Ensuring environmental protection to the highest achievable level
- In ensuring that all works complies with the National Investment HSE Policy, national legislations, best International practice and all relevant SAPZ Environmental and Social Guidelines and Policies
- In identifying the possible hazards that relate to the work process and to assume appropriate measures for the reduction of risks

7.3 Implementation Arrangement

The project will be managed by the Niger State SAPZ company, Project Implementing Unit (PIU) within close collaboration will the Inter-ministerial Steering Committee. The Project will have an Environmental and Social Management Team that oversee environmental and social performance and compliance with legal and policy requirements including the SAPZ company's Guidelines and Policies. The Team will include an Environmental Compliance Officer and a Community Liaison

Officer. The Team will be responsible for implementation of the Environmental and Social Mitigation and Management measures as well as oversee performance of contractors as prescribed in the Project's Environmental and Social Management Plan.

7.4 ESMP Roles and Responsibilities

The Niger State SAPZ company is responsible for the detailed design, procurement, construction and operation of the Special Agro-Industrial Processing Zone Project. In due course, will issue technical invitation to bid documents for the various elements of the construction work scope.

As Project Owner, the Niger State SAPZ company will have the ultimate responsibility for implementing the ESMP, which will include:

- Management of environmental and social issues as detailed design proceeds
- Monitoring and assessment of the Contractor's' HSE (including labour and working conditions) performance
- Assisting the Contractor in implementing the ESMP and topic special management plans
- Acting as a point of contact for consultation with Authorities and stakeholders
- Environmental and social compliance monitoring and reporting.
- Activities that ensure that Contractors will be deployed in accordance with Project standards and regulations.
- Recording of compliance and non-compliance with the provisions of the ESMP.
- Ensuring the compilation of required periodic environmental reports for submission to the FMEnv
- Ensuring that there are sufficient resources (time, money and people) to manage the implementation of the ESMP.

The construction contractors will be required to develop and implement their own Construction Phase management plans for the SAPZ Project, which will meet or exceed the requirement of Niger State SAPZ company's HSE MS. The company's existing and updated HSE MS will form the framework for managing social and environmental issues throughout construction, prior to the operation of the SAPZ facilities. The aforementioned HSE MS will be used to deliver the Project ESIA commitments and coordinate and review the environmental and social performance of the

Project at both the construction stage and operational stage. Special consideration will be given to the following:

- Practical training and raising the environmental and social awareness of personnel,
- Supervision and monitoring of environmental and social issues in the field; and
- Continuous improvement of environmental and social performance throughout the Project.

The Contractor will be responsible for:

- Comply with all national laws, rules and regulations concerning environmental protection and with all permitting terms,
- Demonstrating how requirements will be implemented during the construction,
- Demonstrating commitment to the company's ESMP, topic specific management plans and HSE MS at all levels, including subcontractors,
- Produce a Contractor's ESMP in accordance to Niger State SAPZ company's ESMP and HSE MS,
- Follow up of legislative and regulative frame development and comply with them,
- Update this ESMP, if required.

As part of Niger State SAPZ company's responsibility, the Environmental Officer

- Will be required to conduct weekly inspections of all workplaces.
- Any other construction areas for which the contractor is responsible at each of the aforementioned sites, the Contractor Environmental Officer will be required on a daily basis to check as per the following table where relevant.

Niger State SAPZ company's Environmental/ and the Contractor's Environmental Officer will be responsible to provide Environmental or HSE training to all project personnel on potential environmental issues of the project. Contractors shall prepare a project specific training manual for this purpose. Contractors are also required to provide induction training/briefing to all their staff before the commencement of any activities within the project area of influence.

7.5 EHS Management Plan to be Developed for the Project Include:

- Development of an Environmental Health and Safety Plan
- Development of a Project Specific Emergency Response plan
- Development of a Project Specific management Plan
- Development of a Spill Contingency Management Plan
- Completion of a "Bridging" process with contractors to evaluate their EHS procedures.

7.5.1 Development of an Environmental Health and Safety Plan

A Health and Safety Plan will be prepared for the construction, operation and decommissioning phases of the project to ensure compliance with the Ministry of Health Guidelines for Occupational Health and Safety and IFC guidelines.

To ensure its employees' health and safety, the SAPZ plan will address the following topics:

- Safety device to protect employees from injuries or hazardous conditions,
- Safe drinking water,
- Immunizations, as applicable,
- Clean eating area,
- First aid facilities,
- Sanitary conditions,
- Waste management, including bathrooms, and proper disposal procedures,
- Appropriate signage,
- Fire prevention facilities, training, and awareness; and
- Personal Protective Equipment (PPE).

A safety specialist assigned by SAPZ will be responsible for the preparation, implementation and maintenance of a comprehensive safety program, which will be periodically evaluated. The safety specialist will be provided with written safety instructions including instructions on correct storage handling and disposal of hazardous waste and written contingency Plans / guidelines of action for accidents, spills, and fire. The responsibility of the safety specialist includes performing safety training and conducting safety inspections, sessions and practice. The safety specialist will also be responsible for the investigation of accidents. A safety committee should be formed by SAPZ and regular safety meetings should be organized.

7.5.2 Development of an Emergency Response Plan

An Emergency Preparedness and Response Plan (EPRP) will be prepared to assist project staff in effectively responding to emergencies associated with project hazards. The EPRP will comply with the IFC Occupational Safety guidelines and performance standards. The EPRP will include:

- Roles and responsibilities of emergency personnel,
- Emergency contacts and communications systems/protocols, including procedures for interaction with local and regional emergency authorities,
- Specific emergency response procedures,

- Design and implementation of an emergency alarm system audible across the entire site at the sub-stations,
- An evacuation plan will be read and practice by all employees and contractors. The evacuation plan will include emergency escape routes, procedures for accounting for employees after an evacuation, and roles and responsibilities of personnel during an evacuation,
- Identification of supplies and resources to be utilized during an emergency event, including emergency equipment, facilities, and designated areas; and
- A training plan, which includes specific training and drill schedules for personnel
- Who are responsible for rescue operations, medical duties, spill response, and fire response?

If an emergency develops, all persons on site will be notified immediately and efforts will be coordinated with others in the vicinity surrounding the project area in order to reduce impacts, if applicable. All necessary authorities will be immediately notified. If an emergency is imminent, but has not yet begun, steps will be initiated to immediately advise person in the vicinity of the emergency to evacuate and notifications will be made and all other authorities which have responsibility regarding the emergency.

If there is a slowly developing emergency or unusual situation where an emergency is not imminent, but could occur if no action is taken, project personnel will notify the necessary authorities of the potential problem and keep them advised of the situation. These agencies will be requested to indicate if there are any immediate actions that should be taken to reduce the risk or severity of the emergency and if necessary, what preventative actions will be implemented. In an emergency situation, equipment and supplies will be needed on short notice. Therefore, the SAPZ will maintain an accurate inventory of emergency response equipment and supplies.

The EPRP will include an evacuation plan which will be read and practiced by all employees and contractors. The evacuation plan will include emergency escape routes, procedures, for accounting for employees after an evacuation, and roles and responsibilities of personnel during an evacuation.

In general, the following evacuation procedures should be followed:

- Alert the Emergency Response Team to assist in the evacuation.
- Use communications tools that are appropriate for the type of incident and the time of occurrence, such as alarms or loud speakers.

- When communicating an evacuation, speak clearly and succinctly: “we have a [state the type of emergency]. Evacuate to [state the assembly point]”.
- Turn equipment off, if possible.
- Take emergency supplies and staff roasters, if possible.
- Account for personnel.
- Wait at the assembly point for further instructions.

The ERPP will have specific information on the fire safety and explosion response, which will provide additional details specific to these emergencies.

7.5.3 Development of a Waste Management Plan

The SAPZ company will develop a project specific waste management plan to ensure that all waste for the project activities are properly managed in accordance with applicable laws and regulations, and international standards relevant to the power distribution industry. The waste Management Plan will include:

- Description of the types of waste that will be generated
- Waste minimization opportunities
- Waste management methods
- Good housekeeping practices, including manifest and waste tracking forms

The following general categories of waste are anticipated to be generated from the project at this time:

- Hazardous waste such as construction wastes and debris from exaction materials, unused paint, lubricant, batteries, or similar chemicals that exhibit flammability, corrosive or reactive characteristic
- Liquid waste discharged such as sanitary wastewater and gray water, macerated food waste
- Solid wastes, such as packaging materials, containers, used PPE
- Special and recyclable waste, e.g., Batteries, used oil, paper aluminium cans, fluorescent light boils, mercury light builds
- Domestic waste, e.g., refuse

The plan will specify the proper storage, handing and disposal procedures for each waste identified.

During the construction phases, these will be generation of construction debris as a result of various construction activities. The generate materials will be used for reclamation purposes whenever applicable. Nevertheless, care will be taken to ensure the absence of contaminated fill material and

the adequacy of the physical and chemical properties of such material to limit potential adverse impacts on water and soil and ensure the safety of the project. Construction waste will also be minimized through careful planning during the design stage, whereby reducing or elimination overpowering of construction materials to decrease waste generation and reduce project costs (cost of surplus materials). Sorting of construction and demolition waste will be encouraged, as well as, adoption of a re-use/recycle program on site whenever deemed feasible.

Chemical waste generated include containers that were used for storage of chemical waste on site, the chemical residue as well as contaminated material. These materials will be segregated as hazardous and non-hazardous and properly stored and disposed of. Storage will be place in a separate area t6hat has an impermeable floor, adequate ventilation and a roof to prevent rainfall from entering. In addition, all chemical waste must be clearly labelled in English, stored in corrosion resistant containers and arranged that incompatible materials are adequately separated. There will be a prior agreement with the FMEnv for the disposal hazardous waste generated.

General refuse will be stored in enclosed bins or compaction units separate from construction and chemical waste. An agreement will be drafted with a solid waste collector certified by the FMEnv to identify collection sites and schedule the removal to minimize odour, past infestation and litter build-up. The burning of refuse on the construction site will be strictly prohibited and penalized. General refuse is generated largely by food service activities on sites, so reusable rather than disposable dishware will be promoted id feasible. Aluminium cans will be recovered from the waste stream by their storage collectors if they are segregated and made easily accessible, so separate, labelled bins for their storage should be provided if feasible. Janitorial services will be assigned for upkeep of project sites during construction phase.

7.5.4 Spill Contingency Management Plan

The SAPZ company will prepare and implement a spill contingency management plan that identifies this procedure to prevent, contain, clean-up, and report spill and release of fuel oil and their hazardous materials. Mitigation measure to prevent contamination from hazardous materials are primarily aimed at preventing their release into the environment in the first place and will include:

- Keeping equipment maintained.
- Inspecting equipment and containers for spill and leaks, corrosion, or other signs of deterioration

- Maintaining spill response equipment near material storage areas and on heavy equipment.
- Training employees on material storage, transfer, and transportation procedures, spill response procedures, and reporting requirements.

If a fuel spill occurs at the project sites, prompt action will be taken to contain the leakage or spillage in the event of a spill of leak, all combustible, flammable, and ignition sources (such as running engines) likely to result in a fire will be removed from the vicinity of the spill and anyone in the area will be advised to stay upwind. Spill kits will be kept at the project sites and the transport vehicles to readily clean up small spills. Large spills will be contained by constructing a berm around the spill area to control runoff to surface water.

All soil contaminated by previous spills will be excavated and disposed of in accordance with the SAPZ company hazardous waste management procedures.

7.5.5 Contractor Management

SAPZ company will expect its contractors to follow IFC Guidelines for Occupational Health and Safety and Environmental Management. SAPZ company will issue a set of Environmental, Social, Health and Safety safeguards to the construction contractor to follow, which include standards that are expected to be followed and programs that the contractors are expected to have in place (e.g. Environmental Health and Safety Management System).

7.5.6 Air Quality: Generation of Air Emissions From Disturbance

Control techniques for minimizing temporary particulate matter (PM) emission during construction will involve watering of surfaces, chemical stabilization, or surface wind speed with windbreak or source enclosures. Furthermore, surface improvements offer long-term control techniques. These includes covering the road surface with a new material of lower site content, such as covering a dirt road with gravel or slag. Also, regular maintenance practices, such as grading of gravel roads, help to retain larger aggregate size on the travelled portion of the road and thus help reduce emissions. The amount of emissions reduction is tied directly to the reduction in surface site content.

Other mitigation measures include, maintaining good housekeeping practices throughout the construction phase. These low-cost measures include:

- Proper site enclosure through appropriate hoarding and screening.
- On-site mixing and unloading operations.
- Proper handling of cement material.
- Maintain minimal traffic speed on-site and on access roads to the tower construction sites.

- Covering all vehicles hauling materials likely to give off excessive dust emissions.
- Ensure adequate maintenance and repair of construction machinery and vehicle
- Avoid burring of material resulting from site clearance
- Cover any excavated dusty materials or stockpile of dusty materials entirely by impervious sheeting
- Proper water spraying when necessary.

7.5.7 Generation of Air Emission from Vehicles And Equipment Engines

In addition to PM generation, emissions will consist of combustion emission from diesel engine-driven electrical generators and vehicles and diesel-driven mobile construction equipment (such as, concrete trucks, dump trucks, excavators, and backhoes). The engines emit primarily CO₂, CO, NO₂, Sox, and HC. Measures to reduce combustion emissions include proper truck and engine maintenance, adoption of a traffic management plan while avoiding congested routes, proper maintenance of construction equipment, and the quality of diesel fuel used. In addition, equipment will be turned off when not in use, while would reduce power needs as well as emissions of pollutants. The supervising consultant will have the responsibility of ensuring the implementation of these measures by the contractor.

7.5.8 Degradation of Water Quality Due To Storm Water Runoff

The removal of vegetation and disturbance of soil in the construction work areas may result in erosion and sedimentation causing increased turbidity in water within the project area.

Additionally, degradation of water quality may occur from pollutants in storm water runoff from material and equipment storage areas and spills and leaks from construction equipment

Special care must be taken to decrease impacts where work is or near the marshland/wetland and mangrove areas so as to keep disturbance of the ecosystems to a minimum.

Prior to commencement of construction activities, SAPZ company will require its contractors to prepare and implement an Erosion and sediment Control Plan. Its purpose will be to assist SAPZ company, its contractor, and subcontractors in the implementation of control measure for storm waste runoff from the transmission line corridor, the substations, and material storage areas to prevent degradation of water quality. The plan will achieve this purpose by specifying the best management practices, required to assess the effectiveness of construction storm water management practices, especially during the rainy season. SAPZ company will demonstrate, to the satisfaction line route will not occur during any stage of construction. Briefly, the erosion and sediment control measures to be implemented during the construction phase of the project include:

- Minimizing land cleaning activities to the tower location work areas, access points, and material storage area
- Minimizing the time of exposure of erodible land exposed to storm water runoff during the rainy season
- Maintaining a riparian management Zone (RMZ) (width 15m 174) between the construction work areas and surface water bodies to filter sediments in storm water runoff
- Covering open stockpiles of construction materials with tarpaulin or similar fabric during rainstorm events to prevent erosion and resultant sedimentation of receiving waters.
- Compacting soil as soon as the tower foundations are formed to prevent erosion, especially during the wet season
- Restoring the construction working areas as soon as possible once construction is complete at each tower location

7.5.9 Degradation of Water Quality Due To Accidental Spills And Leaks

SAPZ company will develop and implement a spill contingency plan to prevent and mitigate spills of oils or hazardous material to surface water bodies and groundwater. Storage of fuel and hazardous material should not occur within 30m of a surface water body. If any pumps are needed for removal of water during tower construction within 30m of marshland/wetland water body. They will utilize proper secondary containment. Oil leakage or spillage will be contained and cleaned up immediately. Spent oil and lubricants will be collected and stored for recycling or proper disposal. In addition, all fuel tanks and chemical storage areas will be provided with locks and located within secondary containment structure. Oil/water separators will be installed at storm water channels to remove oils from contaminated waters such as from workshops.

7.5.10 Soil Contamination and Erosion Due to Erosion

Prior to commencement of construction activities, SAPZ company will implement an erosion and sediment control Plan, SAPZ company will demonstrate, to the satisfaction of the FMEnv that any substantial risk of increased sediment discharges from the project sites will not occur during any stage of the project

Cleaning of vegetation will be limited to where it is strictly needed so as decrease the risk of soil erosion, and Riparian Management Zone (RMZ) (width 15m) between the construction areas and surface water bodies. Unpaved roads will be graded so that to decrease the risk of erosion during rainstorms.

- Soils excavated for tower foundations will be used for re-filling and will not be left exposed to wind or water for long periods
- The contractor will avoid steep terrain during the transportation material by using alternative route or use light vehicles where appropriate
- Heavy machinery will be used as needed in the clearance of construction work areas in order to minimize soil compaction, which makes the soil susceptible for erosion
- Riverine and surface water body associated vegetation will be minimally disturbed during the construction phase to reduce soil erosion and safeguard bank protection
- Disturbed areas will be replanted with local species common in the area complement natural vegetation regeneration to improve cover
- In are prone to soil erosion, suitable sediment binding grasses will be planted in degraded substrates.

7.5.11 Noise Management

Typical mitigation measures that will be enforced during construction to minimize noise levels are:

- Effectively utilizing material stockpiles and other structures, where feasible; to reduce noise from on-site construction activities
- Choosing inherently quiet equipment
- Operating only well-maintained mechanical equipment on-site
- Keeping equipment speed as low as possible
- shutting down or throttling down to minimum equipment that may be intermittent in use, between work periods
- Utilizing and properly maintaining silencer or mufflers that reduce vibration on construction equipment during construction works
- Restricting access to the site for truck traffic outside of normal working hours
- Utilizing proper site logistics and planning
- Limiting site working hours the morning hour
- Scheduling noisy activities strictly during the morning hours
- Consulting with local communities and informing the locals when noisy activities are planned
- Enforcing noise monitoring

- Enforce the use of hearing protection actively when the equivalent sound level over 8 hours reaches 85 dB(A), the peak sound levels reach 140dB(C), or the average maximum sound level reaches 110db(A)
- Installing warning signs in area high noise levels
- Consider the use of acoustic insulating materials, isolation of the noise source, and other engineering controls to minimize noise impact.

The noise control measure will be included within the construction contracts and be considered as requirements from contractors. The supervising consultant will have the responsibility of ensuring the implementation of these measure.

7.5.12 Biological Resources & Habitat Alterations

The cleaning of vegetation in the construction work areas may have a significant impact on terrestrial habitats especially in areas with tree cover, During the process of installing the transmission touted, there is need to take into consideration the importance of critical habitat including forest patches and wetlands for biodiversity that depend on road side habitats.

Recommended mitigation measure include:

- Limiting vegetation cleaning to the tower locations, access points, and material storage and work areas. The transmission line will be installed within the existing SAPZ company ROW whenever possible in areas where diversion from the old ROW is deemed necessary, all care will be taken to minimize disturbance and avoid critical habitat
- Installing transmission lines above existing vegetation to avoid land cleaning of the maximum extent possible
- Avoiding construction activities during the breeding season and other sensitive season of time of day
- Re-vegetating disturbed areas with native plant species
- Minimizing vegetation management to selective removal of tall growing trees and plant growth that would negatively affect the transmission lines and equipment
- Utilizing hand cleaning rather than mechanized cleaning whenever practicable
- Removal invasive plant species, whenever possible, and cultivating native plant species
- Avoiding use of machinery in the vicinity of watercourse as much as possible
- Retaining a Riparian management Zone between construction work areas and surface water bodies

- Providing the community priority on use of the removed vegetation for wood-fuel, construction of any other purpose,

7.5.13 Hazardous Materials Management:

SAPZ company will require its contractor to prepare and implement a spill contingency Plan that identifies the procedures to prevent, contain, clean-up, and report spills and releases of oil and hazardous material Mitigation measures to prevent contamination from hazardous materials are primarily aimed at preventing their release into the environment in the first place and will include:

- Storing oil and hazardous materials within secondary containment structures in designated area
- Using portable oil collection pans during refuelling operations
- Storing pesticides and herbicides in designated areas according to FAO Guideline standards any pesticides to be used will be manufactured, packaged, labelled, handled, stored, disposed of, and applied according to standards such as the minimum standards of FAO's Guidelines for packaging and storage of pesticides (Rome,1985), Guidelines on Good labelling practice for pesticides (Rome, 1995)
- Ensuring that no storage of oil and hazardous materials occurs within 30m of a surface waste body
- Keeping equipment maintained
- Inspecting equipment and containers for spill and leaks, corrosion, or other signs of deterioration
- Maintaining spill response equipment near material storage areas and on heavy equipment
- Ensuring all working dealing with such substances are adequately informed about the risks
- Training employees on material storage, transfer, and transportation procedures, spill response procedures, and reporting requirements

The Niger State SAPZ company will keep an accurate inventory of all oil, hazardous material, and waste stored on site and material safety Data sheets will be available for these material.

If a fuel/oil spill occurs at the project site, on any of the access roads to the site, or into a water body or wetland, prompt action will be taken to contain the leakage of spillage. In the event of a spill or leak, all combustibles, flammables, and ignition sources (such as running engines) likely to result in a fire will be removed from the vicinity of the spill and anyone in the area will be advised to stay upwind. Spill kits will be kept at the project site and on the transport vehicles to readily clean up small spills. Large spills will be contained by constructing a berm around the spill

area to control runoff surface water, or deploying a spill boom if the spill is in a water body. All soil contaminated by the spills will be excavated and disposed of in accordance with the SAPZ company hazardous waste management procedures.

7.5.14 Waste Management

During the construction phase, there will be generation of construction debris as a result of various activities. The generated materials will be used for reclamation purposes whenever applicable. Nevertheless, care will be taken to ensure the absence of contaminated fill material and the adequacy of the physical and chemical properties of such material to limit potential adverse impacts on water and soil ensure the safety of the project. Construction wastes will also be minimized through careful planning during the design stage, whereby reducing or elimination over-ordering of construction materials to decrease waste generation and reduce project cost (cost of surplus materials). Sorting of construction and demolition waste will be encouraged, as well as, adoption of a re-use/recycle program on site deemed feasible.

Chemical waste generated during the construction phase include containers that were used for storage of chemical wastes on site, the chemical residue as well as contaminated material. These materials will be segregated and properly stored and disposed of as hazardous waste. Storage will be placed in a separate area, away from the wetland and surface water bodies. The storage will have an impermeable floor, adequate ventilation and a roof to prevent rainfall from entering. In addition, all chemical wastes must be clearly labelled in English, stored in corrosion resistant containers and arranged so that incompatible material are adequately separated.

7.6 Environmental Monitoring Plan

7.6.1 Introduction

The primary object of environmental monitoring is to ensure that mitigation measures are implemented and the potential negative impacts are reduced, minimized to acceptable levels. The primary objective of the Special Agro-Industrial Processing Zone Monitoring Plan includes the following:

- To assess the changes in environmental conditions
- To assess performance and the effectiveness of the mitigation measures adopted
- To determine project compliance with regulatory requirements and adopt remedial action
- To identify potential gaps and promptly implement of corrective measures

7.6.2 Impact Detection Monitoring

Includes periodic sampling to assess the impact of project operations on the environment and human health, and to ensure progress towards minimizing project's negative impact. This is also referred to as Institutional monitoring which be conduct by the project Environmental Officer and team of sustainable staff. The objective of Impact detection monitoring compliance monitoring includes:

- Identify the most probable source,
- Verify the proper implementation of the specified mitigation measures,
- Review the effectiveness of environmental management plans including mitigation measures and propose alternative actions as appropriate

7.6.3 Compliance Monitoring

Compliance Monitoring is conducted to ensure that all project and sub-project activities are in full compliance with the Environmental Protection Agency regulations and standards. It is usually commissioned by a Third-Party Evaluator accredited by the FMEnv. Objectives of the party include;

- To monitor performance and effectiveness of environmental management plans,
- Evaluate project compliance with regulatory requirements,
- Provision of safety at all difference locations of the working area and retention of records,
- Capacity development and training of staff, operators, technicians, staff etc.)
- Adequate analytical instrumentations.

7.6.4 The Receptors Required Monitoring Include

- Air Quality
- Water Resources
- Occupational Health and Safety
- Odour
- Noise Quality
- Soil Quality
- Waste Generation & Management
- Landscape and Visual
- Biodiversity

7.6.5 Summary of Monitoring Program

- Monitoring activities
- Cost and resource requirements;
- Monitoring duration and frequency,
- Monitoring location
- The party incurring the cost
- Party required for implementing the monitoring measure

Table 7.1: Monitoring Program and Cost

Monitoring Activity	Monitoring parameter	Monitoring location	Phase	Frequency	Cost	Cost Responsibility	Implementation responsibility
Air Quality							
Visual Assessment, routine and if necessary, in response to a complaint through the Grievance Mechanism	Dust levels in the atmosphere	Construction areas, places of heavy traffic flow	Construction	Daily & during period of dust generating activity or in response to a complaint through the Grievance Mechanism	Under the general responsibilities of the construction supervisor --No material additional costs associated with this activity	Construction Contractor (CC)	Construction Contractor (CC)
Soil Quality							
Soil sampling	Soil contaminants including heavy metals, non-metallic contaminants, organic and non-organic compounds,	Specific sampling points identified at the project locations and areas where dangerous activities are ongoing	Construction	Prior to construction and after remediation of contaminated sites	Laboratory fees US\$8,000.00	SAPZ	Environmental Consultant
Water Resources							
Surface water	pH, Conductivity, RCRA, COC, SVDC, Suspended solids, dissolved solids, oil and grease, BTEX	Lake/River in closed proximity to the project location to be identified as monitoring point	Construction	Quarterly	Laboratory Fees US\$8,000.00	SAPZ	Environmental Consultant
Ground water	pH, Conductivity, Dissolved Oxygen, Temperature, & Turbidity	Groundwater wells in or around project location	Operation	Prior to commencement of construction, during and then quarterly during operations	Capital cost of Multiparameter probe US\$40,000 (\$10,000X4)	SAPZ	Environmental Consultant
	RCRA, VOC, Suspended solids, dissolved solids oil and grease BTEX	Ground water samples in close proximity to the project location	Operation	Quarterly	Quarterly	SAPZ	Environmental Consultant
Health and Safety							

Health and Safety surveys, documentation of injuries and accidents	Proper use of PPEs, Presence of signs, First Aid Kit, and Firefighting Devices	Construction and operation sites where activities are undertaking	Construction & Operation	Continuous	Under the general responsibilities of the Environmental Consultant—No significant material costs associated with this activity	SAPZ	Contractor Environmental Consultant
Solid Waste							
Solid Waste Generation and Disposal	Visual inspection and photographic documentation and audit	Project site and disposal sites	Construction & Operation	Continuous	Under the General responsibilities of the Environmental Manager-- No significant material costs associated with this activity	SAPZ	SAPZ Environmental Consultant
Landscape and Visual Amenity							
Monitor to ensure that dust control and visual screening measures are implemented effectively	Ensure the effective implementation of mitigation measures	Entire project area where activities are undertaking	Construction & Operation	Quarterly	Under the General responsibilities of the Environmental Consultant—No significant material costs associated with this activity	SAPZ	SAPZ Environmental Consultant
Noise							
Measurements of existing ambient noise will be carried out at the most sensitive locations prior to the start of the construction	Noise level, LAeq, 1 hour	Nearest houses to the project construction sites	Construction	Prior to construction and during activities that are likely to produce the highest noise outputs	Capital costs (onsite noise monitoring meter-US\$3,50000) Monitoring Cost (US\$500.00 X1)	SAPZ	Qualified Acoustic Survey Technicians
Grand Total:					(\$68,000.00 x4) Quarterly		(\$272,000.00) Annually

CHAPTER EIGHT CONCLUSION

The assessment and identification of potential and eminent environmental, social, cultural and health risks and impacts recommended measures to curb, reduce, offset these impacts to acceptable levels ensures project acceptance by the local affected parties and successful implementation. Despite the urgent needs of major stakeholders expressed for project approval and implementation, it is eminent to note other descending views and concerns expressed by project affected parties/ stakeholders should be considered to ensure that the project is environmentally sound and socially sustainable.

A detailed assessment was conducted to determine the level and extent of resettlement that may be required. It is important that the Government of Niger State through the Niger State Special Agro-Industrial Processing Zone company, the Federal Ministry of Agriculture & Rural Development, and the contractor (*Pulse Engineering and Consulting Limited*) enhance efforts in engaging the rural communities and clarify pressing concerns relative to the project development object, land ownership and traditional land, customary land, public and private land ownership.

The overall impacts of the project are minimum and the recommended mitigation measures are effective to address, reduce, and offset these impacts. More importantly, impacts identified during the construction phase range from direct, indirect, short term, temporary, irreversible, and most often under the proponents' control. While those impacts during operations are relatively low and adequate environmental management systems will be employed to address and mitigate them.

Baseline surface and ground water within the proximity of the project area of influence were evaluated to assess its characteristics prior to the implementation of the project activities. Socio-economic survey revealed that the majority of the local and rural people are generally involved with traditional agricultural practices including farming, hunting, charcoal production,

Hence, the Consultant asserts that all environmental and social impacts associated with the Special Agro Industrial Processing Zone Project (SAPZ) have been identified and that the mitigation and management measures herein contained can adequately address the identified impacts when implemented accordingly.

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