Environmental and Social Impact Assessment (ESIA) of

Ijaye Agro-Industrial Hub (AIH) Project

Ijaye Agro-Industrial Hub

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Acronyms and Abbreviations

°C	Degree Celsius
%	Percentage
ADS	Agricultural Development Scheme
AIH	Agro-Industrial Hub
AIP	Affected and Interested Parties
AoI	Area of Influence
ATA	Agricultural Transformation Agenda
Ave.	Average
BAT	Best Available Technology
BH	Borehole
BOD	Biological Oxygen Demand
Ca	Calcium
CBD	Convention on Biological Diversity
CDA	Community Development Association
CDP	Community Development Plan
CE	Circular economy
CGM	Community Grievance Mechanism
CH_4	Methane
CHSSP	Community Health, Safety and Security Plan CIS Commonwealth of Independent States
Cl^-	Chloride ion
cm	Centimeter
CO	Carbon monoxide
CO_2	Carbon dioxide
COD	Chemical Oxygen Demand
CSA	Climate smart agriculture
CSO	Civil Society Organizations
CSR	Corporate Social Responsibility
Cu	Copper
dB	Decibel
DO	Dissolved Oxygen
DPR	Department of Petroleum Resources
EAD	Environmental Assessment Department ECOWAS Economic Community of West African States EHS Environmental Health and Safety
EIA	Environmental Impact Assessment

EMP	Environmental Management Plan
EMS	Environmental Management System
ESA	Environmentally Sensitive Areas
ESI	Environmental and Social Impacts
ESIA	Environmental and Social Impact Assessment ESMS Environmental and Social Management System et. al et. all (and others)
FAO	Food and Agriculture Organisation
Fe	Iron
FGD	Focus Group Discussion
FMEnv	Federal Ministry of Environment
FPIC	Free, Prior, and Informed Consent
g	Gram
g/m^2	Gram per meter square
g/m^3	Gram per Meter Cube
GDP	Gross Domestic Product
GHG	Greenhouse Gases
GIS	Geographic Information System
GPS	Global Positioning System
H_2	Hydrogen
H_2S	Hydrogen Sulphide
HASP	Health and Safety Plan
HSE	Health, Safety and Environment
HUB	Hydrocarbon Utilizing Bacteria
HUF	Hydrocarbon Utilizing Fungi
ICMM	International Council on Mining and Metals
ICP-OES	Inductively coupled plasma-optical emission spectrometer
IDI	In-Depth Interview
IFC	International Finance Corporation
IHR	International Health Regulation
IITA	International Institute of Tropical Agriculture
ILO	International Labour Organization
IUCN	International Union for Conservation of Nature K Potassium
Kg	Kilogram
KII	Key Informant Interview
km^2	Kilometer square
KPIs	Key Performance Indicators
KVA	Kilovolt Ampere
LEMP	Labour and Employment Plan

LFN	Law of the Federation of Nigeria
LGA	Local Government Area
Long.	Longitude
LWCMP	Labour and Working Conditions Management Plan m Meter
m/s	Meter per second
MADS	Moshav Agricultural Development Strategy
MANRRD	Ministry of Agriculture, Natural Resources and Rural Development
Max.	Maximum
MDA	Ministries, Departments, and Agencies
mg	Microgram / Milligram
mg/g	Microgram per gram
mg/l	Milligram per litre
mg/m^3	Micro gram per meter cube
Min	Minimum
ml	Millilitre
mm	Millimetre
Mn	Manganese
mS/cm	Micro Siemens per Centimeter
N	Naira
Na	Sodium
NAAQS	Nigerian Ambient Air Quality Standards
NAFDAC	National Agency for Food and Drug Administration and Control
NESREA	National Environmental Standards and Regulations Enforcement Agency
NH_3	Ammonia
NIMET	Nigerian Meteorological Agency
NOx	Nitrogen Oxides
NPE	National Policy on the Environment
NTFP	Non-Timber Forest Products
OECD	Organisation for Economic Co-operation and Development
ONADEP	Oyo North Agricultural Development Programme
OSH	Occupational Safety and Health Management System
OYEPA	Oyo Environmental Protection Authority
OYSADA	Oyo State Agribusiness Development Agency
OYSADEP	Oyo State Agricultural Development Programme
OYSG	Oyo State Government
OYUPDA	Oyo State Urban Planning and Development Agency Pb Lead

PCBs	Polychlorinated biphenyls
pH	Potential of Hydrogen (Hydrogen ion Concentration)
PM	Particulate Matter
PPE	Personal Protective Equipment
ppm	Parts per Million
QA	Quality Assurance
QC	Quality Control
QHSE	Quality Health, Safety and Environment
SL	Screen Line
SO_2	Sulphur dioxide
SON	Standards Organization of Nigeria
SOPs	Standard Operating Procedures
SPM	Suspended Particulate Matter
Sqm	Square meter
SUVs	Sports Utility Vehicles
TDS	Total Dissolved Solids
THB	Total Heterotrophic Bacteria
THF	Total Heterotrophic Fungi
TM	Tropical Maritime
TOC	Total Organic Compounds
ToR	Terms of Reference
TSP	Total Suspended Particulate
UNEP	United Nations Environment Programme
USEPA	United State Environmental Protection Agency
USTs	Underground Storage Tanks
VOC	Volatile Organic Compounds
WHO	World Health Organization
WMP	Waste Management Plan
Yrs	Years
Zn	Zinc

Executive Summary

EXECUTIVE SUMMARY (AfDB SAPZ–ALIGNED, CONSOLIDATED)

ES1: Introduction

This Environmental and Social Impact Assessment (ESIA) has been prepared for the proposed **Ijaye Agro-Industrial Hub (AIH)** under the Special Agro-Industrial Processing Zones (SAPZ) Programme supported by the African Development Bank (AfDB). The Project is promoted by the Oyo State Government through the Oyo State Agribusiness Development Agency (OYSADA) under a Public–Private Development Partnership (PPDP) framework.

Agriculture remains a cornerstone of Nigeria's economy, providing livelihoods for the majority of households and offering strong potential for inclusive economic growth. However, structural constraints—such as low productivity, weak value-chain integration, and high post-harvest losses—continue to limit sector performance. This ESIA has been conducted in compliance with the Environmental Impact Assessment Act (Cap E12 LFN 2004) and AfDB Integrated Safeguards System (ISS) to identify environmental and social risks and define appropriate mitigation and management measures.

Nigeria's agricultural sector contributes significantly to employment and GDP; however, it is characterized by structural inefficiencies such as:

- Low input utilization and mechanization levels;
- Weak integration between production and processing;
- Inadequate storage and logistics infrastructure;
- High vulnerability to climate variability.

These constraints result in reduced productivity, income instability, and persistent rural poverty. The ESIA was conducted to ensure that the project is designed and implemented in an environmentally sustainable and socially responsible manner. Specifically, the objectives are to:

- Establish baseline environmental and socio-economic conditions;
- Identify, predict, and evaluate potential environmental and social impacts;
- Develop mitigation and enhancement measures;
- Prepare an Environmental and Social Management Plan (ESMP);
- Ensure compliance with national and international safeguard frameworks.

The study adopts a risk-based and precautionary approach, integrating climate resilience, ecosystem protection, and social inclusion principles into project planning.

ES2: Project Description

The proposed Ijaye Agro-Industrial Hub is located in Ijaye, Akinyele Local Government Area of Oyo State, along the Moniya–Iseyin Road, and spans approximately 3,000 hectares. The site is bordered by Atan and Aruna communities.

The AIH is designed as an integrated agribusiness cluster supporting priority value chains including cassava, rice, maize, soybean, cocoa, tomatoes, pepper, beans, aquaculture, and livestock. It combines large-scale mechanized farming, agro-processing, storage, logistics, and market access within a single ecosystem.

Key components include crop production areas, a processing enclave, livestock facilities, irrigation systems, internal roads, power and water infrastructure (including solar hybrid systems), storage facilities, and administrative and training centres.

The project will be implemented in four phases: pre-construction (6 months), construction (12 months), operation (25–30 years), and decommissioning (6 months).

The total estimated investment is approximately ₦54 billion, supported by the AfDB under the SAPZ programme.

The AIH is conceptualized as a fully integrated agro-industrial ecosystem that consolidates agricultural production, processing, storage, and distribution within a single geographic cluster. The hub is designed to support multiple value chains, including cassava, rice, maize, soybean, cocoa, tomatoes, pepper, beans, aquaculture, and livestock production.

Key infrastructure components include:

- Large-scale mechanized farming zones;
- Agro-processing and industrial enclave;
- Irrigation and water resource systems;
- Internal road networks and logistics infrastructure;
- Renewable energy systems (solar hybrid power);
- Warehousing, cold storage, and aggregation facilities;
- Administrative buildings, training centres, and research support units.

The AIH is structured into interconnected functional zones:

1. **Primary Production Zone**
    - Mechanized crop cultivation (cassava, maize, rice, soybean, etc.);
    - Livestock production (poultry, cattle, small ruminants);
    - Aquaculture systems.
2. **Processing and Industrial Zone**
    - Agro-processing facilities (milling, drying, packaging);
    - Value addition infrastructure;
    - By-product recovery and circular economy systems.
3. **Infrastructure and Utilities**
    - Solar hybrid power systems (with backup generators);
    - Irrigation infrastructure (surface and groundwater abstraction);
    - Internal road networks and drainage systems;
    - Water supply and wastewater treatment systems.
4. **Logistics and Storage**
    - Warehouses and silos;
    - Cold storage facilities;
    - Aggregation centres.
5. **Social and Institutional Infrastructure**
    - Administrative offices;
    - Training and research centres;
    - Worker accommodation (where applicable).

Project Phases

- **Pre-construction:** Land acquisition, surveys, ESMP finalization, stakeholder engagement;
- **Construction:** Land clearing, earthworks, infrastructure development, installation of equipment;
- **Operation:** Farming, processing, logistics, maintenance;
- **Decommissioning:** Facility dismantling, waste disposal, land restoration.

ES3: Project Justification

The project responds directly to critical constraints in Oyo State's agricultural sector, including low productivity, weak processing capacity, fragmented smallholder systems, and significant post-harvest losses. Subsistence farming currently dominates and is insufficient to meet rising food demand.

The AIH will enhance food security, improve value-chain integration, stimulate agribusiness development, reduce reliance on food imports, and generate employment. It aligns with SAPZ objectives by promoting agro-industrialization, private sector participation, and rural economic transformation. The project also integrates climate-smart agriculture and circular economy principles to ensure long-term sustainability.

The justification for the AIH is grounded in addressing systemic inefficiencies within Oyo State's agricultural sector and aligning with national priorities for economic diversification and food security.

Currently, agricultural production in the region is predominantly subsistence-based, characterized by fragmented landholdings, limited access to improved inputs, and minimal value addition. These limitations result in low farmer incomes, high rural poverty rates, and dependence on imported food products.

The AIH will:

- Improve agricultural productivity through mechanization and modern farming techniques;
- Strengthen value-chain integration by linking production to processing and markets;
- Reduce post-harvest losses through improved storage and logistics systems;
- Promote agro-industrialization and rural economic transformation;
- Generate direct and indirect employment opportunities across the value chain.

The project aligns with:

- Nigeria's Agricultural Promotion Policy;
- National Development Plan (2021–2025);
- AfDB SAPZ Programme objectives;
- Climate-smart agriculture and circular economy principles.

By integrating renewable energy, efficient water use, and waste recycling systems, the project is designed to achieve long-term environmental sustainability and resilience to climate variability.

ES4: Legal and Institutional Framework

The Project complies with applicable national legislation and international safeguard frameworks. Key instruments include the Environmental Impact Assessment Act (2004), NESREA regulations, Climate Change Act (2021), Land Use Act (2004), and Oyo State environmental laws.

At the international level, the project aligns with the African Development Bank Integrated Safeguards System, including Operational Safeguards on environmental assessment, involuntary resettlement, biodiversity conservation, pollution prevention, and labour and working conditions. It also reflects principles of the World Bank Environmental and Social Framework and IFC Performance Standards, applying Good International Industry Practice.

The project is guided by a comprehensive legal and institutional framework at both national and international levels.

National Framework

Key applicable laws and regulations include:

- Environmental Impact Assessment Act (Cap E12 LFN 2004);
- National Environmental Standards and Regulations Enforcement Agency (NESREA) Act;
- Climate Change Act (2021);
- Land Use Act (2004);
- Oyo State environmental protection laws and planning regulations.

These instruments provide the basis for environmental protection, pollution control, land acquisition, and climate governance.

International Safeguards

The project complies with the AfDB Integrated Safeguards System (ISS), including:

- OS1: Assessment and Management of Environmental and Social Risk and Impact;
- OS2: Labour and Working Conditions;
- OS3: Resources Efficiency and Pollution Prevention and Management;
- OS4: Community Health, Safety and Security;
- OS5: Land Acquisition, Restrictions on Access to Land and Land Use, and Involuntary Resettlement;
- OS6: Habitat and Biodiversity Conservation, and Sustainable Management of Living Natural Resources
- OS7: Vulnerable Groups;
- OS8: Cultural Heritage;
- OS9: Financial Intermediaries;
- OS10: Stakeholder Engagement and Information Disclosure

In addition, the ESIA reflects principles from:

- World Bank Environmental and Social Framework (ESF);
- IFC Performance Standards;
- Good International Industry Practice (GIIP).

Institutionally, OYSADA will coordinate implementation, while FMEnv, NESREA, and other regulatory bodies will provide oversight and compliance monitoring.

ES5: Description of the Project Environment

The project area is characterized by a tropical climate with distinct wet and dry seasons, supporting year-round agriculture. Soils are predominantly sandy loam, fertile and suitable for mechanized farming, although requiring organic matter management. Surface and groundwater quality are within acceptable standards, and baseline air quality and noise levels are low. The ecological setting is within the derived savannah zone, consisting mainly of secondary vegetation and farmlands. No endangered species or critical habitats were identified.

The socio-economic environment comprises semi-rural farming communities (Camp, Atan, and Aruna) with agriculture as the dominant livelihood. Infrastructure such as electricity, potable water, and road networks is limited. Despite these constraints, community support for the project is strong, with over 94% acceptance. Key sensitivities include land access, environmental degradation risks, and community health conditions. The project area lies within a tropical climate zone characterized by distinct wet and dry seasons, with annual rainfall ranging between 1,200–1,500 mm. Temperatures are moderately high year-round, supporting continuous agricultural production. Soils are predominantly sandy loam, well-drained, and suitable for mechanized farming, though susceptible to erosion if not properly managed. Surface water and groundwater resources are available and generally within acceptable quality standards for agricultural use. Baseline air quality and noise levels are low, reflecting limited industrial activity in the area.

Biological Environment

The ecological zone is classified as derived savannah, consisting largely of secondary vegetation, farmlands, and fallow lands. Biodiversity is relatively low due to prior agricultural activities, and no critical habitats or endangered species were identified within the project footprint.

Socio-Economic Environment

The host communities (Camp, Atan, and Aruna) are predominantly agrarian, with livelihoods centred on smallholder farming, petty trading, and livestock rearing.

Key socio-economic characteristics include:

- Limited access to basic infrastructure (electricity, potable water, healthcare);
- High youth population and underemployment;
- Strong community cohesion and traditional leadership structures.

Stakeholder consultations indicate strong community support (over 94% acceptance), although concerns exist regarding land acquisition, environmental risks, and equitable benefit-sharing.

ES6: Stakeholder Engagement

Extensive stakeholder consultations were conducted with host communities, farmers, traditional leaders, women and youth groups, and local authorities. Engagement followed principles of inclusiveness, transparency, and free, prior, and informed participation.

Key concerns raised included employment opportunities, land acquisition and compensation, environmental impacts, and community development needs. The project has committed to prioritizing local employment, ensuring fair and transparent compensation, promoting inclusion of women and youth, and maintaining continuous engagement.

A structured Grievance Redress Mechanism (GRM) has been established to ensure timely, transparent, and culturally appropriate resolution of complaints, integrating both community-based and formal systems.

Stakeholder engagement was conducted throughout the ESIA process in accordance with AfDB requirements for inclusive and participatory consultation.

Engagement activities included:

- Community meetings and focus group discussions;
- Consultations with traditional rulers, women groups, and youth associations;
- Meetings with local government authorities and relevant MDAs.

Key issues raised include:

- Employment opportunities for local residents;
- Fair compensation for land acquisition;
- Environmental protection and pollution control;
- Community development needs (roads, water, schools, healthcare).

In response, the project has committed to:

- Prioritizing local employment and procurement;
- Implementing transparent compensation processes;
- Integrating community development programmes;
- Ensuring continuous stakeholder engagement throughout the project lifecycle.

A structured Grievance Redress Mechanism (GRM) has been established to provide accessible, transparent, and culturally appropriate channels for resolving complaints.

ES7: Key Environmental and Social Impacts

The project will generate significant positive socio-economic benefits, including job creation, increased agricultural productivity, improved incomes, and enhanced market access.

Potential adverse environmental impacts include vegetation clearance, habitat modification, soil erosion, air emissions, noise, and risks of soil and water contamination from agrochemicals and processing activities. Social impacts include land acquisition-related risks, labour influx, and pressure on local infrastructure.

Health and safety risks include occupational hazards, agrochemical exposure, traffic-related risks, and potential spread of communicable diseases.

Positive Impacts

- Job creation (direct and indirect);
- Increased agricultural productivity and income generation;
- Improved infrastructure and market access;
- Technology transfer and capacity building;
- Enhanced food security.

Negative Impacts

- Vegetation clearance and habitat alteration;
- Soil erosion and land degradation risks;
- Air emissions and noise during construction;
- Water and soil contamination from agrochemicals;
- Land acquisition and potential displacement;
- Labour influx and pressure on local services.

Health and Safety Risks

- Occupational hazards (machinery, chemicals);
- Community exposure to dust, noise, and traffic risks;
- Potential spread of communicable diseases.

Methodology for Impact Assessment and Significance Matrix

Impact significance was determined using a combination of:

- **Magnitude of Impact** (extent, duration, reversibility);
- **Sensitivity of Receptors** (environmental or social importance)

Impact Significance Matrix

Magnitude \ Sensitivity	**Low Sensitivity**	**Medium Sensitivity**	**High Sensitivity**
Low Magnitude	Minor	Minor–Moderate	Moderate
Medium Magnitude	Minor–Moderate	Moderate	Major
High Magnitude	Moderate	Major	Major–Critical

Significance Classification

- **Minor:** Negligible impact, no significant mitigation required;
- **Moderate:** Manageable with standard mitigation;
- **Major:** Requires strong mitigation and monitoring;
- **Critical:** Potentially unacceptable without redesign.

ES7 (b): Key Impact Significance Evaluation

Project Activity	**Impact**	**Magnitude**	**Sensitivity**	**Significance**
Land clearing	Vegetation loss	Medium	Medium	Moderate
Construction works	Dust & noise	Medium	Low	Minor–Moderate

Agrochemical use	Soil/water contamination	High	Medium	Major
Processing activities	Effluent discharge	High	High	Major–Critical
Land acquisition	Livelihood disruption	High	High	Major–Critical
Operation phase	Employment generation	High	High	Major (Positive)

ES8: Mitigation and Enhancement Measures

Mitigation measures follow the hierarchy of avoidance, minimization, restoration, and compensation. Key measures include controlled land clearing, soil conservation practices, installation of effluent treatment systems, adoption of Integrated Pest Management, and implementation of structured waste management systems.

Air and noise impacts will be managed through equipment maintenance and operational controls, while occupational health and safety risks will be addressed through comprehensive OHS systems, training, and provision of personal protective equipment.

Enhancement measures include local employment generation, capacity building, technology transfer, and Corporate Social Responsibility initiatives focused on infrastructure development. Gender inclusion and youth empowerment are integral components of the project design.

Key measures include:

- Controlled vegetation clearing and reforestation programmes;
- Soil conservation techniques (mulching, contour farming);
- Installation of effluent treatment and waste management systems;
- Adoption of Integrated Pest Management (IPM);
- Air and noise control through equipment maintenance;
- Comprehensive Occupational Health and Safety (OHS) systems.

Enhancement measures include:

- Local employment quotas;
- Skills development and training programmes;
- Gender inclusion and youth empowerment initiatives;
- Corporate Social Responsibility (CSR) projects.

ES9: Environmental and Social Management Plan (ESMP)

A comprehensive ESMP has been developed in line with AfDB requirements to ensure effective implementation of mitigation measures and monitoring of impacts throughout the project lifecycle.

The ESMP includes mitigation actions, monitoring programmes, institutional responsibilities, capacity building, emergency preparedness, and grievance management. Monitoring will cover key environmental and social parameters such as air quality, water, soil, biodiversity, waste management, and occupational health and safety.

The estimated ESMP budget is approximately ₦108 billion, representing about 9% of the total project cost. This covers mitigation implementation, monitoring activities, training, audits, and GRM operation. A robust monitoring and evaluation framework, including routine inspections, audits, and corrective action tracking, will ensure compliance and continuous improvement.

The ESMP provides a structured framework for implementing mitigation measures and monitoring environmental and social performance.

It includes:

- Detailed mitigation actions for identified impacts;
- Monitoring indicators and schedules;
- Institutional roles and responsibilities;
- Capacity building and training programmes;
- Emergency preparedness and response plans;
- Grievance redress procedures.

Monitoring parameters include:

- Air and water quality;
- Soil condition;
- Biodiversity status;
- Waste management efficiency;
- Occupational health and safety performance.

The ESMP budget is estimated at ₦108 Million Naira (approximately 0.2% of total project cost), covering implementation, monitoring, audits, and reporting.

AfDB-ISS Compliant Environmental and Social Management Budget Summary

Component	% of Total Project Cost	Allocated Amount (₦)	AfDB Safeguard Linkage	Implementation Responsibility	Contractual Integration
Mitigation Measures	15%	16,200,000	OS1, OS2 OS3, OS4, OS10	Main Contractor	Embedded in BoQ and Technical Specifications; enforceable through E&S performance clauses
Implementation Cost	20%	21,600,000			
Environmental & Social Monitoring	10%	10,800,000	OS1 Compliance Monitoring	Supervision Consultant + PIU	Included in supervision contract; linked to certification and AfDB reporting
Capacity Building & Training	15%	16,200,000	Institutional Strengthening under ISS	PIU + Contractor	Included in safeguard capacity plan and contractor obligations
Grievance Redress Mechanism (GRM)	20%	21,600,000	OS1 Stakeholder Engagement	PIU / Project Proponent	Operationalized under PIU; contractor supports community

					interface
Independent Environmental Audit & Reporting	12%	12,960,000	ISS Compliance Verification	Independent E&S Auditor	Separate oversight line item; periodic reporting to AfDB
Contingency for Safeguard Implementation	8%	8,640,000	Risk Management under ISS	Project Proponent	Reserved for unforeseen safeguard risks
Total ESMP Allocation		**108,000,000**	—	—	—

ES10: Implementation Roles and Project Alternatives

OYSADA will be responsible for overall ESMP implementation and coordination, while contractors will ensure compliance during construction and operations. Regulatory agencies such as FMEnv and NESREA will provide oversight, and host communities will participate through monitoring and grievance reporting mechanisms.

Alternative analysis consi dered the no-project and delayed options, both of which were rejected due to their negative implications for food security, economic development, and employment. The preferred option is immediate project implementation.

Technology alternatives were evaluated, with drip irrigation selected for water efficiency, and solar hybrid systems for sustainable energy supply. The integrated agro-industrial cluster model was adopted as the most efficient approach to achieving SAPZ objectives.

OYSADA will serve as the primary implementing agency, responsible for ESMP coordination and reporting. Contractors will implement mitigation measures during construction and operations.

Regulatory oversight will be provided by FMEnv, NESREA, and relevant state agencies, while communities will participate through monitoring and grievance mechanisms.

Alternatives Analysis

- No-project option: Rejected due to continued economic stagnation and food insecurity;
- Delayed implementation: Rejected due to lost economic opportunities;
- Technology alternatives: Drip irrigation and solar hybrid systems selected for efficiency and sustainability;
- Design alternative: Integrated agro-industrial cluster adopted as the optimal model.

ES11: Conclusion

The ESIA concludes that the proposed Ijaye Agro-Industrial Hub is environmentally sound, socially acceptable, and economically viable. Potential adverse impacts are site-specific, manageable, and can be effectively mitigated through the proposed ESMP.

The project is therefore recommended for approval, subject to full compliance with regulatory requirements, effective ESMP implementation, continuous stakeholder engagement, and regular monitoring and reporting.

With these measures in place, the project will significantly contribute to food security, job creation, rural development, and sustainable agro-industrial transformation in Oyo State and Nigeria.

The ESIA concludes that the proposed Ijaye Agro-Industrial Hub is environmentally viable, socially acceptable, and economically beneficial.

Potential adverse impacts are largely site-specific, reversible, and can be effectively mitigated through the implementation of the ESMP and adherence to regulatory requirements.

The project is therefore recommended for approval, subject to:

- Full compliance with environmental and social safeguards;
- Effective implementation of mitigation measures;
- Continuous stakeholder engagement;
- Robust monitoring and reporting.

Overall, the project is expected to significantly contribute to food security, employment generation, rural development, and sustainable agro-industrial transformation in Oyo State and Nigeria.

Environmental & Social Impact Assessment

Chapter One

1.

Introduction

1.0 Background Information

The significance of agriculture in the economy of a nation cannot be overstated because it is the economic mainstay of the majority of households in Nigeria. Agriculture can be an engine of growth for overall national development, but igniting inclusive growth has proven difficult. Thus, proactive utilization of agricultural resources would enable a country to feed its growing population, create employment opportunities, earn foreign exchange, and provide raw materials for industries.

Agricultural activities in this part of the country are typically characterized by low harvestable yields, postharvest losses, a lack of processing facilities, low-income returns, and numerous other challenges that have been bedeviling this sector. Moreover, agricultural production is primarily in the hands of many small-scale, unorganized farmers scattered across the country. Lack of organization, coupled with the dispersed nature of farmers, hinders their participation in agricultural and rural development. This impedes the supply of extension services, farm credit, and other vital inputs to farmers. These have created gaps that need to be addressed to achieve food security.

Food security and sustainability for the Nigerian population, estimated at around 220 million, is the goal of the present Government, particularly the OYSG, under the current administration, which has made food sufficiency one of its key objectives. It is on the note of the continuous increase in demand for food, coupled with the renewed drive of the OYSG, that an agricultural hub to cater to food cultivation, processing, and distribution was conceived, and committed efforts are being made towards its actualization.

A growing Nigerian population and varied diets are driving up food demand. Production is struggling to keep up as crop yields level decline, water sources are drying up and natural resources, including soils, water, and biodiversity, are depleted and threatened with extinction. Nigeria's projected population of 262-263 million people (Abbani, 2021Statista, 2026), with roughly 60 million living in poverty, demands immediate action. The food security dilemma will only become more challenging as Nigeria's population continues to expand, necessitating the production of around 70% more food by 2040 in order to feed the country's growing population. The difficulty is exacerbated by agriculture's high vulnerability to the effects of climate change. Increasing temperatures, greater weather variability, shifting agroecosystem boundaries, invasive crops and pests, and more frequent extreme weather events are all examples of the negative impacts of climate change. Therefore, this initiative of the State Government is expected to achieve agricultural policies incorporating climate-smart

agriculture (CSA) to address food loss, preserve the local environment, and enable continuous infrastructural development. When these objectives are achieved, they will serve as models for climate-friendly agricultural practices that encompass the entire value chain while causing the minimal environmental disturbance possible. The project will adopt circular economy principles by prioritizing waste minimization, resource recovery, and reuse where technically and economically feasible.

In accordance with the provisions of the Nigerian Environmental Impact Assessment (EIA) Act No. 86 of 1992 (Cap E12 LFN 2004), and the African Development Bank's Integrated Safeguards System (ISS) and Environmental and Social Assessment Procedures (ESAP, 2015), an ESIA study of the proposed Project has been conducted. Where relevant, the assessment also reflects elements of Good International Industry Practice (GIIP). The study also aligns with OYSG's corporate policies on environmental protection and human health.

The purpose of the EIA study is to identify and assess the potential environmental and social (E&S) risks and impacts of the Project so that they can be appropriately managed. The EIA study has been conducted to encompass the entire life cycle of the proposed Project.

Significance of Agriculture and Food Security in Nigeria

Importance of Agriculture

The significance of agriculture in Nigeria's economy cannot be overstated, as it is the primary economic activity for the majority of households. Agriculture has the potential to drive national development and economic growth. However, achieving inclusive growth through agriculture has proven difficult. The proactive utilization of agricultural resources is essential for ensuring that a country can feed its growing population, generate employment opportunities, earn foreign exchange, and supply raw materials to industries.

Challenges Facing Agriculture

Agricultural activities in this region are characterized by low yields, postharvest losses, limited processing facilities, low income returns, and a variety of other challenges. Agricultural production is primarily carried out by numerous small-scale, unorganized farmers who are scattered across the country. This lack of organization and the dispersed nature of farmers hinder their participation in agricultural and rural development, making it difficult to supply extension services, farm credit, and other essential inputs. These issues have created gaps that must be addressed to achieve food security.

Government Initiatives and Food Security

Food security and sustainability for Nigeria's population, estimated at around 220 million, are central goals of the current government, particularly the Oyo State Government (OYSG). The administration has made food sufficiency a key objective. In response to the growing demand for food and OYSG's renewed commitment, an agricultural hub was developed to support food cultivation, processing, and distribution. Efforts are being made toward the realization of this hub.

Growing Population and Resource Constraints

Nigeria's growing population and changing dietary patterns are driving increased food demand. Agricultural production is struggling to keep pace as crop yields decline, water sources dry up, and natural resources such as soil, water, and biodiversity become depleted or threatened. With a projected population of 329,066,615 people and approximately 60 million living in poverty, there is a pressing need for immediate action to address these challenges.

Future Food Security and Climate Change

The food security dilemma will become increasingly difficult as Nigeria's population expands, requiring about 70% more food by 2040 to meet the needs of its people. The challenge is compounded by agriculture's high vulnerability to climate change, including rising temperatures, increased weather variability, shifting agroecosystem boundaries, invasive species, and more frequent extreme weather events. To address these issues, agricultural policies that incorporate climate-smart agriculture (CSA) are necessary. Such policies aim to reduce food loss, preserve the local environment, and support ongoing infrastructural development as envisioned by the State Government. Achieving these objectives will provide models for climate-friendly agricultural practices that cover the entire value chain while minimizing environmental disturbance. A circular economy will be promoted, where all waste generated is converted for further use, serving as an example for other countries.

Regulatory Framework and Environmental Assessment

In accordance with Nigerian EIA Act No 86 of 1992, codified as the EIA Act Cap E12 Law of the Federation of Nigeria (LFN) 2004, and relevant international standards such as the International Finance Corporation (IFC) Performance Standards on Environmental and Social Sustainability (2012) and the World Bank Environmental and Social Framework (2016), an Environmental Impact Assessment (EIA) study has been conducted for the proposed project. The study aligns with OYSG's policies on environmental protection and human health.

Purpose of the EIA Study

The purpose of the EIA study is to identify and assess potential environmental and social risks and impacts associated with the project, enabling them to be appropriately managed. The EIA encompasses the entire life cycle of the proposed project, ensuring comprehensive evaluation and management of environmental and social concerns.

1.1 Project Scope

The scope of this Environmental and Social Impact Assessment (ESIA) covers the evaluation of potential environmental and social impacts associated with the establishment of the Ijaye Agro-Industrial Hub (AIH) in Ijaye (Atan), located in Akinyele Local Government Area, Oyo State, Nigeria.

The area presently hosts a semi-rural farming population whose major occupations include crop farming, livestock rearing, petty trading, and artisanal services. The principal crops cultivated are maize, cassava, cocoa, vegetables, and palm oil, while poultry, goat, and fish farming are common sources of livelihood.

The ESIA study was commissioned under the Oyo State Agribusiness Development Agency (OYSADA) as part of the Special Agro-Industrial Processing Zone (SAPZ) Programme jointly supported by the African Development Bank (AfDB), the Islamic Development Bank (IsDB), and the International Fund for Agricultural Development (IFAD). The SAPZ Programme aims to drive agricultural transformation across participating states in Nigeria by establishing industrialized agricultural clusters that connect farmers to markets through modern infrastructure, value addition, and private-sector-led agroprocessing. The Ijaye Agro-Industrial Hub is a core component of the Oyo State SAPZ Programme, strategically positioned to serve as a catalyst for rural industrialization and agribusiness competitiveness within the Akinyele–Ibadan axis.

The overall objective of the project is to restore, transform, and reposition agriculture as the primary driver of Oyo State's economy by promoting inclusive and sustainable growth, ensuring food security, enhancing youth employment, and reducing poverty. Specifically, the project aims to upgrade existing agricultural infrastructure, promote mechanized and climate-smart agriculture, enhance processing and value addition, and attract private investment through public–private partnerships (PPPs). These interventions are being undertaken in compliance with OYSADA's environmental sustainability commitments and AfDB's Integrated Safeguard System (ISS), which requires Environmental and Social Impact Assessments for all category 2 (equivalent to World Bank Category B) projects.

Accordingly, this ESIA identifies and assesses all potential impacts arising from land preparation, infrastructure development, construction activities, agroprocessing operations, and waste management within the Ijaye Community. The assessment further proposes mitigation and enhancement measures to ensure that project implementation is consistent with national environmental laws and international safeguard standards. In recognition of the potential impacts associated with the project's operational phase, OYSADA, through the SAPZ programme, engaged independent Environmental and Social Consultants—Agro4you Limited—to conduct the ESIA study, including baseline surveys, impact analysis, and stakeholder engagement for the Ijaye Community intervention.

1.2 Project Proponent

This Environmental and Social Impact Assessment (ESIA) report presents the findings for the proposed Ijaye Agro-Industrial Hub (AIH), located in Ijaye, Akinyele Local Government Area of Oyo State. The Project Proponent is the Oyo State Government (OYSG), while the Implementing Agency is the Oyo State Agribusiness Development Agency (OYSADA). The Project is being developed under the Special Agro-Industrial Processing Zones (SAPZ) Programme coordinated at the national level by the Federal Ministry of Agriculture and Food Security (FMAFS). Financing support for the Project is provided by the African Development Bank (AfDB).

The SAPZ program was formally launched on October 24–25, 2022, by the Federal Government of Nigeria in collaboration with the African Development Bank (AfDB), the International Fund for Agricultural Development (IFAD), and the Islamic Development Bank

(IsDB). The program was conceived to drive inclusive and sustainable agro-industrial development, enhance food and nutrition security, and create employment opportunities, particularly for youth and women in rural areas.

The first phase of SAPZ implementation spans seven (7) states—Cross River, Imo, Kaduna, Kano, Kwara, Ogun, Oyo, and the Federal Capital Territory (FCT)—with additional states to be included in subsequent phases.

Mandate and Role

The SAPZ program is designed to:

- Promote agro-industrialization through value addition and postharvest processing.
- Increase rural incomes and stimulate private sector investment in agriculture.
- Develop critical infrastructure such as access roads, renewable energy, and water systems for agribusiness operations.
- Establish agricultural clusters that link farmers, processors, aggregators, and markets.
- Facilitate technology transfer, capacity development, and access to finance for agricultural enterprises.

Relevance to the Ijaye Project

The Ijaye Agro-Industrial Hub (AIH) represents a collaborative effort between the Oyo State Government and the African Development Bank (AfDB) under the SAPZ framework.

Through this transformative program, the project will enhance farm productivity, promote agroprocessing and value addition, and strengthen linkages across major agricultural value chains, including cassava, maize, poultry, horticulture, and aquaculture. The AIH, Ijaye, will also stimulate employment generation, youth entrepreneurship, and women's economic empowerment, while ensuring environmental and social sustainability through climate-smart agricultural practices.

Under the SAPZ initiative, the Federal and State Governments, in partnership with AfDB, aim to develop competitive, inclusive, and resilient agribusiness ecosystems. The Ijaye AIH, therefore, serves as a cornerstone for Oyo State's strategy to achieve economic diversification, rural industrialization, and food security, aligning with national development priorities and the AfDB's Feed Africa strategy.

The Special Agro-Industrial Processing Zones (SAPZ) Project is financed through a multi-partner arrangement involving the African Development Bank (AfDB), International Fund for Agricultural Development (IFAD), and Islamic Development Bank (IsDB), who serve as co-financing institutions providing sovereign financing, fiduciary oversight, and implementation supervision. For the Oyo State SAPZ, the African Development Bank (AfDB) is the primary financing institution with the state also providing counterpart financing as well as counterpart contribution in assets.

The Oyo State Government is the Project Proponent, with overall responsibility for project ownership, land allocation, infrastructure provision, safeguards compliance, and project execution within its jurisdiction. The OYSG bears the operational responsibility for SAPZ activities within its territory.

The Oyo State Agribusiness Development Agency (OYSADA) serves as the Implementing Agency and is responsible for the day-to-day implementation of the project, including coordination of consultants and contractors, supervision of project activities, safeguards compliance, and reporting to national authorities and the financing institution.

1.3 EIA Terms of Reference

In line with the National EIA Procedural Guidelines, Terms of Reference (ToR) for the study were prepared and submitted to AfDB. The ToR section –outlined the general scope of the EIA, including the key data requirements, regulatory context, and methodological approach for assessing the proposed project environment.for the proposed Project environment.

It situates the EIA within the SAPZ Programme, which promotes agro-industrial development through the Agro-Industrial Hubs (AIHs) and Agricultural Transformation Centres (ATCs), and requires a comprehensive assessment of environmental and social risks across all phases of the project in line with national and AfDB safeguard requirements.

The ToR further defines the EIA objectives to include establishing baseline environmental and socio-economic conditions, identifying and evaluating potential impacts, and recommending mitigation measures. It emphasizes compliance with Nigerian regulations and international standards, inclusive stakeholder engagement, and the preparation of site-specific Environmental and Social Management Plans (ESMPs) with clear implementation and monitoring frameworks.

It also prescribes a phased approach covering scoping, baseline studies, impact assessment, stakeholder consultations, and reporting. The TOR requires assessment of direct, indirect, and cumulative impacts and the application of the mitigation hierarchy, while promoting modular, site-specific analyses to ensure effective mitigation, regulatory approval, and ongoing monitoring.

The EIA study has also been conducted in compliance with the relevant requirements of applicable international standards, including the AfDB Operational Safeguardas documented in Table 1.1 (see Annex 1).

1.4 EIA Objectives

The overall objective of this EIA is to proactively identify and evaluate potential environmental and social (E&S) risks and impacts that could arise from implementation of activities under the proposed Project, as well as to propose practicable and cost-effective mitigation measures to address the identified potential impacts. This is to ensure that the Project is developed and operated in an environmentally sustainable manner.

EIA is an environmental management tool used to assess the potential adverse and positive impacts of a proposed activity/development on components of the environment.

Specific objectives of the proposed EIA are as follows:

- Identification of all communities within the project area and other stakeholders for effective consultation.
- Obtain and provide all necessary information and evidence needed for developing an Environmental Impact Assessment report (EIA) for the proposed project.
- Satisfy regulations from federal, state, and local authorities on environmental matters by showing that a systematic assessment of the potential impacts of the proposed project has been carried out using standard procedures.
- Generate the necessary data for establishing the environmental baseline conditions of the project area.
- Identify and evaluate the associated and potential impacts of the proposed project on the ecological and socioeconomic communities within the study area.
- Establish control and cost-effective strategies, procedures, and practices to be followed during design, construction, and operation to ensure the environmental sustainability of the project.
- Develop an Environmental Management Plan (EMP) for the proposed project: and
- Provide information and evidence needed for developing an Environmental Impact Statement (EIS) for the proposed Agro-Industrial Hub Project.

1.5 Scope of the EIA

The scope of work for the EIA includes the following:

- Review of applicable local, national, and international laws and regulations and industry codes relevant to the proposed Project and the EIA study.
- Description of all actions/activities that would be carried out in the course of the proposed project.
- Review of existing literature on the project area and identify the data gaps.
- Scoping exercise including stakeholder engagement.
- Field data gathering, laboratory analysis of field samples, and data analysis.
- Identification and evaluation of potential environmental and social impacts of the proposed Project.
- Recommendation of appropriate and cost-effective mitigation measures, including EMP.
- Preparation of an EIA report in conformity with the national and international guidelines and standards.
- Procurement of EIA certificate from the FMEnv for the proposed project.

1.6 EIA Methodology

This EIA study has been conducted in accordance with the Nigerian (FMEnv) EIA Procedural Guidelines, as well as the relevant International Standards and Guidelines. The Nigerian EIA process is summarized in Figure 1.1. The EIA involves a number of key phases carried out in a stepwise manner. These include scoping, literature review, field data gathering, laboratory

analysis, stakeholder engagement; impact identification and evaluation, development of mitigation measures and EMP, and report writing and disclosure. Each of these stages is explained in detail in the subsequent chapters of this report.

1.7 Legal and Administrative Framework

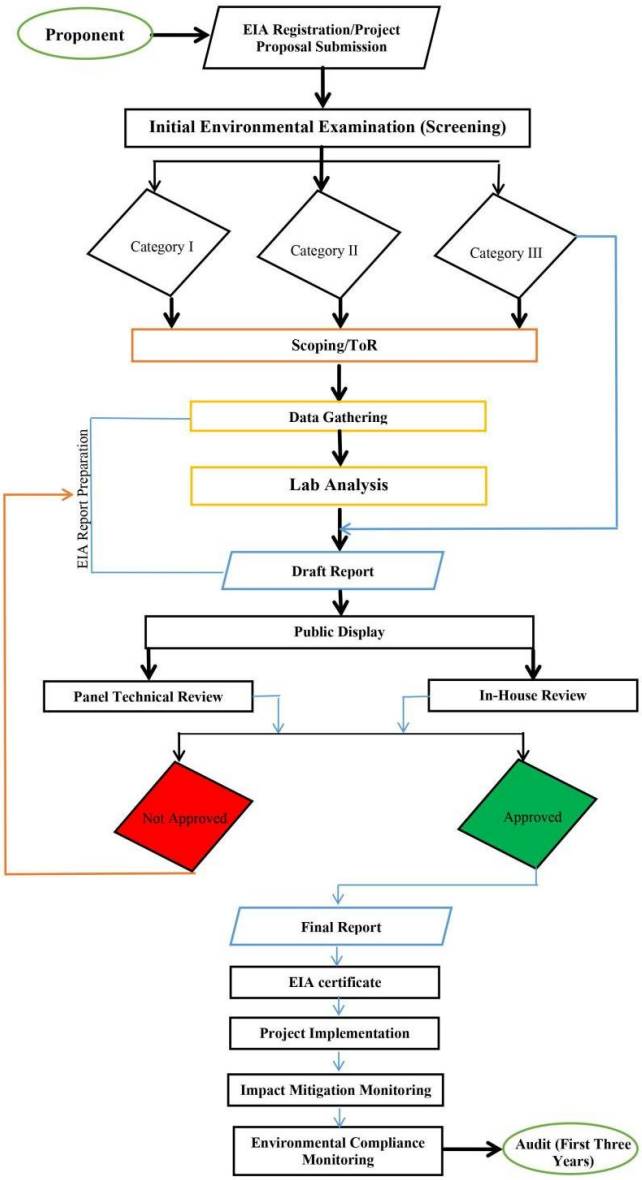
This section presents the legislation and policy context as well as environmental and social regulations that apply to the proposed project and the EIA study. The Project shall ensure compliance with the applicable local and international regulations and standards throughout its life cycle.

1.7.1 National Policy, Guidelines, and Regulations

Federal Ministry of Environment (FMEnv)

The FMEnv is the primary authority for the regulation and enforcement of environmental laws in Nigeria. The Act establishing the Ministry places on it the responsibilities of ensuring that all development and industry activity, operations, and emissions are within the limits prescribed in the national guidelines and standards and comply with relevant regulations for environmental pollution management in Nigeria, as may be released by the Ministry.

Figure 1.1: EIA Process Flowchart



Source: FMoE, https://ead.gov.ng/eia-process-flowchart/

In furtherance of her mandate, the FMEnv developed laws, guidelines, and regulations on various sectors of the national economy. The specific policies, acts, and guidelines enforced by FMEnv that are applicable to the proposed Project are summarized in the following paragraphs:

National Policy on the Environment

Environmental management in Nigeria is based on the National Policy on the Environment (1989), revised in 1999 and 2017. The Policy states that Nigeria is committed to safeguarding the country's natural and built environment for the use of present and future generations. This commitment demands that efficient resource use and the reduction of

environmental impacts be a core requirement of all developmental activities. The strategic objective of the Policy is to coordinate environmental protection and natural resources conservation for sustainable development.

- National Guidelines and Standards for Environmental Pollution Control in Nigeria, 1991

  This represents the basic instrument for monitoring and controlling industrial and urban pollution.

- **National Environmental Protection (Effluent Limitation) Regulations, 1991, S.I.8**

  The Effluent Limitation Regulation makes it mandatory for industries to install anti-pollution and pollution abatement equipment on site. Appropriate penalties for contravention are also prescribed.

- **National Environmental Protection (Pollution Abatement in Industries and Facilities Generating Wastes) Regulations, 1991, S.I. 9**

  This imposes restrictions on the release of toxic substances into the environment and stipulates requirements for pollution monitoring units, machinery for combatting pollution and contingency plans by industries.

- **National Environmental Protection (Management of Solid and Hazardous Wastes) Regulations, 1991, S.I.15**

  This Statutory Instrument regulates the collection, treatment and disposal of solid and hazardous waste from municipal and industrial sources and provides a comprehensive list of chemicals and chemical waste by toxicity categories.

- **EIA Act Cap E12 LFN 2004**

  The EIA Act is the primary Act governing EIA in Nigeria. It was promulgated to enable prior consideration of an EIA on specified public or private projects. The Act sets out the procedure to be followed and methods to be used in undertaking an EIA. Section 2(2) of the Act requires that the extent, nature or location of proposed project or activity that is likely to significantly affect the environment requires an EIA to be undertaken in accordance with the provisions of the Act.

- **National Environmental Impact Assessment Procedural and Sectoral Guidelines**

  In response to the promulgation of the EIA Act, the FMEnv developed National EIA Procedural Guidelines and additional guidelines for various sectors of the National economy. The EIA Guidelines for Agricultural and Rural Development projects (Agricultural Land Management) apply to this study.

  The FMEnv has developed guidelines to assist proponents in conducting detailed environmental and social assessments for Agricultural and Rural Development projects in Nigeria.

- **National Environmental Standards and Regulations Enforcement Agency**

  The National Environmental Standards and Regulations Enforcement Agency (NESREA) was established in 2007 by the Federal Government of Nigeria as a parastatal of the Federal Ministry of Environment (FMEnv). The Agency is responsible for enforcing environmental laws, guidelines, standards, and regulations in Nigeria, particularly during the operational phase of developmental projects. The NESREA's regulations applicable to the proposed Project include:

- ***National Environmental (Sanitation and Wastes Control) Regulations, 2009, S.I. 28. The purpose of this regulation is the adoption of sustainable and environmentally*** friendly practices in environmental sanitation and waste management to minimize pollution.

- ***National Environmental (Noise Standards and Control) Regulations, 2009, S.I. 35.*** This regulation highlights the permissible noise levels to which a person may be exposed; control and mitigation of noise; permits for noise emissions in excess of permissible levels; and enforcement. NESREA's permissible noise level for the ambient environment is 85 dB(A) for industrial environment.

- **National Environmental (Surface and Groundwater Quality Control) Regulations, 2011, S.1 22**

  The purpose of this regulation is to enhance and preserve the physical, chemical, and biological integrity of groundwater and surface water resources.

- **National Environmental (Construction Sector) Regulation, 2011, S.I 19**

  The purpose of this regulation is to prevent and minimize pollution from construction, decommissioning, and demolition activities to the Nigerian environment.

- **National Environmental (Food, Beverage and Tobacco Sector), 2009, S.I. 33**

  The purpose of these Regulations is to prevent and minimize pollution from all operations and ancillary activities in this sector that affect the Nigerian Environment.

- Other NESREA regulations relevant to the proposed Project are:
  - National Environmental (Ozone Layer Protection) Regulations, 2009, S.I. 32: The provisions of this Regulation seek to prohibit the importation, manufacture, sale and use of ozone-depleting substances.
  - National Environmental (Soil Erosion and Flood Control) Regulations 2011, S.I. 12: The overall objective of this Regulation is to regulate all earth-disturbing activities, practices or developments for agricultural, non-agricultural, commercial, industrial and residential purposes.
  - National Environmental (Protection of Endangered Species in International Trade) Regulations, 2011, S.I. 16: The major objective of this Regulation is to protect species of endangered wildlife from extinction through the prohibition of trade, importation, etc.

- National Environmental (Air Quality Control) Regulations, 2013, S.I. 64: The objective of this Regulation is to ensure the control of air pollutants that may affect the ambient environment.
- National Environmental (Hazardous Chemicals and Pesticides) Regulations, 2014, S.I. 65: The main objective of this Regulation is to ensure that best practices are applied and maintained in the transport, use, storage, handling, and management of hazardous chemicals and pesticides.

1.7.2 Federal Ministry of Agriculture and Food Security (FMAFS)

The Federal Ministry of Agriculture and Food Security (FMAFS) has the administrative power to regulate agricultural research, agriculture, and natural resources, forestry, and veterinary research all over Nigeria. Since its establishment in 1966, the Ministry has been mandated with the responsibility of optimizing agriculture and integrating rural development to transform the Nigerian economy, with the goal of achieving food security and positioning Nigeria as a net food exporter for socio-economic development.

To carry out its mandate, the Ministry develops and implements policies aimed at key areas of interest in the agricultural sector. These policies are the synthesis of the Government's framework and action plans, designed to achieve overall agricultural growth and development. The current agricultural policy being adopted by FMAFS is the National Agricultural Technology and Innovation Policy (NATIP) 2022-2027

❖ ***National Agricultural Technology and Innovation Policy (2022-2027)***

The NATIP is designed for food security, jobs and wealth creation and is expected to leverage other policies, strategies and programmes in the agriculture sector. The overall increase in productivity would lead to lower composite food prices by an average of 30 percent over the next six years, thereby improving access to quality food and nutrition as well as revamping the national strategic food reserve. The lower cost of production to be realized from mechanization, the use of high-quality inputs, innovative practices and access to affordable credit would fast track the industrialization process, create new high-income jobs and enhance the international competitiveness of the Nigerian agricultural products.

1.7.3 Water Resources Act, CAP W2 LFN 2004

The Act is aimed at promoting the optimum planning, development and use of the Nigeria's water resources; ensuring the coordination of activities that are likely to influence the quality, quantity; distribution, use and management of water; ensuring the application of appropriate standards and techniques for the investigation, use, control, protection, management and administration of water resources; and facilitating technical assistance and rehabilitation for water supplies.

1.7.4 Harmful Waste (Special Criminal Provisions) Act, CAP H1 LFN 2004

This Act prohibits and declares unlawful all activities relating to the purchase, sales, importation, transit, transportation, deposit, or storage of harmful wastes. Appropriate penalties for contravention are prescribed.

The Endangered Species (Control of International Trade and Traffic) Act, Cap. E9, LFN, 2004 was amended in 2016 to bring the penalty provisions in line with economic realities and to act as a deterrent or deter people from trafficking and trading in endangered species because endangered species are preserved in the country. It aims to improve agriculture and preserve endangered species in Nigeria.

1.7.5 Criminal Code (South-Western States) Federal Provisions Act, CAP C38 LFN 2004

The Act contains the basic criminal law offences relating to endangering the lives of people from various activities in the Northern region of Nigeria. These include offences relating the public health, safety, and convenience, among others.

1.7.6 Labour Act CAP L1 LFN 2004

The Labour Act is the primary law protecting the employment rights of individual workers. The Act covers the protection of wages, contracts, employment terms and conditions, and recruitment, and classifies workers into general and special categories.

Trade Unions (Amendment) Act, 2005

This Act contains provisions regarding the formation, registration, and organization of trade unions. It includes stipulation of 'equal pay for equal workers without discrimination on account of sex, or any other ground whatsoever'.

Employees Compensation Act, 2010

This Act repeals the Workmen's Compensation Act W6 LFN 2004 and makes comprehensive provisions for payment of compensation to employees who suffer from occupational diseases or suffer injuries from an accident at the workplace or in the course of employment.

Factories Act, CAP F1 LFN 2004

The Factories Act is the primary law regulating the health, safety and welfare of workers in factories/facilities in the country. The law holds management and staff personally responsible for violations of the Act's provisions. With respect to safety, there are general provisions regarding the securing, fixing, usage, maintenance, and storage of machinery, hoists and lifts, chains, ropes, and lifting tackle, as well as other lifting machines. In addition to these, standards are set for worker training, safe access to workplaces, and fire prevention.

Pension Reform Act, 2014

This Act provides for a contributory pension scheme for both the public and private sectors in Nigeria.

Land Use Act CAP L5 LFN 2004

The Land Use Act of 1978, the Constitution of 1999, and the Public Lands Acquisition Laws of the relevant states constitute the governing policy for land acquisition in Nigeria. As is the case with most National and State laws on the acquisition of land in the public interest or for a public purpose, the legislation enables the state to acquire land. The Acts also specify the procedures the State must follow to clear the land and define the compensatory measures it must implement to compensate affected people.

National Health Act, 2014

In Nigeria, the Public Health Law mandates that development projects be executed in accordance with guidelines that promote health by protecting the environment and safeguarding human health.

National Policy on Occupational Safety and Health, 2016

The National Policy on Occupational Safety and Health revised (2020) stipulates that the health, safety, and welfare of all people in employment must be safeguarded and not endangered or abused.

Public Participation and Disclosure

Primarily, relevant regulatory authorities are required to inform the public of environmental-related issues. Section 55 of the EIA Act establishes a Public Registry to facilitate public access to records related to environmental assessments.

Public hearings to which interested members of the public are invited to provide comments on the EIA for a proposed project are a key part of the FMEnv's approval process.

Standards Organisation of Nigeria

The Standards Organisation of Nigeria (SON) was established by an Enabling Act, No. 56 of 1971—the SON Cap 412 of the Laws of the Federal Republic of Nigeria—with a commencement date of January 1, 1970, when the Organisation began to function. The Act has three amendments: Act No. 20 of 1976, Act No. 32 of 1984, and Act No. 18 of 1990. The SON directorate applicable to this Project is summarized as follows:

- **Nigerian Industrial Standards (NIS)**

  NIS is a document that is established by consensus and approved by the Standards Council of SON. It provides rules, guidelines, or characteristics for products, services, and related processes or production methods, aimed at achieving the optimum degree of order in each context. Standardization activities are managed by the Director of Standards, with the support of the Technical Groups. The Food/Codex Group is responsible for the development of standards covering food technologies, food safety, agricultural produce, livestock and livestock products, poultry and poultry products, and Codex matters.

1.7.7 National Agency for Food and Drug Administration and Control (NAFDAC) Act, CAP F32, Laws of the Federation of Nigeria 2004

It empowers the agency to regulate and control the manufacture, importation, exportation, distribution, sale, and use of food, chemicals, and related agricultural inputs. For the Ijaye project, this Act ensures that all fertilizers, agrochemicals, and processed food products used or produced within the hub comply with national standards for quality and safety. The project must therefore adopt safe handling, labeling, and storage procedures for all regulated materials and maintain full compliance with NAFDAC's environmental and product safety requirements.

1.7.8 Climate Change Act, 2021

It provides the overarching legal framework for achieving low greenhouse gas emissions and promoting climate-resilient development in Nigeria. It established the National Council on Climate Change (NCCC) to coordinate the implementation of national climate actions across sectors. In relation to the Ijaye project, the Act requires incorporating climate-smart agricultural practices, green infrastructure, and emission-reduction strategies into the project's design and operations. This means the Ijaye Agro-Industrial Hub must prioritize energy efficiency, sustainable land use, and adaptation measures that enhance resilience to extreme weather conditions.

1.7.9 Oyo State Ministry of Environment and Oyo State Commercial Agriculture Development Project (OSADEP) Proclamations

All states in Nigeria have the power to make laws on environmental matters under the Constitution. This is because environmental subjects are included in the concurrent legislative list.

In Oyo State, environmental issues are under the purview of the Ministry of Environment and Habitat. However, in 1996, Oyo State established the State Environmental Protection Agency (OSEPA). The edict clearly spells out the functions and authority of the agency, imposes restrictions on the release of toxic materials into the environment, and outlines the responsibilities of industries whose operations are likely to impact the environment negatively.

Specific functions of the agency include:

- monitoring and controlling disposal of waste generated within the State.
- monitoring and controlling of all forms of environmental degradation from agricultural, industrial and government operations.
- monitoring surface, underground, and potable water, air, land, and soils within the State to determine the pollution level as well as collect baseline data.
- Cooperating with federal, state, and local governments on matters and facilities relating to environmental protection.

The Agency is empowered to apply enforcement measures and establish regulations to control water, air, soil, and noise pollution, as well as effluent discharge standards and waste management. The edict also empowers the Agency to combat environmental degradation in

manufacturing premises and government operations, and to analyze samples of any substance found on any premises searched.

Other Statutory Regulations, Legislation and Guidelines related to infrastructural Development activities in Nigeria include:

- Nigerian Urban and Regional Planning Law No 88 of 1992,
- Oyo State Urban and Regional Planning Board Law 2001
- National Guidelines for Environmental Audit in Nigeria, 2011,
- Guidelines and Standards for Environmental Pollution Control 1991,
- Guidelines on Hazardous Chemicals Management 1998,
- Guidelines on Safe and Effective Use of Pesticides 2001,
- National Guidelines on Environmental Management Systems, and
- Blueprint on Environmental Enforcement: A Citizens' Guide.
- Land Use Act (Cap L5, 2004)
- Akinyele Local Government Bye-laws

❖ **Ijaye Agro-Industrial Hub Health, Safety, and Environment (HSE) Policy**

It sets out the internal framework for safeguarding workers, host communities, and the surrounding environment. The policy commits the management to preventing accidents, injuries, and occupational hazards; ensuring pollution prevention and waste minimization; and promoting efficient resource use in all operations. It also mandates the establishment of emergency preparedness and response systems, regular HSE audits, and continuous training to ensure compliance with national and international safety standards. This policy reflects the project's commitment to sustainable agricultural development and the well-being of its community.

❖ **Akinyele Local Government by-laws on land development and waste management (2020)**

They serve as the local regulatory framework governing environmental sanitation, waste management, and land use within the project area. The Ijaye project is required to comply with these bylaws by ensuring proper waste disposal, maintaining adequate drainage systems, and preventing pollution of the local environment. It must also work closely with the Local Government Environmental Health Unit to monitor hygiene, pest control, and waste management practices. Furthermore, the project must engage host communities through participatory consultations and adhere to local mechanisms for resolving environmental and land-use disputes.

1.7.10 International Guidelines and Conventions

In addition to the FMEnv EIA process, this study has been conducted to comply with the requirements of the applicable International Guidelines and Standards as discussed in the sub-sections below:

International Guidelines and Standards

1.7.10.1 The AfDB Operational Safeguards (OS) Framework

In line with its long-term strategy for inclusive and green growth, the Bank Group is dedicated to supporting Borrowers through its operations in designing and implementing projects, activities, and initiatives that are environmentally and socially sustainable. To realize this vision, the Bank seeks to strengthen the capacity of member countries and Borrowers by enhancing their Environmental and Social Frameworks. This capacity building enables them to effectively assess and manage environmental and social (E&S) risks and impacts associated with their projects. To achieve this objective, the Bank has established Environmental and Social Operational Safeguards (OSs). These safeguards aim to maximize positive outcomes while avoiding, minimizing, reducing, mitigating, or compensating for adverse E&S risks and impacts, including those linked to climate change.

The Operational Safeguards function as an interconnected management system rather than isolated requirements. They are organized thematically to ensure comprehensive coverage of all sustainability dimensions:

a) Environmental and Social Operational Safeguard 1: Environmental and Social Assessment.
b) Environmental and Social Operational Safeguard 2: Labour and Working Conditions.
c) Environmental and Social Operational Safeguard 3: Resource Efficiency and Pollution Prevention and Management.
d) Environmental and Social Operational Safeguard 4: Community Health, Safety and Security, Dam Safety, and Emergency Preparedness and Response Planning.
e) Environmental and Social Operational Safeguard 5a: Land Acquisition, Restrictions on Land Use, and Involuntary Resettlement.
f) Environmental and Social Operational Safeguard 5b: Involuntary Resettlement Instruments.
g) Environmental and Social Operational Safeguard 6: Biodiversity Conservation and Sustainable Natural Resource Management.
h) Environmental and Social Operational Safeguard 7: Vulnerable Groups.
i) Environmental and Social Operational Safeguard 8: Cultural Heritage.
j) Environmental and Social Operational Safeguard 9: Financial Intermediaries. and

Environmental and Social Operational Safeguards 10a–10c covering Stakeholder Engagement, Grievance Mechanisms, and Reprisal Risk Management.

The AfDB Operational Safeguard and the applicability of each of the standards to the proposed Project is summarized in Table 1.1 (see Annex 1).

1.7.10 International Conventions

The Nigerian Government is an essential player in international efforts to protect the environment. As such, the country is a signatory to several international laws and conventions aimed at the conservation and protection of the environment to ensure sustainable development. Some International conventions and regulations that are applicable to the proposed Project include:

African Convention on the Conservation of Nature and Natural Resources

The African Convention on the Conservation of Nature and Natural Resources was adopted in Algiers, Algeria, on September 15, 1968, and entered into force on June 16, 1969. The Convention was adopted in Algiers, Algeria, on September 15, 1968, and entered into force on June 16, 1969. The Convention stipulates that the contracting States shall undertake to adopt the measures necessary to ensure conservation, utilization and development of soil, water, flora and fauna resources in accordance with scientific principles and with due regard to the best interests of the people.

- **Convention Concerning the Protection of the World Cultural and Natural Heritage:** The Convention was adopted in Paris, France, on October 17, 1972. The Convention sets aside areas of cultural and natural heritage for protection. It places obligations on each State Party to recognize that the duty of ensuring the identification, protection, conservation, presentation and transmission to future generations of the cultural and natural heritage situated on its territory belongs primarily to that State.

- **Convention on the Conservation of Migratory Species of Wild Animals:** This Convention, also known as the Bonn Convention, was adopted in 1979 and entered into force in 1983. It stipulates actions for the conservation and management of migratory species, including habitat conservation.
- **Vienna Convention for the Protection of the Ozone Layer:** The Vienna Convention was adopted in 1985 and entered into force on September 22, 1988. It places general obligations on countries to take appropriate measures to protect the environment against adverse effects resulting from human activities which tend to modify the ozone layer.
- **The Montreal Protocol on Substances that Deplete the Ozone Layer:** The Protocol was adopted on September 16, 1987, as an international treaty to eliminate ozone-depleting chemicals production and consumption.
- **Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and their Disposal:** The Convention was adopted on March 22, 1989, and entered into force in May 1989. It focuses on the hazards of the generation and disposal of hazardous waste. The Convention defines the wastes to be regulated and controlled to protect human and environmental health against their adverse effects.
- **The United Nations Convention on Biological Diversity:** The convention was adopted in 1994. The objectives of the Convention include the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of benefits arising out of the utilization of genetic resources.
- **The United Nations Framework Convention on Climate Change:** The Convention on Climate Change was adopted in 1992 during the Rio Earth Summit in Rio De Janeiro, Brazil and entered into force in 1994 to limit Greenhouse Gas (GHG) emissions, which cause global warming.
- **International Health Regulations:** The International Health Regulations (IHR) are an international legal instrument binding on 196 countries worldwide, including all the Member States of the World Health Organisation (WHO). This binding instrument of international law entered into force on June 15, 2007. The purpose and scope is "to prevent, protect against, control and provide a public health response to the international spread of disease in ways that are commensurate with and restricted to public health risks and which avoid unnecessary interference with international traffic and trade".
- Declaration of the United Nations Conference on Human Environment: United Nations Conference on the Human Environment proclaims that "a point has been reached in history when we must shape our actions throughout the world with a more prudent care for their environmental consequences."

The principles of this Declaration relevant to the Project are summarized below:

Principle 2: The natural resources of the earth, including the air, water, land, flora and fauna, especially representative samples of natural ecosystems, must be safeguarded for the benefit of present and future generations through careful planning or management, as appropriate.

Principle 3: The capacity of the earth to produce vital renewable resources must be maintained and, wherever practicable, restored or improved.

Principle 4: Nature conservation, including wildlife, must receive importance in planning for economic development.

Principle 15: Planning must be applied to human settlements and urbanization with a view to avoiding adverse effects on the environment and obtaining maximum social, economic and environmental benefits for all.

Principle 18: Science and technology, as part of their contribution to economic and social development, must be applied to the identification, avoidance and control of environmental risks and the solution of environmental problems and for the common good of mankind.

- **The Rio Declaration on Environment and Development**

The Declaration was made in 1992 in Rio de Janeiro, reaffirming the declaration of the United Nations Conference on Human Environment adopted at Stockholm in 1972. The principle works toward an international agreement which respects the interests of all and protects the integrity of the global environment and development. The relevant principles include:

Principle 4: In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it.

Principle 17: EIA 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 competent national authority.

- **International Labour Organization (ILO): ILO-OSH 2001 - Guidelines on Occupational Safety and Health (OSH) Management Systems**

These guidelines call for coherent policies to protect workers from occupational hazards and risks while improving productivity. The guidelines present practical approaches and tools for assisting organizations, competent national institutions, employers, workers and other social partners in establishing, implementing and improving occupational safety and health management systems, with the aim of reducing work-related injuries, ill health, diseases, incidents and deaths.

At the organizational level, the guidelines encourage the integration of OSH management system elements as an important component of overall policy and management arrangements. Organizations, employers, owners, managerial staff, workers and their representatives are motivated to apply appropriate OSH management principles and methods to improve OSH performance. Nigeria ratified the guidelines in 2001.

1.7.11 Oyo State Government Environmental Policy

Oyo State Government is committed to the aforementioned policies for protecting the environment, human health, and safety. It is committed to conducting its operations in an environmentally sustainable manner at all its facilities, including the proposed Project.

1.8 EIA Report Structure

This EIA report covers nine chapters and is structured as listed below:

- **Preliminary Sections:** Contents**,** Tables, Figures and Plates, Acronyms and Abbreviations, Executive Summary
- **Chapter One:** containing an introductory part, which includes the background of the proposed agribusiness, EIA structure, project scope, scope and objectives of EIA, and appropriate legal and institutional framework.
- **Chapter Two**: discusses project justification comprising the design, project components, key performance indicators, and agricultural production and commercialization.
- **Chapter Three:** outlines the proposed project description containing the technical elements of the Project.
- **Chapter Four:** describes the existing Environment. It details the baseline data relevant to decisions about the Project location, design, and operation. It describes the socioeconomic survey and the health impact of the proposed project.
- **Chapter Five:** The assessment covers all environmental, social, health, and safety impacts associated with the Ijaye Agriculture Industrial Hub.
- It encompasses activities across the cassava, maize, soybean, cocoa, and vegetable value chains. It reports cumulative impacts from cultivation and the processing chain.
- **Chapter Six:** Impact Mitigation Measures discusses mitigation measures for the identified environmental and social impacts.
- **Chapter Seven:** Environmental management summarizes the key measures and actions, and the timeframe, including responsibility for the implementation of the recommended measures.
- **Chapter Eight:** Decommissioning and Remediation Plan
- **Chapter Nine**: Conclusion and Recommendations
- **References and Biblography**

CHAPTER TWO

2.

Project Justification

2.1 Background Information

This chapter presents the rationale for the proposed AIH in Ijaye, in Akinyele LG, Oyo State, Nigeria. It also includes descriptions of alternatives and development options considered for the proposed Project.

2.2 Need for the Project

The proposed Ijaye Agro-Industrial Hub (AIH) is driven by site-specific agricultural and value-chain constraints within Oyo State, rather than general national-level considerations. The Ijaye axis in Akinyele LGA is characterized by favourable agro-ecological conditions, including fertile soils, suitable rainfall patterns, and an existing base of smallholder farming communities engaged in crops such as cassava, maize, soybean, and vegetables. Despite this potential, agricultural production in the area remains largely fragmented, low-input, and subsistence-oriented, resulting in low productivity, limited market integration, and significant post-harvest losses.

A key gap in the Ijaye and broader Oyo State agricultural system is the absence of integrated production–processing–market infrastructure. Existing initiatives have primarily focused on primary production, with limited investment in aggregation, storage, processing, and logistics. This has constrained value addition, reduced farmer incomes, and limited the ability of producers to access formal markets and agro-industrial supply chains. In addition, access to mechanization, irrigation, extension services, and structured financing remains inadequate, further limiting productivity and scalability.

The AIH is designed to address these gaps through a cluster-based agro-industrial model that co-locates large-scale production, processing facilities, storage systems, and market linkages within a single, coordinated platform. This approach enables economies of scale, reduces post-harvest losses, improves product quality, and enhances supply chain efficiency. It also facilitates stronger integration of smallholder farmers throughout-grower schemes and service provision.

The selection of Ijaye as the project location is strategic. The area offers suitable land availability within a declassified forest reserve, proximity to Ibadan and regional markets, and access to existing road networks, including the Moniya–Iseyin corridor. These factors provide logistical advantages for input supply, product evacuation, and linkage to domestic and regional markets. The presence of established farming communities further supports rapid project integration and local participation.

The scale and design of the Project are aligned with the requirements of the Special Agro-Industrial Processing Zones (SAPZ) Programme, which emphasizes integrated value-chain development, private sector participation, and agro-industrial clustering. The combination of

mechanized farming, processing infrastructure, and supporting utilities is intended to transform the area from dispersed subsistence production to a structured, market-oriented agribusiness hub.

Conclusively, the need for the Project is justified by:

- The underutilized agricultural potential of the Ijaye axis;
- The absence of integrated agro-processing and market infrastructure;
- The inefficiencies in existing smallholder-based production systems; and
- The strategic suitability of the site for a scalable agro-industrial cluster.

The AIH therefore represents a targeted intervention to unlock local agricultural potential, strengthen value chains, and support sustainable agribusiness development within Oyo State.

2.3 Value of the Project

The total estimated investment for the Oyo State Agribusiness Industrial Hub (AIH) at Ijaye, Akinyele Local Government Area, Oyo State, is approximately ₦54 billion. The project is a flagship component of the State's integrated agribusiness transformation agenda aimed at driving agricultural industrialization, value addition, and job creation.

The development is being promoted by the Oyo State Government through the Oyo State Agribusiness Development Agency (OYSADA), under a Public–Private Development Partnership (PPDP) framework. This partnership model leverages public-sector facilitation and enabling infrastructure with private-sector investment, operational efficiency, and market access to ensure project sustainability.

The financing structure of the project is anchored by the African Development Bank (AfDB) with active participation of the Special Agro-Industrial Processing Zones (SAPZ) program, which provides technical and financial support for the development of agro-industrial clusters across Nigeria. The SAPZ initiative aims to stimulate inclusive and sustainable agricultural industrialization by concentrating agroprocessing, logistics, and service activities in dedicated zones equipped with shared infrastructure and utilities.

Under this arrangement, the Oyo State Government will provide the enabling environment, including land acquisition, access roads, power, and water infrastructure. At the same time, private-sector partners will invest in production, processing, packaging, and marketing components. The model is expected to enhance agricultural productivity, reduce postharvest losses, increase export potential, and strengthen rural livelihoods within the Ijaye–Akinyele agrarian corridor.

2.4 Project Benefits

The Project benefits include, among others:

Agricultural and Economic Benefits

- Significant increase in crop yield and food supply within Oyo State and Nigeria.

- Improved efficiency across agricultural value chains and reduction in postharvest losses.
- Generation of revenue for the government through taxes, levies, and product sales.
- Expansion of the regional economy via contracts, logistics services, and ancillary businesses.

- Employment and Capacity Development

- Creation of direct and indirect employment across all project phases (estimated more than 5000 jobs).
- Enhancement of technical capacity and technology transfer through training in mechanized farming, irrigation, and agro processing.

Social Benefits

- Strengthening of rural livelihoods, youth empowerment, and gender inclusion.
- Support for community infrastructure through Corporate Social Responsibility
- (CSR) initiatives such as water supply, access roads, and electricity.

2.5 Envisaged Sustainability

2.5.1 Technical Sustainability

The technical sustainability of the AIH will be achieved through the deployment of proven, climate-smart, and mechanized agricultural technologies. The Oyo State Agribusiness Development Agency (OYSADA) will implement the project in collaboration with Craneburg Construction Company, designated as the equipment and technology partner. The agricultural machinery—including tractors, planters, and harvesters—will be sourced through SAPZ from companies whose technologies are globally deployed in successful agricultural clusters across countries. Similarly, the processing machinery for cassava starch, feed mill, and poultry operations will be procured from an approved company by the State under AfDB's Special Agro-Industrial Processing Zone (SAPZ) framework. The AIH will be managed by a team of qualified agricultural and engineering experts, in accordance with established technical standards and Standard Operating Procedures (SOPs). Comprehensive manuals will be prepared for facility operation and maintenance, while personnel will undergo regular training on best agricultural practices, safety, and environmental stewardship. The hub will operate in accordance with globally accepted standards and be managed by qualified agronomists, engineers, and farm managers.

- Modern Practices: Adoption of modern mechanization, precision soil testing, and the use of improved, high-yield varieties of cassava, maize, cocoa, and vegetables.
- Water Management: Implementation of drip and sprinkler irrigation to optimize water use and minimize soil erosion.
- Capacity Building: Establishment of on-site workshops and farmer training centers to build local capacity for machine maintenance, safe handling of agrochemicals, and adherence to standard operating procedures (SOPs).

- Longevity: Scheduled maintenance and local staff training will ensure the longevity and sustained operation of all facilities.
- Technical employees will undergo training on equipment handling, operation, and preventive maintenance, jointly facilitated by OYSADA and the Oyo State Ministry of Agriculture. The curriculum will cover farm mechanization, irrigation management, and equipment diagnostics. Maintenance of machines will be performed under a periodic service agreement with equipment suppliers to ensure optimal performance and longevity.
- Local farmers within and around the hub will also receive practical training on safe and effective use of pesticides, herbicides, and fertilizers in compliance with NAFDAC and FMARD guidelines. This will be done through extension workshops and demonstration plots established at the hub's training centre. The training will emphasize integrated pest management (IPM) techniques, personal safety, and environmental protection.

2.5.2 Environmental Sustainability

Environmental sustainability will be achieved through careful project design that conserves resources and mitigates pollution. The Hub will employ drip irrigation technology, which delivers water directly to crop roots, reducing wastage and preventing soil erosion compared to traditional irrigation systems.

In addition, renewable energy integration (solar hybrid systems) will be prioritized to reduce reliance on diesel-powered generators. All organic wastes from farms and processing plants will be composted or converted into biogas and organic fertilizer, promoting a circular economy.

The AIH is committed to minimizing its ecological footprint and enhancing climate resilience.

- Circular Waste Management: Organic residues (e.g., cassava peels, soybean husks) will be incorporated into a circular waste management system, where they are composted into biofertilizer, and effluents are treated and reused.
- Clean Energy and Soil Health: Integration of organic composting, biochar soil enhancement, and renewable-energy-based drying and storage systems to minimize greenhouse gas emissions and chemical reliance.
- Regulatory Compliance: Strict use of approved agrochemicals and adherence to all Federal Ministry of Environment (FMEnv)/National Environmental Standards and Regulations Enforcement Agency (NESREA) environmental standards.
- Climate Resilience: Incorporation of climate resilience measures, such as flood control, drainage, and vegetation buffers.

The use of pesticides, herbicides or fertilizers will be conducted in an environmentally, responsible manner. Only environment-friendly and biodegradable substances that have been approved by the relevant government authorities, such as the National Agency for Food and Drug Administration and Control (NAFDAC) and the Standards Organisation of Nigeria

(SON) would be used for farming operations and other related activities. The use of pesticides, herbicides and fertilizers will be applied only when necessary and will be based on the manufacturer's instructions.

The following measures should also ensure the environmental sustainability of the Project:

- The Project facilities shall be designed and constructed to keep environmental impacts at a minimum and acceptable levels.
- The Project development activities shall be carried out to conform to all relevant international and national environmental regulations and standards, including the recommendations of this EIA study.
- A comprehensive Health, Safety and Environment (HSE) plan shall be developed, which will include sustained training and retraining of the Project employees and those of the contractors and subcontractors on the management of environmental and social (including health safety) issues associated with the Project. The Plan shall be periodically reviewed and updated as the Project progresses.
- Handling, storage, and disposal of wastes shall be in accordance with the applicable local, national, and international requirements.

2.5.3 Economic Sustainability

The project will be financed through a Public–Private Partnership (PPP) model between the Oyo State Government and private investors, ensuring financial viability and reducing the State's fiscal burden. Nigeria's large consumer base and regional export markets guarantee strong demand for products from the Hub.

The project's financial model is structured to ensure profitability, attract investment, and drive regional growth.

- Funding Model: The project is funded by the Oyo State Government under a robust Public–Private Partnership (PPP) framework, ensuring shared risk and expertise.
- Profitability and GDP: Profitability is secured through diversified production and strong market demand for high-value cassava and soy derivatives. The hub is projected to significantly enhance agroprocessing, attract private investors, and increase the state's GDP.
- Reinvestment: Proceeds will be reinvested for long-term operational stability and targeted community development initiatives.

The project's economic benefits will include job creation, income generation, and enhanced access to inputs and markets for smallholder farmers. Over time, the Hub will serve as a training and innovation center for modern agribusiness practices in Southwest Nigeria.

2.5.4 Social Sustainability

The project will enhance food security, promote local agribusiness development, and reduce rural–urban migration. Through increased access to markets, storage, and mechanization, smallholder farmers will enjoy higher productivity and income stability.

The AIH is designed to be socially equitable and inclusive. The project will:

- Maintain at least 40% women participation in training and employment.
- Prioritize the engagement of local labor and youth from host communities.
- Provide equal employment opportunities for persons with disabilities (PWDs) in administrative and logistics roles.
- Implement transparent recruitment criteria based on merit, local inclusion, and gender balance.

The AIH is dedicated to promoting fairness, inclusivity, and long-term harmony with the host communities.

- Employment and Job Creation: The hub is expected to create over 2,500 direct jobs and 5,000 indirect jobs, providing economic opportunities for the region.
- Inclusivity: Promotion of inclusive participation of women, youth, and vulnerable groups through cooperative schemes and fair employment policies.
- Community Engagement: Sustained stakeholder engagement throughout the project lifecycle, coupled with community-based benefit-sharing mechanisms.
- Accountability: Establishment of a Grievance Redress Mechanism (GRM) to address community concerns promptly, alongside regular environmental and social performance reviews involving regulators and host communities.

2.5.5 Project Components, Activities, Waste Streams, and Lifespan

The AIH will function as a multi-commodity agricultural estate emphasizing cassava, maize, cocoa, and vegetables. Key components include:

- ❖ Crop Production Fields—mechanized farms for cassava, maize, and vegetables.
- ❖ Processing Units—cassava starch and flour plant, maize feed mill, cocoa fermentation/drying unit, and vegetable packaging line.
- ❖ Supporting Infrastructure—irrigation networks, internal roads, drainage, workshops, warehouses, cold storage, and silos.
- ❖ Utilities and Services—power generation (hybrid solar-diesel), boreholes, water treatment, and waste management facilities.
- ❖ Administrative and Training Facilities—offices, laboratories, classrooms, and community liaison offices.

Table 2.1: Summary of sustainability measures.

Pillar	Key Strategy	Responsible Agency
Technical	Mechanization, local capacity building, preventive maintenance	OYSADA / John Deere / OYSCATECH
Environmental	Drip irrigation, waste-to-energy, EMP monitoring	OYSADA / FMEnv / NESREA
Economic	PPP funding, off-take markets, export linkages	OYSADA / Private Investors
Social	Gender equity, community inclusion, GRM	OYSADA / LGA / Community Leaders

2.6 Project Alternatives

This section discusses the various alternatives considered for the proposed Project during the design phase and within the EIA process. These include the following:

- Site location alternatives
- Land use alternatives
- Irrigation technology alternatives
- Power source alternatives

2.6.1 Site Location Alternatives

The proposed AIH will be sited at Ijaye. The site was selected for its available land, access to the water source (a dam) for irrigation, and existing road networks, among other factors.

Alternatives to the current Project site include locating it in a congested area where basic agricultural needs are absent. This option is not considered viable since it is evidently more environmentally and socially vulnerable. It may result in significant physical and economic displacement because of land acquisition.

2.6.2 Land Use Alternative

Maintaining forest status or subsistence farming on the site would yield minimal socioeconomic returns. The agro-industrial model ensures optimal productivity and employment generation.

2.6.3 Irrigation Technology Alternatives

The following types of irrigation systems were considered for the proposed project:

- Centre Pivot Irrigation
- Manual Irrigation—using buckets/pitchers or watering cans
- Sprinkler Irrigation
- Surface Irrigation/flood irrigation
- Drip Irrigation

The analysis of each of these irrigation systems is provided as follows:

Centre-Pivot Irrigation

Centre-pivot irrigation involves a self-propelled system in which a single pipeline supported by a row of mobile towers is suspended 2 to 4 meters above ground. Water is pumped into the central pipe, and as the towers rotate slowly around the pivot point, a large circular area is irrigated. Sprinkler nozzles mounted on or suspended from the pipeline distribute water under pressure as the pipeline rotates. The nozzles are graduated from small to large so that the faster moving outer circle receives the same amount of water as the slower moving ones on the inside.

The advantages of this irrigation system include the following:

- Uniformity of applied water to the farm
- No human labor is required
- May operate at lower pressure, thus conserving energy
  Efficient water use, which prevents water runoff

The disadvantages of this irrigation system include:

- High initial cost of installation
- High maintenance cost
- It is not suitable for the irrigation of fields of rectangular or square shape
- The field surface should be flat
- Not suitable for irrigation in windy conditions; uneven water application may occur and applied fertilizers may be carried away.

This option is not considered suitable for the proposed Project.

Manual Irrigation

This system has low requirements for infrastructure and technical equipment, but needs high labor input. Irrigation using watering cans is common, for example, in most rural and peri-urban areas.

The advantages of manual irrigation include the following:

- Improved water-use efficiency (reduced loss through evaporation)
- Well-directed, selective and targeted irrigation
- Ensures a constant water supply in the crucial phase of germination
- Higher yields, better quality, higher germination rate, lower incidence of pest attacks
- Can be constructed with locally available material (e.g., watering cans, pitchers, hoses)
- Low investment costs

The disadvantages of manual irrigation include:

- It is labor intensive
- If the water is not properly filtered and the equipment is not properly maintained, it can result in clogging

- Manual subsurface drip irrigation avoids the high capillary potential of traditional surface-applied irrigation, which can draw salt deposits up from deposits below.

This option is not considered viable for the proposed Project.

Sprinkler Irrigation

Sprinkler irrigation is another popular method, which pipes a set amount of water to the fields, and then sprays this directly over the crops with high-pressure sprinklers. The amount of water can be closely controlled, which is a huge benefit.

The advantages of a sprinkler irrigation system include:

- It is suitable for most types of field conditions
- It ensures uniform distribution of water with high efficiency
- Loss of water is minimal
- It allows accurate and easy measurement of distributed water
- Soluble fertilizers, herbicides, and fungicides can be added to the water before distribution to crops
- It is easy to operate, and it reduces labor costs.

The disadvantages of sprinkler irrigation systems include:

- High initial cost of installation
- The water used must be clean and free of sand, debris, and dissolved salts
- It cannot be used in windy climates
- Crops can be damaged due to excessive water
- It requires a high and continuous power supply

This option is not considered suitable for the proposed Project.

Surface Irrigation

In surface irrigation, water moves over and across the land by simple gravity flow to wet and infiltrate the soil. Surface irrigation can be divided into furrow, border strip, or basin irrigation. It is often called flood irrigation when it results in flooding or near flood of the cultivated land.

The advantages of surface irrigation include the following:

- Gravity irrigation, due to the simplicity of its infrastructure, is one of the most economical.
- The energy requirements for its operation are practically nonexistent, due to the use of gravitational energy.
- Wind is not a limiting factor in the distribution of water.

The disadvantages of surface irrigation include the following:

- Requires level land to achieve high efficiencies (maximum land elevation fluctuation should not be greater than half the applied irrigation depth);

- Soils with high infiltration rates require small field sizes, which interferes with mechanization.
- Difficulty in applying small irrigation quantities, excess water is difficult to evacuate, particularly during times of excess rainfall.
- Plants are partly covered with water, sometimes for extended periods (in low infiltration rate soils). This can lead to the growth of fungus among the soybean plants.
- Small basins require extensive delivery channels and are not readily adaptable to tractor mechanization.

This option is not considered viable for the proposed Project.

Drip Irrigation

Drip irrigation, also known as trickle irrigation, functions as its name suggests. Water is delivered to the root zone of plants, drop by drop. This method can be the most water-efficient method of irrigation, if managed properly, since evaporation and runoff are minimized. In modern agriculture, drip irrigation is often combined with plastic mulch, further reducing evaporation, and is also a means of delivery of fertilizer. The process is known as fertigation.

The drip irrigation system has the following advantages:

- Fertilizer and nutrient loss is minimized due to a localized application and reduced leaching.
- Water application efficiency is high if managed correctly.
- Field leveling is not necessary.
- Fields with irregular shapes are easily accommodated.
- Recycled non-potable water can be safely used.
- Moisture within the root zone can be maintained at field capacity.
- Soil type plays a less important role in the frequency of irrigation.
- Soil erosion is lessened.
- Weed growth is lessened.
- Water distribution is highly uniform, controlled by the output of each nozzle.
- Labor cost is less than other irrigation methods.
- Variation in supply can be regulated by regulating the valves and drippers.
- Fertigation can easily be included with minimal waste of fertilizers.
- Foliage remains dry, reducing the risk of disease.
- Usually operated at lower pressure than other types of pressurized irrigation, reducing energy costs.

However, a drip irrigation system has its disadvantages, which include the following:

- The initial cost of installation is high
- The lifetime of tubes used in drip irrigation can be shortened by the sun, causing wastage
- It may cause clogging if water is not filtered correctly
- It cannot be applied directly during germination

- It requires a high level of skill or expertise

A drip irrigation system is considered the preferred option for the proposed Project due to its inherent benefits over other irrigation options. Also, a drip irrigation system is better suited to the clayey soil in the proposed area for soybean cultivation. Furthermore, researchers agree that drip irrigation systems can improve the yield of soybean plants significantly (Mitchell et al., 2014). They attributed this to the drip system's ability to precisely apply moisture and nutrients directly to the crop's root zone.

2.6.4 Power Source Alternatives

A sustainable, continuous power source will be required for the proposed agribusiness. Therefore, the following sources of power were considered for the facility:

- National grid
- Diesel-fueled generating sets

National grid

This involves connecting to the existing power infrastructure from the national grid in the area. This may require installing an additional transformer. The advantages of this option include lower power costs and the reduction in air emissions compared to the use of generating sets. However, this option may not be dependable as the power supply in Nigeria is not yet stable.

Generating sets

Due to the unreliable nature of the power supply in Nigeria, most industrial facilities depend on generating sets for their operations. The installation and operation of generating sets can serve as a primary or backup power source.

2.7 Project Development Options

2.7.1 No Project Option

One of the options considered for the Project is the No Project Option. The rationale behind the proposed Project is that government support for agriculture now is unparalleled and current demand for produce is high and due to the population of Nigerians.

If the proposed Project does not go ahead, it is unlikely that food sustainability will be achieved, as this project promises to bridge the gap in agricultural practices. Also, Nigeria's economic development may further be hampered, and the employment opportunities associated with the Project would be lost.

One of the major objectives of the Project is to demonstrate modern farming practices, providing local farmers with opportunities to learn methods to increase their output. If the "No project" option is selected, the learning opportunity will be missed, and the farmers will most likely continue using their inefficient old methods. Thus, the No Project Option is not considered to be the preferred option given the current situation of soybean and agricultural product supply in the country.

2.7.2 Delayed Project Option

This option implies that the planned Project will be delayed until a much later date. Such an option is usually taken when conditions are unfavorable to project implementation, such as in a war situation, or where the host communities are deeply resentful of the Project. Also, if the prevailing economic climate is not quite favorable to the Project, then the delayed project option may be feasible. But none of these conditions is applicable.

Indeed, both the economic and the political environments are most favorably disposed toward the Project. The implication of the delayed project option will mean that all the preliminary work and associated efforts/costs incurred would have come to nothing. Also, because of inflationary trends, such a delay may result in an unanticipated increase in project costs, which may affect the final profit accruable from the Project. The delayed option is considered unviable for the Project.

2.7.3 With the Project Option *(Go-ahead option)*

The inherent benefits of allowing the Project to go ahead as planned are multifarious, both to the proponent and the Nigeria populace. Job opportunities for Nigerian professionals, skilled and semi-skilled craftsmen will increase. The Project will also contribute significantly to the production of agricultural produce, thus increasing the local and regional economy. Thus, given the above-mentioned considerations, the preferred option - construction of the proposed Project with efficient technology, cost minimization and environmental friendliness - is considered the optimal one. The option to go ahead as planned does outweigh the other options of no project and delay, as clearly highlighted above.

Chapter Three

3.

Project Description

3.1 Introduction

This chapter provides a description of the technical elements of the proposed AIH in the Akinyele Local Government Area (LGA) of Oyo State, Nigeria. The information provided in this chapter covers the following, among others: Project location, Project components, Project activities, workforce, utilities consumption, associated waste streams and management, and Project schedule.

3.2 Project Location

The proposed agribusiness site is situated within Ijaye, located in Akinyele Local Government Area (LGA) of Oyo State, Nigeria. The area covers approximately 3000 hectares, as delineated by the Oyo State Ministry of Agriculture, Natural Resources, and Rural Development. It lies at Latitude 7°40'47"N and Longitude 3°42'58"E, in the northern zone of Ibadan, and can be accessed through the Moniya–Iseyin road network. It is bordered by the communities of Atan and Aruna, and includes forest reserves and fallow agricultural land. The land cover is dominated by secondary vegetation consisting mainly of shrubs, grasses, trees, and herbs, indicative of a regenerating ecosystem with moderate anthropogenic disturbance. The topography is gently undulating, and the soils are fertile and well-drained, making the area suitable for large-scale mixed agricultural activities and agro-industrial development. The site is designated as gazetted agricultural land and has been confirmed to be free of legal encumbrances. Field verification and stakeholder consultations indicate that while portions of the land have been previously utilized by local farmers under informal or allocated use arrangements, such users were aware of the land status prior to access and do not possess formal ownership or competing land rights. This establishes clear tenure for project development while maintaining transparency regarding historical land use.

The proposed Oyo State Agro-Industrial Hub, Ijaye, will be developed as an integrated agricultural enterprise under the Special Agro-Industrial Processing Zones (SAPZ) program, supported by the African Development Bank (AfDB) and other technical partners. The SAPZ initiative aims to promote agricultural industrialization by concentrating infrastructure, processing, and market facilities within designated agro-clusters. Within the 3000 hectares, approximately 2,100 hectares will be dedicated to large-scale mechanized crop production and livestock ranching, while 300 hectares will be reserved for the SAPZ processing enclave. This processing zone will accommodate agro-industrial facilities for cassava, maize, soybean, poultry, and dairy value chains, together with storage, packaging, and distribution units.

Table 3.1: Land allocation for specific project at Ijaye Agro-Industrial Hub.

Zone	Description	Area (Ha)

A	Core agribusiness production area	2,341.15 ha
B	Support facilities/administration and allied infrastructure	200 ha
C	SAPZ enclave / agro-industrial processing and logistics	100 ha
D	Livestock development area / ranching and support systems	369.466 ha

The land-use structure is designed to optimise agricultural productivity and value addition by clustering primary production with processing, agrologistics, technology adoption, extension services, and market linkages. The configuration supports efficient farm operations, industrial processing, agricultural extension and training, utility provision, and future expansion, while incorporating buffer areas and environmental safeguards.

The hub will require a core workforce of approximately 400 personnel (skilled, semi-skilled, and unskilled), with an additional 200–300 seasonal/contract workers engaged during peak farming and processing seasons.

The administrative map of Nigeria showing the location of Oyo State is presented in Figure 3.1, while Figures 3.2 and 3.3 present the administrative maps of Oyo State and Akinyele LGA, respectively. Also, the aerial imagery of the Project area is shown in Figure 3.4, while the site layouts and aerial photograph AIH are presented in Figures 3.5 and 3.6.

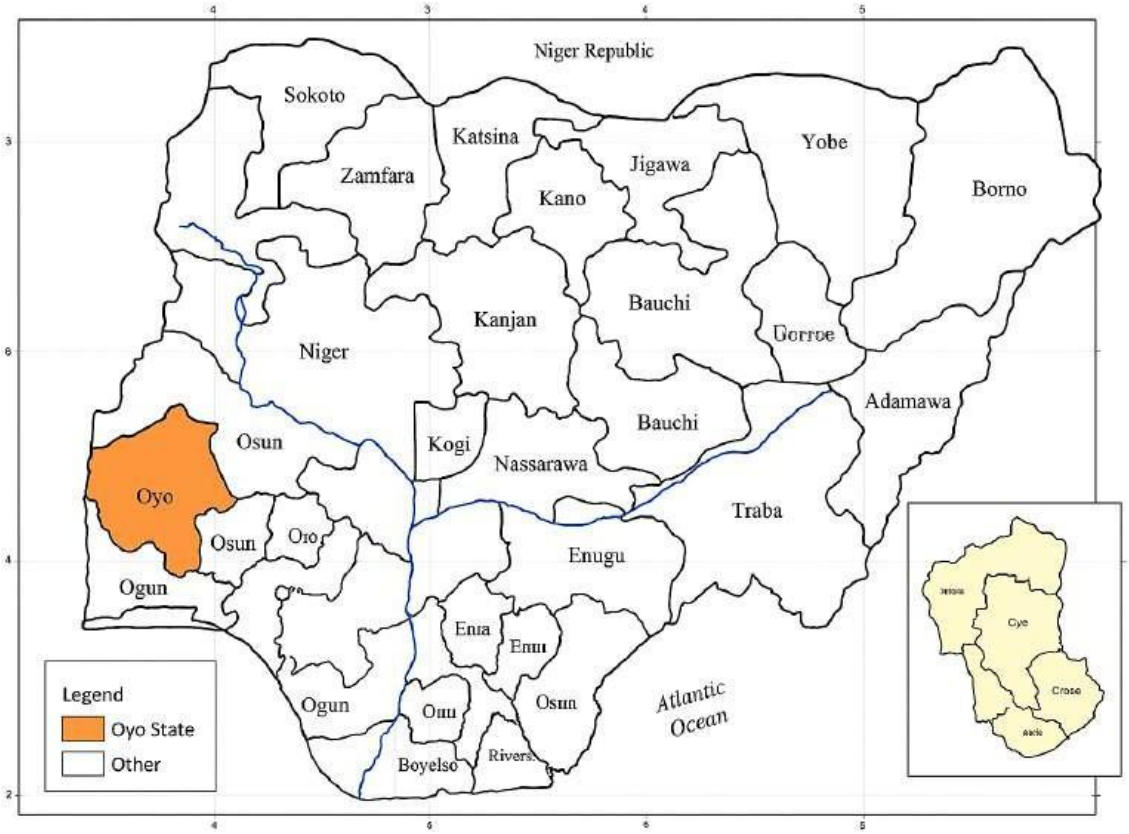


Figure 3.1: Administrative map of Nigeria highlighting Oyo State

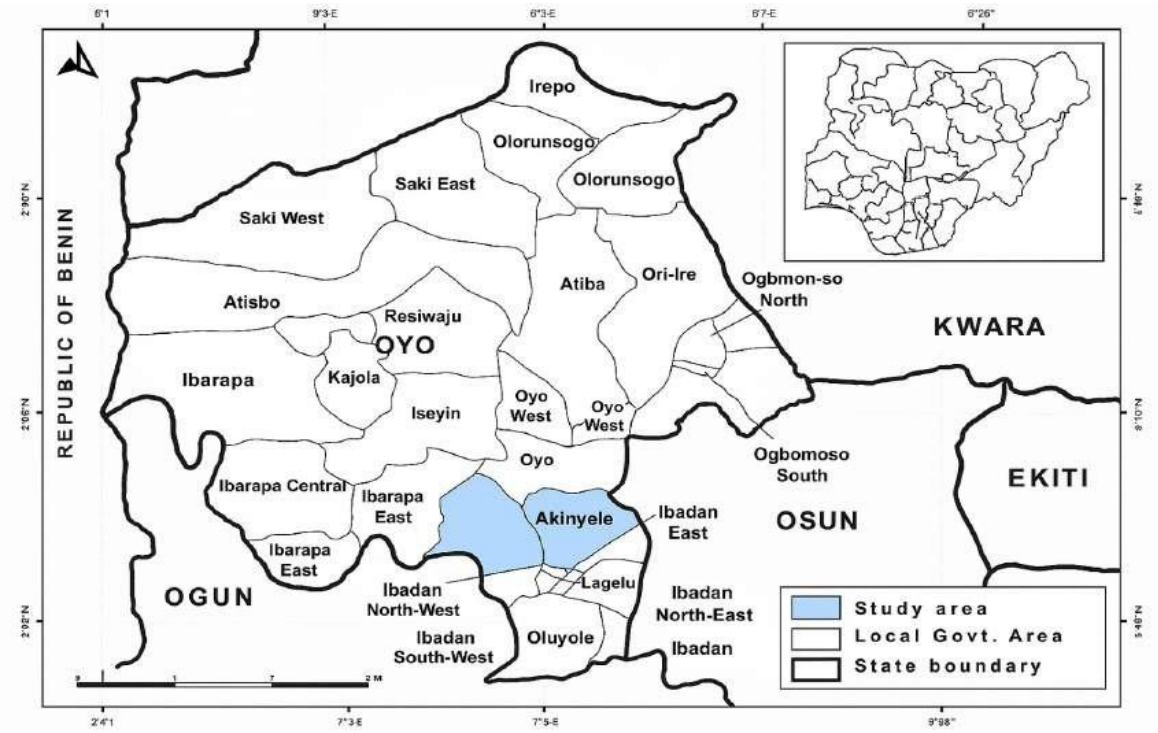


Figure 3.2: Administrative map of Oyo State showing Akinyele Local Government Area

Source: Google

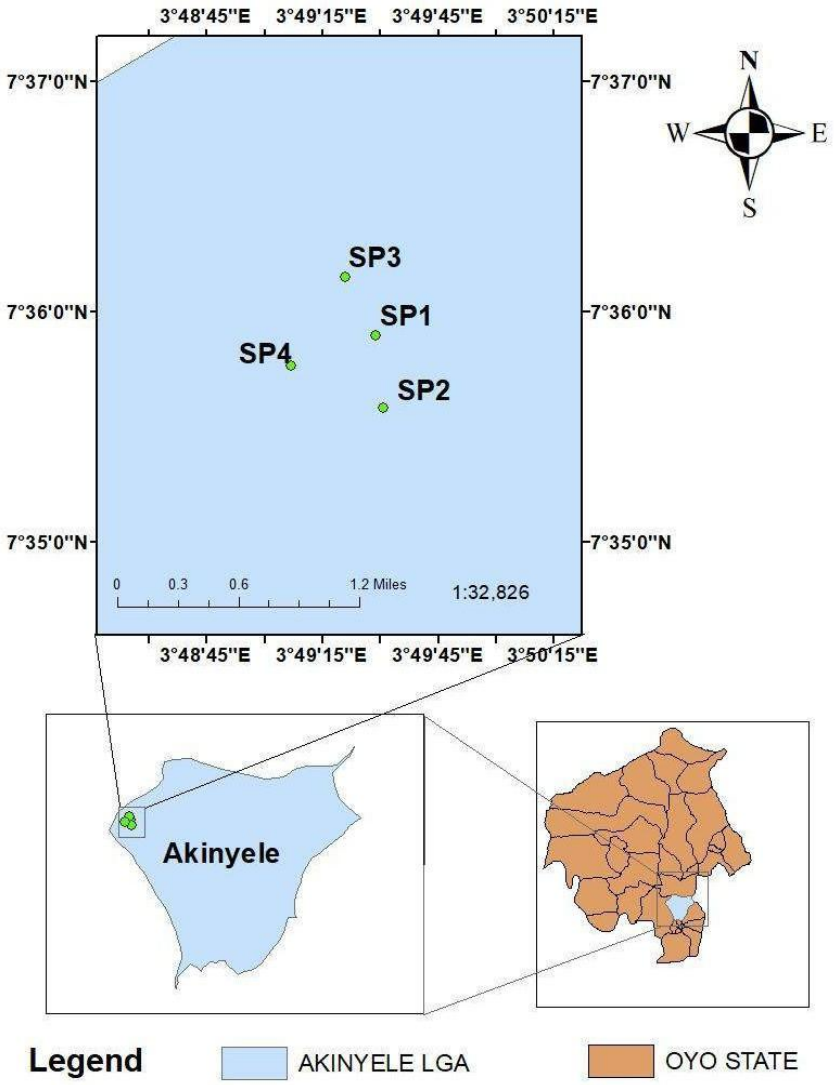


Figure 3.3: Administrative map of Akinyele Local Government Area

Figure 3.4: Location of the proposed Ijaye Agro-Industrial Hub

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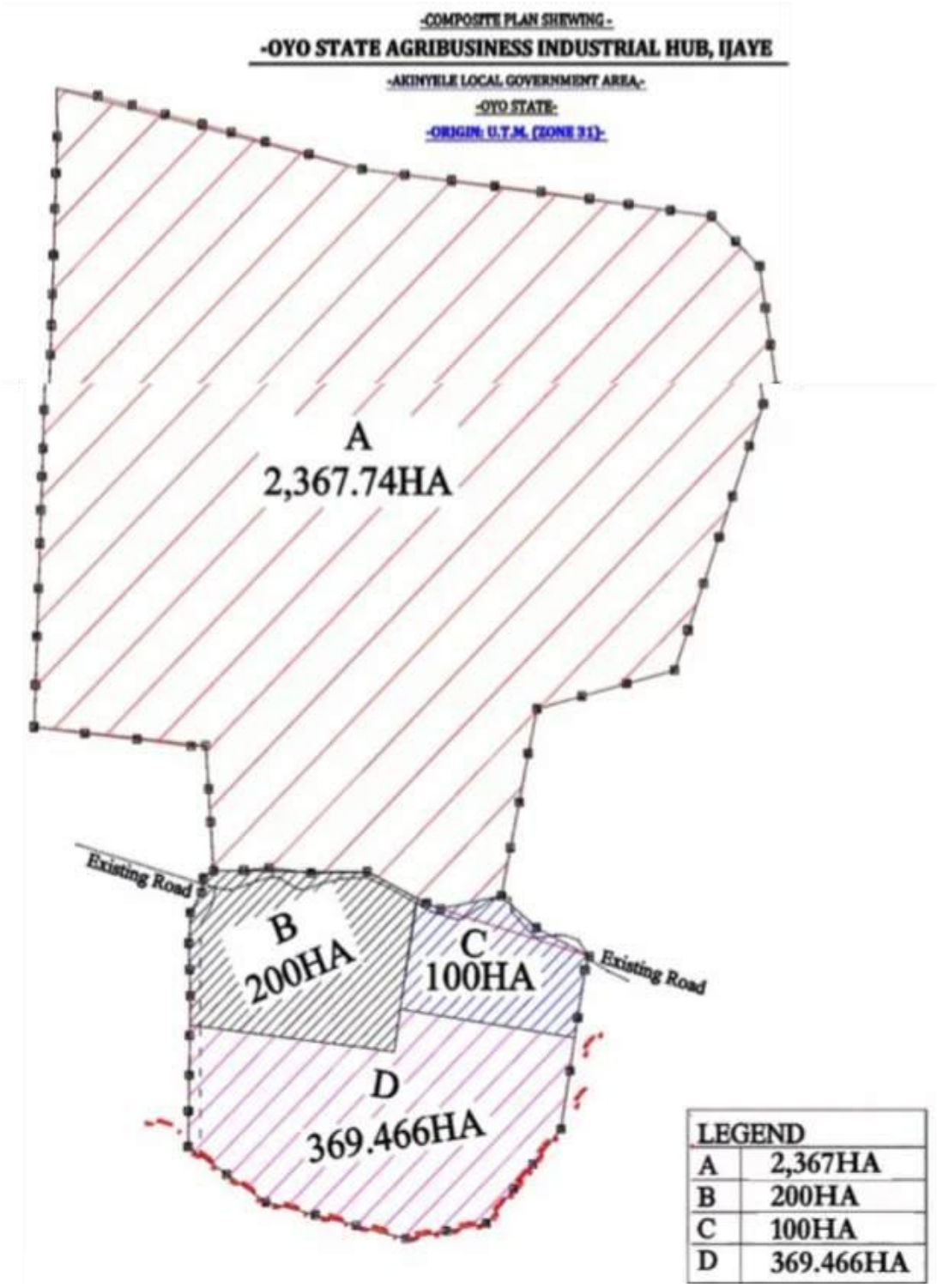


Figure 3.5: Composite Plan Shewing of the proposed Ijaye Agro-Industrial Hub. Source - OYSG

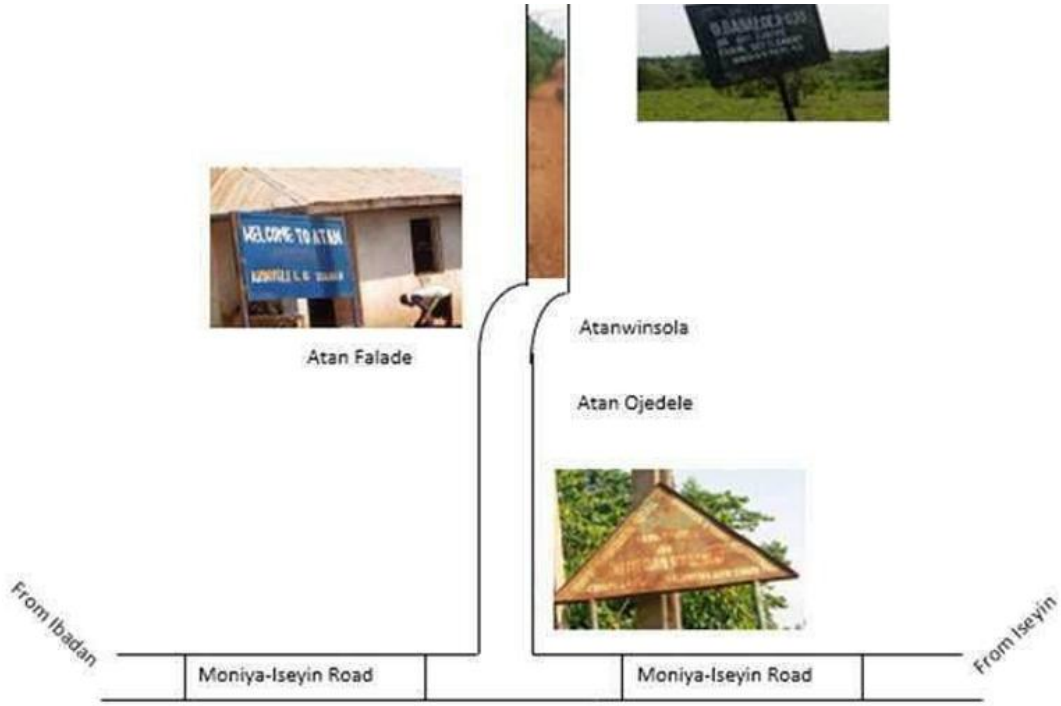


Figure 3.6: Direction to the proposed AIH at Ijaye: Source – Field Survey

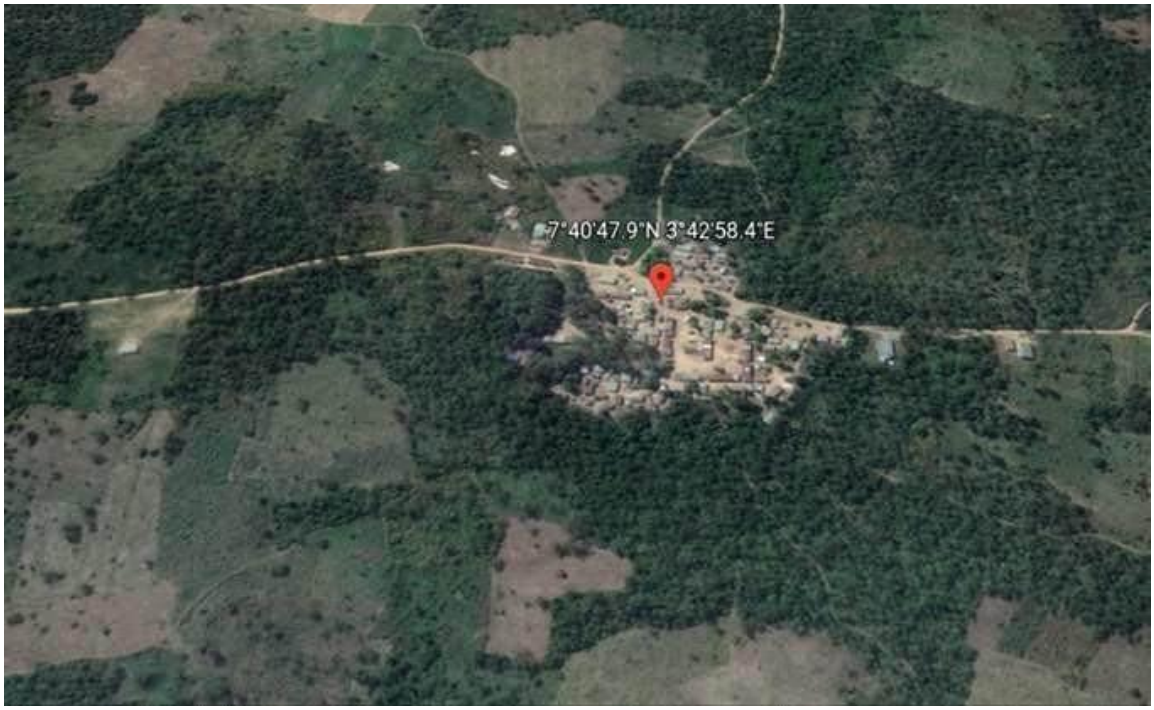


Figure 3:7: Aerial imagery of the proposed Industrial Agro Hub at Ijaye

Source: Google Earth

3.3 Overview of the proposed Project

The Ijaye Agro-Industrial Hub will involve the cultivation, processing, and marketing of major agricultural value chains, including cassava, maize, cocoa, soybean, vegetables (such as tomato and leafy greens), and livestock (poultry and cattle). The project will also include an integrated processing complex for cassava (garri, starch, ethanol), maize (flour and animal feed), cocoa (butter and liquor), and tomato (paste and puree) production.

These value chains were selected based on agroecological suitability, existing market demand, and Oyo State's comparative advantage in their production.

3.4 Project components

The key components/aspects of the proposed Project are as follows:
Cultivation

- Cultivation
- Pest and disease control
- Irrigation system
- Farm equipment and machinery (tractors, tillers, sprayers, etc.)

Processing Plant

- Processing equipment
- Borehole
- Septic tank
- Storage containers

Associated Facilities

- Offices and chalets
- Perimeter fence
- Access road
- Diesel-fueled Generators
- Transformer

3.4.1 Industrial Agro Hub

OYSG will be involved in the cultivation of maize, cassava, cocoa, tomtoe and soybean. The soil in Ijaye, as described in Chapter 4, is sufficiently fertile to support the cultivation of these food items. Moreover, OYSG shall ensure climate-smart agriculture practices for inlusive growth. Cassava, maize, tomato, cucumber, and other varieties of crops grow well in most soils and across a wide range of climatic conditions. They require an optimum level of soil fertility and adequate water for good yields. Typical products from the cultivation of these food items are presented in Figure 3.8. Cassava and maize can be eaten raw or processed into many products, such as garri, fufu, and flour, while rice and cucumber can be consumed cooked and processed into different products (Figure 3.8)

Figure 3.8: Cassava, maize, tomato, and cocoa farm produce

Climate requirements

Cassava and soybean grow well in warm, moist weather for high yield and premium quality, and perform optimally at temperatures between 24 and 30 °C. The location selected for the proposed AIH project can favorably support the growth of cassava, maize, soybean, and a host of other crops, as reported in chapter 4.

Soil requirements and nutrients

To achieve optimal yield and high-quality fruit, a high level of soil fertility is essential. Soybean grows well on a variety of soils with a pH between 4.5 and 8.5 except for sandy, gravely, and shallow soil to avoid drought. Cassava grows well in light, sandy loam soil with good drainage.

Soil composition obtained for the baseline study indicates that the soil at the proposed AIH would support good yields of these items. The soil is sandy loam, pH is largely neutral, and fertility is high considering soil organic content as well as nitrate and phosphate content.

3.4.1.1 Climatic Requirements and Cropping Calendar

Each crop will be cultivated in accordance with local climatic conditions and best agronomic practices to achieve optimal yield (Table 3.2).

Table 3.2: Proposed Agricultural Production Schedule and Requirements for AIH

Crop	Planting Period	Harvest Period	Optimum Temperature (°C)	Fertilizer Type & Quantity	Expected Yield (t/ha)
Maize	April–June (early wet season) & September (late planting)	August–November	21–27	NPK 15:15:15 (200kg/ha), Urea (50 kg/ha)	5–7
Cassava	March–May	December–February (after 9–12 months)	25–29	NPK 12:12:17 + Mg (400 kg/ha)	20–25
Cocoa	May–July	October–February	24–28	Organic manure (5 t/ha)	1.5–2
Tomato	October–January (dry-season irrigated)	February–April	21–24	NPK 20:10:10 (300 kg/ha)	25–30
Soybean	May–June	September–October	22–28	NPK 20:10:10 (150 kg/ha)	2–3

Cultivation will be rotated to maintain soil fertility and prevent pest buildup. Fertilizer applications will follow recommendations from the Oyo State Agricultural Development Programme (OYSADEP).

3.4.1.2 Postharvest Storage and Preservation Methods

A critical aspect of minimizing postharvest losses is selecting the right storage technology. The choice of equipment depends heavily on the commodity—whether it is a durable grain, a perishable fruit, or a root crop. To ensure the quality of raw materials and minimize postharvest losses, the AIH will employ specific, industrial-scale storage and preservation technologies tailored to each major crop cultivated. Each farm produce shall be stored as listed in Table 3.3 using instruments such as silos for maize and soybean, among others (Figures 3.17a and b).

Table 3.3: Postharvest Storage strategy and technologies for AIH crops.

Crop	Harvest Period	Mode of Storage After Harvest	Key Technology & Goal
Maize	August–Nove mber	Vertical Steel Silos and Aerated Flat Warehouses.	Dry Storage: Maize will be mechanically dried to a safe moisture content (typically 12.5% to 13.5%) and stored in sealed, temperature- and humidity-controlled silos. This prevents mycotoxin formation, insect infestation, and spoilage over long periods.
Cassava	December–F ebruary	Immediate Processing and Temporary Wet Storage.	Processing Pathway: Due to high perishability, harvested cassava is prioritized for immediate processing at the on-site processing plant into starch, flour, or garri. For temporary storage, roots may be held in water tanks (steeping) or processed into stable products like cassava chips within 24–48 hours of harvest.
Cocoa	October–Feb ruary	Fermentation, Drying, and Bag Storage.	Quality Development: Fresh pods are immediately broken, and beans undergo controlled fermentation for 5–7 days, followed by sun-drying or mechanical drying to a moisture content of 7%. The dried beans are then stored in clean jute bags in a dry, well-ventilated warehouse.
Tomato	February–Ap ril	Cold Chain Storage And Immediate Processing.	Perishability Control: Fresh tomatoes intended for market or short-term hold are placed in refrigerated storage (8–10 °C) to slow ripening and decay. The bulk of the harvest, however, will be directed to the processing plant for immediate conversion into paste and concentrate using aseptic packaging.
Soybean	September–October	Vertical Steel Silos and Aerated Flat Warehouses.	Dry Storage: Similar to maize, soybeans will be cleaned, dried to a safe moisture content (typically 10 to 12%), and stored in the silos and dedicated warehouse facilities to maintain quality for industrial oil extraction and feed production.

3.4.2 Pest Management and Disease Control

Integrated Pest Management (IPM) will be adopted to minimize chemical dependency. Specific pesticides/herbicides/fungicides are presented in Tables 3.4 and 3.5. This schedule outlines the chemical controls planned for the AIH, emphasizing precise application and adherence to safety and environmental standards.

Table 3.4: Targeted chemical application schedule.

Category	Example Product (Source)	Mode of Application	Frequency
Herbicide	Glyphosate (Round-Up®, Bayer)	Pre-plant, 3 L/ha via boom sprayer	Once before planting
Insecticide	Lambda-cyhalothrin ((Karate® Gold, Syngenta)	Foliar spray using knapsack sprayer	Every 3 weeks
Fungicide	Mancozeb (Dithane M-45®, BASF)	Foliar spray	Bi-weekly during wet season
Pesticide	Cypermethrin + Dimethoate (Cypermethrin Plus®)	Targeted for borers and beetles	As required

Chemical Handling and Safety: All farm personnel will be trained in Safe Handling of Chemicals (SHOC). Storage, labeling, and disposal will comply with FMEnv and NAFDAC standards. Empty containers will be rinsed, punctured, and disposed of through accredited hazardous-waste contractors.

Common diseases and preventive measures include:

Table 3.5: Major diseases and IPM control measures.

Crop	Major Disease	Symptoms	Control Measures
Cassava	Mosaic virus	Leaf curling, chlorosis	Use resistant varieties, vector control
Maize	Stem borer, rust	Stunted growth, brown pustules	Crop rotation, biological control
Tomato	Blight, nematodes	Leaf spots, wilting	Fungicide spray, solarization
Cocoa	Black pod	Pod rot	Regular fungicide application

3.4.2.1 Post-Management Sanitation

Diseased plant materials will be immediately isolated and subjected to controlled decomposition through composting in designated, managed pits, ensuring pathogens are neutralized before the compost is reused.

3.4.2.2. Enhancement to Integrated Pest Management (IPM)

To further enhance the AIH's IPM strategy, the following measures are integrated:

- Scouting and Thresholds: A dedicated team will conduct weekly field scouting to monitor pest and disease populations. Chemical intervention will only be triggered

upon reaching specific Economic Thresholds (ETs), moving away from routine prophylactic application.

- Agroecological Practices: Implement practices such as trap cropping (planting a different species to attract pests away from the main crop) and fostering natural enemies (beneficial insects) within the farm ecosystem to provide biological control.
- Pest and Disease Forecasting: Utilize local weather data and crop growth models to predict high-risk periods for major diseases (like Maize Rust or Tomato Blight), allowing for timely, preventative measures (e.g., pruning, slight adjustments to irrigation) rather than relying solely on chemical sprays.

3.4.3 Water Pump and Irrigation System

Water is required for wetting maize, cassava, and soybean plants during the planting season. A pump will be installed at the pond near the proposed farm, and water will be delivered to the farm via pipes from the head control unit. The pipes will be installed on the farm so that water can reach the soybean plant roots directly.

The type of pump to be installed for the proposed Project is a centrifugal pump. Centrifugal pumps are designed to move large volumes of water (high flow rate), but they do not generate much pressure. The pump will draw water from the pond and deliver it to the head control unit of the irrigation system.

The irrigation system for the Project is planned to be a drip method that allows water to drip slowly to the root of plants, either from above the soil surface or buried below the surface. This will reduce the risk of runoff and flooding of the farm during planting season.

The irrigation water will be sourced from a perennial stream (Odo Iya Alaso) located approximately 350 m west of the farm. A centrifugal pump (20 HP, 8-inch discharge, 180 m^3/h capacity) will transfer water through HDPE pipes (200 mm diameter) into a head control unit and distribution network supplying drip lines to the cultivation blocks.

The estimated irrigation water demand is 1,200 m^3/week per 100 ha, with variation depending on rainfall and crop stage. The system design allows automated water scheduling to optimize water-use efficiency.

3.4.4 Farm Equipment and Machinery

The use of agricultural machinery to mechanize farm operations can improve productivity and yield on the farm. Mechanized farming is well suited for the proposed Project due to the large land size and the high output of soybean needed to make the operation viable. **Large-scale mechanized operations** are central to the AIH's strategy to maximize efficiency and productivity. The modern agricultural equipment listed in Table 3.6 supports all core activities, from precision planting to harvesting.

Table 3.6: AIH mechanization and key equipment inventory.

Equipment	Quantity	Specification/Model	Function
Tractors	10	Massey Ferguson MF-260	Land prep, Hauling
Disc Harrows	5	3-disc offset	Tillage
Boom Sprayers	6	600 L, 12 m boom	Chemical Application
Planters	4	Precision Planter PP-1	Row planting
Harvesters	4	Combine Harvester CX5080	Harvesting Grains
Mowers/Slashers	3	Heavy-duty rotary	Weed control
Water pumps	3	20 HP centrifugal	Irrigation
Generators	2	250 kVA diesel	Power backup

Routine maintenance will follow manufacturer guidelines (every 250 engine hours). Noise levels will be < 75 dB(A).

Typically, the following equipment will be used on the farm:

- Tractors

Tractors are an essential source of power in farming, where they are used in most farm operations throughout the season. They are designed for pushing or pulling special machinery or heavy loads over land. OYSADA would acquire tractors fitted with GPS for the farm Project. The typical photograph of a tractor is shown in Figure 3.9a.

- Disc Harrow

A towed implement consisting of heavy concave steel discs. Its function is tillage (secondary land preparation) by cutting, breaking, and turning the soil after plowing. This helps crush clods, incorporate residues, and create a smooth, fine seedbed for planting (Figure 3.9b).

- Boom Sprayer

These mechanized sprayers are used for chemical applications (herbicides, insecticides, and fungicides). The large tank capacity (600 L) and wide boom width (12 m) ensure fast, uniform, and efficient application across large fields, critical for timely crop protection (Figure 3.9c).

- Planter

Specialized equipment designed for accurate, row planting of seeds (like maize and soybeans). Precision planters ensure seeds are placed at the correct depth and spacing, which is vital for achieving optimal plant population, uniform growth, and maximizing yield (Figure 3.9d).

❖ Harvester

They are self-propelled machines that perform three harvesting operations simultaneously: reaping (cutting), threshing (separating grain), and winnowing (cleaning). The Combine Harvester CX5080 is essential for the efficient, large-scale harvesting of grains (maize, soybean) (Figure 3.9e).

❖ Mower/Slasher

Implements used for cutting down weeds, cover crops, and overgrown vegetation. Their function is primarily weed control and field maintenance, ensuring clear access and reducing competition with the main crops (Figure 3.9f).

❖ Water pump

High-capacity pumps used for irrigation. These pumps draw large volumes of water from sources (boreholes, reservoirs, or streams) and feed the farm's drip and sprinkler irrigation networks, ensuring consistent water supply, especially during the dry season (Figure 3.9g).

❖ Generators

Stationary units providing power backup and primary power for non-grid-connected operations. They supply essential electricity to run the office buildings, security systems, cold storage facilities, and crucial components of the processing plants during power outages (Figure 3.9h).

Figures 3.9a and b: A typical tractor and disc harrows

Figures 3.9 C–H: A boom sprayer, a planter, a harvester, a mower/slasher, a water pump, and a generator

3.4.5 Processing Plant

OYSADA's agroprocessing complex will handle cassava, maize, cocoa, tomato, and soybean.

The facility will include:

- Cassava section: peeling, grating, pressing, drying, and bagging for starch, garri, flour, and ethanol.
- Maize unit: shelling, drying, milling, and blending for flour and animal feed.
- Cocoa line: fermentation, drying, roasting, and grinding to produce butter and liquor.
- Tomato unit: washing, pulping, evaporating, and aseptic packaging for paste and puree.
- Soybean unit: cleaning, dehulling, oil extraction, and cake processing.

Final products will include garri, starch, cassava flour, maize flour, poultry feed, tomato paste, cocoa butter, soybean oil, and compost from organic waste (Figures 3.10 and 3.11).

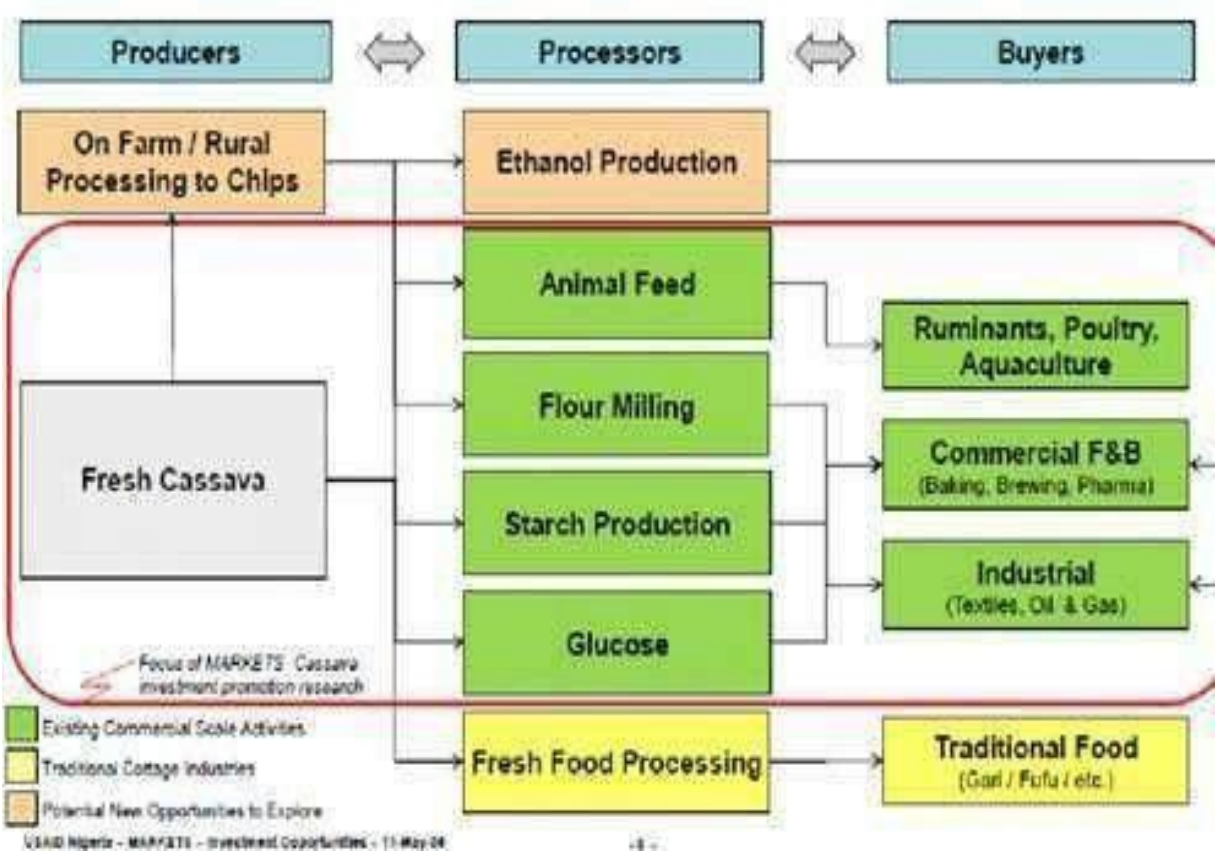


Figure 3.10: Typical cassava value chain

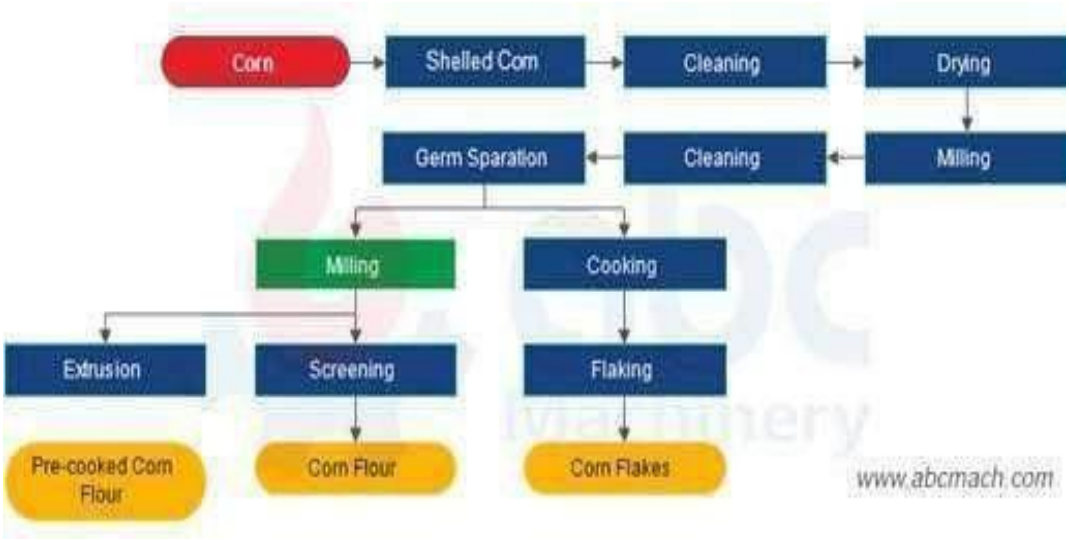


Figure 3.11: Typical maize value chain

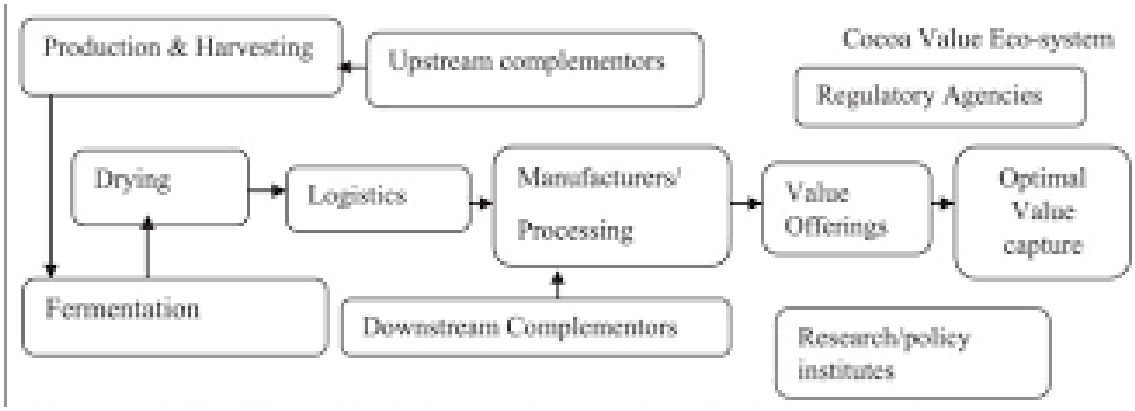


Figure 3.12: Typical cocoa value chain

3.4.5.1 Processing plant equipment

Some equipment required for processing cassava and soybean to various products and involvement of locals in their production are shown in figures 3.12, 3.13, 3.14, and 3.15 c–h.

Figure 3.13: Cassava Processing Machine

Figure 3.14: Local Cassava processing into garri

Figure 3.15: Typical maize processing machine

3.4.5.2 Solid Waste Area

Solid waste, such as cassava peels, corn husks, cobs, and tomato residues (estimated 4 t/day) will be processed into compost or used for biogas generation. Wastewater from processing units will pass through a three-stage treatment system (grease trap → sedimentation → biological filter) before reuse for irrigation or discharge meeting NESREA/FME effluent limits (Table 3.7).

Table 3.7: Solid Water Disposal Method

Phase	Waste Type	Quantity (approx.)	Disposal Method
Pre-construction	Vegetative debris	40 t	Composting
Construction	Excavated soil, packaging	60 t	Reuse, recycling
Operation	Cassava peels, wastewater	150 t/month	Composting, treatment
Decommissioning	Scrap metal, rubble	20 t	Recycle/disposal

Figure 3.16: A typical composting lifecycle of organic wastes

3.4.5.3 Liquid Wastewater Treatment and Septic Tank

A septic tank will be constructed for the collection of sewage and domestic wastewater at the facility. Domestic wastewater from the offices, toilets, cloakrooms, and washrooms will be directed to the septic tank.

Wastewater generated by the processing units (washing, cleaning, and cooling) will be managed through a rigorous, multi-stage treatment process to ensure compliance and promote reuse.

3.4.5.3.1 Treatment System: Wastewater will pass through a dedicated three-stage treatment system:

a) Grease Trap: To remove oils, fats, and grease.

b) Sedimentation Tank: To allow for the settling of suspended solids.
c) Biological Filter (e.g., Constructed Wetlands or Bio-Reactors): To break down residual organic matter using microbial action.

3.4.5.3.2 Discharge and Reuse:

The treated effluent will meet the strict environmental discharge limits set by NESREA / Federal Ministry of Environment (FME). The treated water will then be prioritized for reuse in irrigation on the AIH farmlands before any necessary discharge.

3.4.5.4 Storage Containers

An example of a storage facility on the farm is shown in Figures 3.17a and b.

a) Maize: stored in five silos (1,000 t each) fabricated on-site using galvanized steel.
b) Cassava: stored temporarily (< 48 hours) in ventilated sheds before processing.
c) Tomatoes: stored in cold rooms (10 °C) for up to 5 days prior to processing.
d) Cocoa: fermented beans stored in jute bags in dry, aerated warehouses.

Figure 3.17a: Local shed for storing and preserving grains

Figure 3.17b: A typical silo for storing grain

3.5 Project Development Activities

The proposed Project activities are grouped as follows:

- Pre-construction phase activities
- Construction and installation phase activities
- Operational phase activities

Details on the proposed Project activities are presented in the following sub-sections:

3.5.1 Pre-Construction Phase Activities

The pre-construction phase activities for the Project will include site clearing / preparation and mobilization of personnel and transportation of construction materials such as steel, stones, cement, sand, etc. to the site.

3.5.2 Construction Phase Activities

3.5.2.1 Safety Procedures

Construction activities usually require a careful approach and appropriate safety procedures. The procedures include:

- Risk Assessment
- Personal Safety
- Site Safety and Security
- Ground Excavation
- Final Clean Up

- **Risk Assessment**

  This involves assessing the risks in every aspect of the job and educating the on-site workmen regarding the identified risks. People working in the area shall also be

warned of the risks involved; i.e., warning signs shall be erected so they are clearly visible.

- **Personal Safety**

All staff, workmen, suppliers and sub-contractors working on site shall be informed of the need to ensure their personal safety and the safety of the people working around them. Every workman will be instructed to always put on his safety kits (personal protective equipment —PPE) anytime he is on site.

- **Site Safety and Security**

The Project site will be enclosed by means of fencing from the surrounding community and the main road. Security officials will be positioned within and around the Project site day and night. Furthermore, warning signs will be erected around the site and a closed-circuit video surveillance system installed.

- **Ground Excavation**

This involves digging to lay foundations for the processing plant equipment. Appropriate safety measures will be implemented and overseen by an on-site HSE officer during site excavation and related activities.

Construction site clean-up would include builder's scrap materials. All scrap materials will be removed from the area by tidying up the entire site area prior to demobilization.

3.5.3 Operational and Maintenance Activities

The SAPZ operational development and industrial area to be carved out will be maximized to effectively protect the green environment and limit vulnerability to climate change difficulties, as well as the exposure of local residents to pollutants.

The Project operational activities will include:

3.6 Utilities Consumption

3.6.1 Water Use

Water is required during the Project's construction and operation phases. During the construction phase, water demand is driven by the following key requirements: to make concrete for piled concrete mounting structure foundations, and for staff sanitation.

3.6.2 Waste Management

This section discusses the waste streams associated with the proposed Project and the intended management plan.

3.6.3 Philosophy

3.6.3.1 Associated Waste Streams

All waste generated from the Project will be categorized as either non-hazardous or hazardous following an assessment of the hazard potential of the material.

3.7 Climate-smart agriculture

In order to ensure high productivity and minimize waste generation, climate-smart agriculture (CSA) principles shall be followed by OYSG. CSA refers to agricultural techniques that boost production and system resilience while lowering greenhouse gas emissions. CSA contributes to the direct incorporation of climate change adaptation and mitigation into agricultural development planning and investment strategies. CSA is one of the sustainable agriculture practices, which is based on the integrated management of water, land, and ecosystems at the landscape scale. CSA is frequently marketed as the future of African agriculture and a sustainable solution to climate change. Because agriculture remains critical to Nigerian development, CSA has the potential to boost productivity and resilience while reducing the vulnerability of hundreds of millions of smallholder farmers. CSA can directly benefit smallholder farmers by increasing the efficiency of valuable inputs such as labour, seeds, and fertilizer, as well as increasing food security and income generation opportunities. CSA contributes to the preservation of natural resources for future generations by conserving ecosystems and landscapes.

CHAPTER FOUR

4.

Description of Existing Natural Environment

4.1 Introduction

This chapter describes the existing ecological and physical environmental as well as socioeconomic situations and health conditions of the proposed Project area against which the potential and associated impacts of the Project have been assessed. Data and information for the description of the existing environmental conditions of the study area were based on information obtained through a combination of literature review and comprehensive field investigations conducted across two seasons to adequately capture seasonal variations in environmental parameters. The field survey was conducted between April 16 and October 10, 2021, covering both the dry-to-rainy season transition and the peak rainy season periods. Additional data were obtained between 8 and 13 October, 2025. The exercise was undertaken by a multidisciplinary team of specialists encompassing expertise in ecology, soil science, hydrology, meteorology, socioeconomics, and environmental management.

The description of the existing environmental conditions of the study area presented in this chapter covers the following:

- Meteorology
- Geology and Hydrogeology
- Air quality and Noise
- Surface water quality
- Soil
- Terrestrial Flora and Fauna
- Socioeconomics and Health

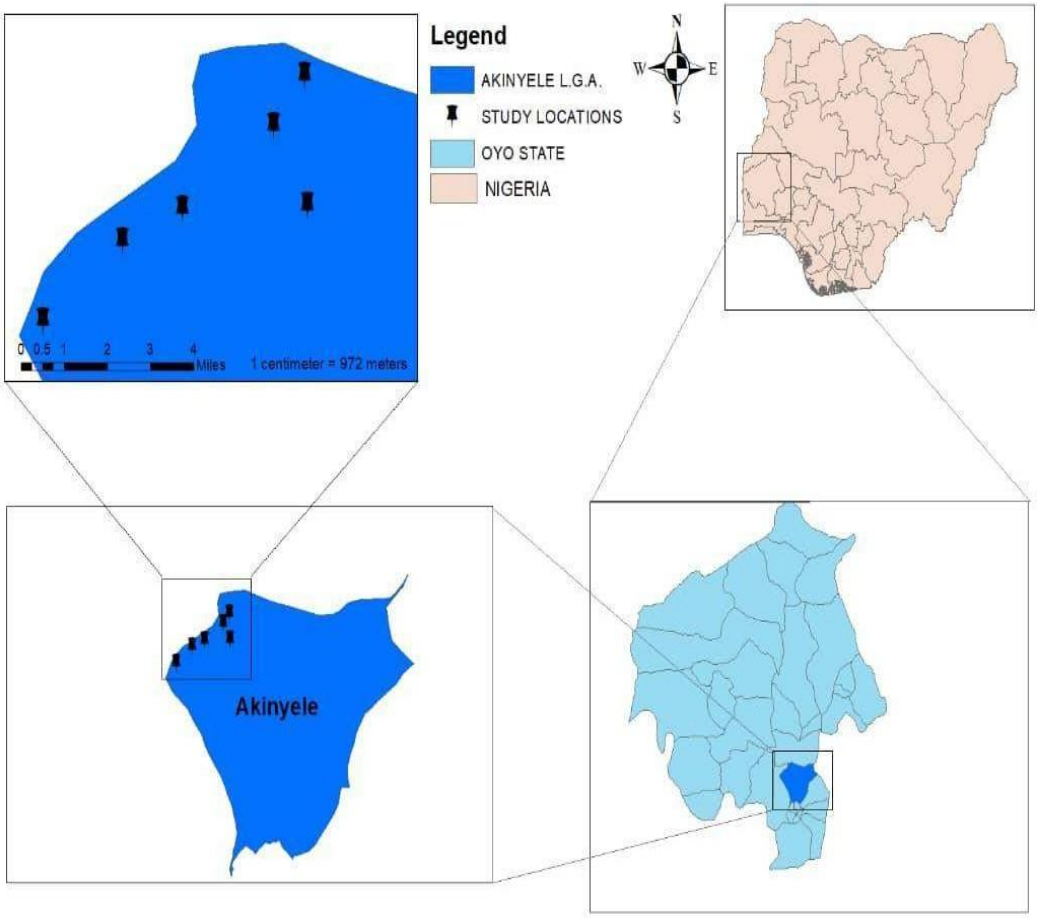


Figure 4.1: Maps showing exact locations of proposed IAGH centre

4.2 Baseline Data Acquisition

The baseline data acquisition for the environmental and socioeconomic characteristics of the Project is based on the following: i) Field sampling and laboratory analysis, ii) Literature survey, and iii) Consultation with potentially affected communities.

4.2.1 Field Sampling and Laboratory Analysis

4.2.1.1 Field Sampling

To effectively characterize the ecology, environmental, and socioeconomic conditions of the study area, a thorough field data acquisition was conducted from April 16 to October 10, 2021. Additional data were obtained between 8 and 13 October, 2025 and on November 10, 2025. Reconnaissance visits were earlier conducted between March 10 and 14, 2021 to identify sampling points, engage community representatives, and delineate access routes. The field sampling activities were carried out in line with the FMEnv-approved ToR, and the relevant requirements of applicable international standards. In addition, soil and water samples collected during the field campaign were analyzed at the Rural Water and Environmental

Sanitation Agency (RUWESA) Laboratory, Abeere, Osun State, using standard analytical protocols in accordance with national and international environmental quality standards. The analyses covered key physico-chemical and microbiological parameters to ensure data quality, accuracy, and reliability. Different views of Ijaye AIH are presented in Plate 4.1

Baseline environmental sampling was designed to ensure adequate spatial coverage and representativeness of conditions within the Project Area of Influence (AoI). A total of seven (7) sampling locations were established for soil and ambient air quality assessment, distributed across the Project site at approximately 3 km intervals to capture spatial variability in land use, vegetation cover, and potential receptor sensitivity.
Sampling points were strategically selected to represent key environmental settings, including active farmlands, fallow areas, settlement proximities, access corridors, and relatively undisturbed locations, thereby providing a balanced characterization of baseline conditions.
For water quality assessment, both surface water and groundwater samples were collected from locations within and around the proposed AIH site, including streams and existing wells used by local communities. These sampling locations were selected based on hydrological relevance, usage patterns, and potential interaction with project activities.
Overall, the number and distribution of sampling points are considered adequate for a project of this scale and environmental setting, providing a representative baseline against which future project-induced changes can be monitored.

The integrated dataset derived from these sources provides a comprehensive baseline description of the biophysical and socioeconomic environment within the Ijaye Agro-Industrial Hub's Area of Influence, forming a sound basis for assessing potential environmental and social impacts associated with the proposed project.

The main objectives of these sampling activities are to gather and generate baseline data that sufficiently describe the ecological, environmental and socioeconomic conditions of the proposed project site and provide a sound basis for EIA of the site. During sampling, field observations were well documented.

Soil sampling stations were established to ensure the major soil types that characterize the proposed project site (Figure 4.2). Surface water sampling was carried out in line with applicable procedures (Figure 4.2). Heavy metals in soil and water were determined with an Inductively Coupled Plasma-Optical Emission Spectrometer. Air quality/noise was sampled along sensitive sampling points.

The site was geo-referenced with a Global Positioning System (GPS) using an Oregon 550 Garmin. An administrative map of the project location is included. GPS coordinates of sampling areas for air, soil, water, and vegetation are presented in Table 4.1. Seven sampling locations were chosen.

Quality assurance and quality control measures, in line with the local and international requirements, were implemented during the field sampling. These include, among others: i) in-situ measurements of parameters with short holding time in surface water and groundwater samples immediately after collection; ii) proper calibration of all portable meters used for in-

situ measurements; iii) separate samples were collected for parameters requiring different treatment/preservation before analysis; iv) field samples were adequately preserved with the appropriate reagents and labeled; and iv) chemical reagents used for sample preservation were adequately labeled to avoid mix-up.

All laboratory analyses were conducted at the Rural Water and Environmental Sanitation Agency (RUWESA) Laboratory, Abeere, Osun State, and CTX-ION Analytics, both established environmental laboratories with demonstrated competence in physico-chemical and microbiological analysis. The laboratories operate under documented Standard Operating Procedures (SOPs) consistent with recognized analytical methods. The Certificates of Analysis are provided below.

To ensure data reliability and integrity, the following QA/QC controls were implemented: use of analytical-grade reagents throughout; routine calibration of laboratory instruments using certified standards; application of field and laboratory blanks to detect contamination; and replicate (duplicate) analyses to assess precision. These measures, combined with adherence to sample preservation, handling, and holding time requirements, ensure that the analytical results are accurate, consistent, and fit for purpose.

Plate 4.1: Different views from the proposed AIH at Ijaye


A


B


C


D

Plate 4.2: Air, soil, and water sample collections

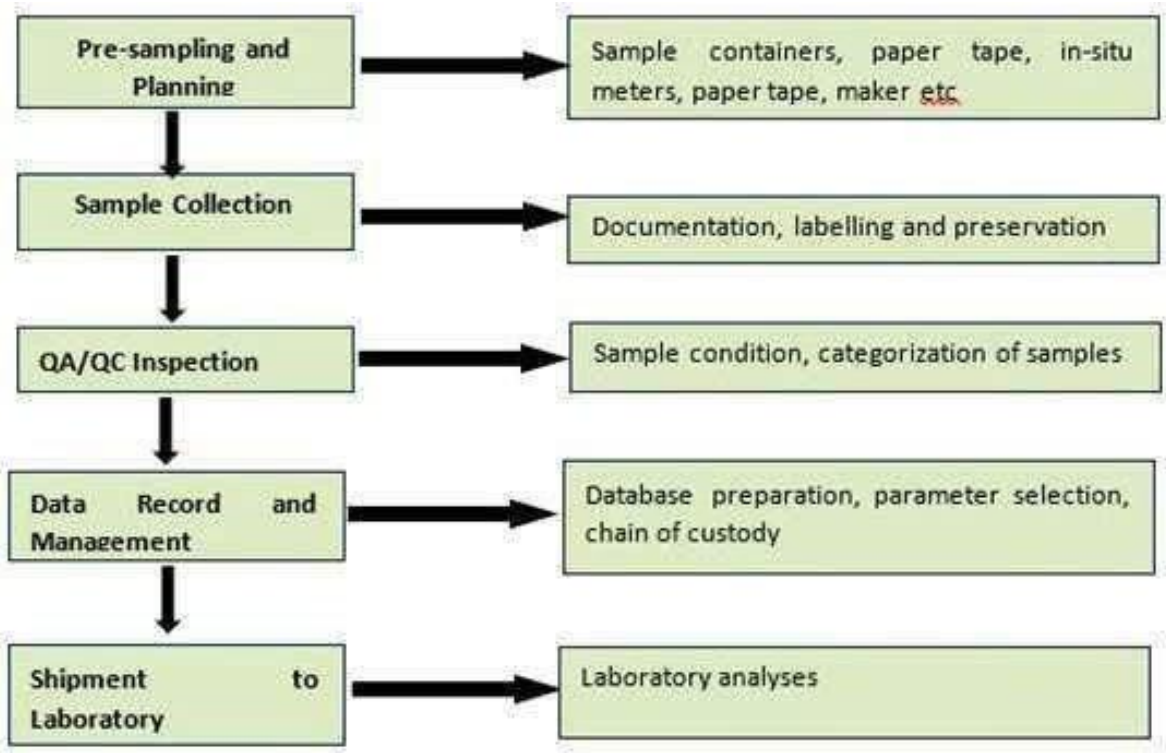


Figure 4.2: The summary of sample management program put in place to *safeguard the integrity of the field samples collected*

Table 4.1 shows the coordinates of sampling locations, and Table 4.2 presents the field equipment used during the field sampling.

Table 4.1: Sampling location coordinates and requirements.

Sampling location	GPS locations		Requirement
SP1	7°40'27.9°N	3°44'32.5°E	Air quality, noise, soil composition, and vegetation
SP2	7°40'44.8°N	3°44'07.8°E	Air quality, noise, soil composition, and vegetation
SP3	7°40'45.5°N	3°44'12.4°E	Air quality, soil composition, stream water (Odo Iyalaso), and vegetation
SP4	7°40'46.9°N	3°44'14.5°E	Air quality, noise, soil composition, and vegetation
SP5	7°40'37.6°N	3°44'16.3°E	Air quality, noise, soil composition, andvegetation
SP6	7°40'37.0°N	3°44'18.1°E	Air quality, noise, soil composition, and vegetation
SP7	7°40'40.9°N	3°45'24.7°E	Air quality, noise, soil composition, and underground water

Table 4.2: Field equipment used during sampling

S/N	Environmental component to be sampled/measu	Equipment/Tool	Detection limit
1.	Ambient Air Quality (pollutant gases)	▪ Aeroqual series 500. The pre -calibrated equipment was equipped with the following gas sensors: CO; CO2; SO2; H2S; NH3; NO 2; and VOC.	▪ 0.01 ppm for CO, SO_2, CO_2, H_2S, NH_3 ▪ 0.001 ppm for NO_2
2.	Ambient Air Quality (particulate matter)	▪ Met One GT-321 Particle monitor and air quality monitor (PM-1064SD)	▪ 0.001 ppm
3.	Wind pattern (In-situ weather parameters: Ambient Air Temp, Humidity, Wind Speed and Direction)	NiMet data and Literature review	
4.	Soil	Stainless Steel Augers	
5.	Surface water (in-situ water testing for parameters with short holding time namely pH, electrical conductivity, DO, Salinity, TDS, temperature)	▪ Extech Digital DO700 meter ▪ Hanna Digital meter	▪ pH ±0.01; DO 0.01 mg/L
7.	Ambient Noise Levels	Extech Integrating Sound Level Meter (Model No: 407780)	
8.	Vegetation (Flora) and Wildlife (Fauna)	Physical identification	

Copies of the Laboratory certificates can be seen below.

OSUN STATE RURAL WATER AND ENVIRONMENTAL SANITATION AGENC
(RUWESA)

Email:ruwesaosun@gmail.com
P.M.B 4465 OSOGBO
Tel: 09030138383

Our Ref:..... Your Ref:..... Date:.....20.....

TO WHOM IT MAY CONCERN

The following water samples were analyzed in the water quality control laboratory of the abovenamed agency. I attest that the information is true and correct to the best of my knowledge.

I thank you.

Latona T.G.

.....

Head (Quality Control Laboratory)

CTX-ION Analytics Ltd
2b Awori Close, Ikeja, Lagos
090 3495 6049, 080 6365 5850

Analysis Certificate

Title: Analysis of Elements by ICP-OES
Date: 13 February 2026
Customer: Prof Azeez Luqman

This is to certify that elemental analysis by ICP-OES was carried out on behalf of Prof. Luqman Azeez. The samples were analysed on 4th of April 2025 and 22nd of July 2025

Signature:
Ademoroti Adesoji
Laboratory Supervisor

The study methodologies employed for each component of the environment studied are provided below.

4.2.2 Climate and Meteorology

The long-term climatic data of the Project area was sourced from the Nigerian Meteorological Agency (NiMet), and it spanned from 1991 to 2023.

4.2.3 Air Quality and Noise

Air quality and ambient noise were conducted in situ using pre-calibrated digital hand-held monitoring equipment (refer to Table 4.2) for the following parameters: Sulphur (IV) Oxide (SO_2), Nitrogen (IV) Oxide (NO_2), Carbon Monoxide (CO), Carbon (IV) Oxides (CO_2), Volatile Organic Compounds (VOC), Hydrogen Sulphide (H2S), and Total Suspended Particulate (TSP).

Ambient noise levels were measured using an Extech Integrated Sound Level Meter with a detection range of 30 dB (A) to 130 dB(A). Noise Level measurements were taken at a height of approximately 2 m above ground level, and the response time was set to slow and read on the 'A' frequency weighting scale in units of decibels.

4.2.4 Surface and Underground (Well) Water

Surface water samples were collected from *Odo Iya Alaso Stream* located within the Project area, while groundwater (well water) samples were obtained from a hand-dug well approximately 500 meters from the site. The samples were analyzed in situ for key physico-chemical parameters, including pH, temperature, dissolved oxygen (DO), conductivity, and turbidity. Additional laboratory analyses were conducted for odor, color, heavy metals, salinity, chemical oxygen demand (COD), biological oxygen demand (BOD), hardness, alkalinity, and total and faecal coliform counts to assess overall water quality and suitability for domestic and agricultural use.

4.2.5 Soil Sampling

Composite soil samples were collected at designated soil stations with the aid of hand Auger and were collected from 0 to 15cm. The composite soil samples collected were homogenized in plastic bucket lined with aluminum foil sheet, and from the homogenized soil samples, sub-samples were taken for microbial and physico-chemical analysis.

4.2.6 Terrestrial Flora and Fauna

A flora assessment of the project area was undertaken to provide information on the following: vegetation types, floristic composition, species diversity, inventory of economic/medicinal plants and general biodiversity assessment. The survey was conducted in accordance with the standard botanical field sampling procedures. Plant species encountered were identified to species level both in situ and ex situ in the herbarium using appropriate references, manuals and monographs. The ecological status of the species was evaluated and classified appropriately according to the International Union for Conservation of Nature (IUCN).

Sampling techniques for terrestrial fauna assessment include footprint, nest type, feeding site, voice, physical appearance, faecal samples, and shell types.

4.2.7 Laboratory Analysis of Field Samples

Field samples collected during baseline data collection were conveyed to the laboratory for analysis, along with the completed chain- of- custody forms. The field samples were preserved with appropriate reagents (such as nitric acid).

The laboratory analyses for soil and water samples collected during the field campaign were analyzed at the Rural Water and Environmental Sanitation Agency (RUWESA) Laboratory, Abeere, Osun State, using standard analytical protocols in accordance with national and international environmental quality standards, and undertaken in consistency with the approved standard methodologies, such as those recommended by ASTM International, the American Public Health Association (APHA), and the FMEnv. The summary of analytical methods employed is presented in Table 4.3.

Table 4.3: Methods employed for field samples analysis.

S/N	Parameters	Analytical Methods
1.	Total Suspended Solids	Gravimetric method
2.	BOD	Dilution method
3.	COD	Reflux dichromate method
4.	Alkalinity	Titration method
5.	Total Hardness	Titration method
6.	Nitrate	Colorimetric method
7.	Sulphate	Turbidimetric method
8.	Phosphate	Ascorbic acid method
9.	Sodium	ICP-OES
10.	Potassium	ICP-OES
11.	Calcium	ICP-OES
12.	Magnesium	ICP-OES
13.	Heavy metals (e.g. Pb, As, Cd, Zn, Cr, Cu, Fe)	ICP-OES
14.	Mercury	ICP-OES

Plate 4.3a: Analysis of samples in the laboratory at RUWESA

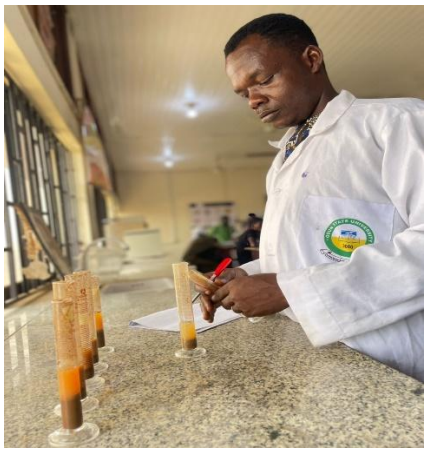


Plate 4.3b: Microbiological and soil analysis of samples in the laboratory at RUWESA

4.2.8 Consultation with Local Communities

Relevant information was gathered during the field visit through extensive engagement with key stakeholders in the Ijaye Community and environs, particularly within the Camp and Atan communities. The socioeconomic and health baseline data were obtained using a combination of qualitative and quantitative research methods to ensure a comprehensive understanding of local conditions. These methods included the administration of structured questionnaires to households and farmers (a sample copy is provided in the annex), key informant interviews (KIIs) with community leaders, cooperative heads, extension officers, and health personnel, as well as focus group discussions (FGDs) involving youth, women, and farmer groups. In addition, relevant secondary data were sourced through a literature review of existing reports, and direct field observations were conducted to validate responses and assess on-ground realities. A detailed description of these data collection methodologies is provided in Section 4.10 of this chapter.

4.2.9 Climate and Meteorology

The long-term climatic data of the Project area was sourced from the NiMet and spanned from 1991 to 2023. Meteorological data covering temperature, rainfall, percentage relative humidity, sunshine hours, and wind speed were analyzed to establish the baseline climatic conditions of the proposed Ijaye Agro-Industrial Hub.

Oyo State lies within the moderately hot and humid tropical climate zone of southwestern Nigeria. The area experiences a typical tropical climate characterized by distinct wet and dry seasons, both of which are primarily influenced by the dynamics of the Inter-Tropical Convergence Zone (ITCZ). The ITCZ represents the meeting point between two dominant air masses: the maritime tropical air mass, which brings warm and humid southwesterly winds from the Atlantic Ocean, and the continental tropical air mass, associated with hot, dry northeasterly winds from the Sahara Desert. The north–south oscillation of the ITCZ governs the alternation of these seasons.

The wet season, from April to October, is dominated by moisture-laden south-westerly winds, while the dry season, from November to March, is influenced by dry northeasterly winds. Within the dry season, the harmattan period—characterized by dry, dusty winds, low humidity, and relatively cooler temperatures—typically occurs between December and February.

Table 4.4 presents the monthly mean climatic parameters of Oyo State (1991–2023), illustrating variations in rainfall, temperature, and humidity over the study period.

Table 4.4: Monthly mean climatic characteristics of the project area in Oyo (1991–2023).

Month	Temperature $_{o}$C		Rainfall (mm	Relative Humidity (%)		Sunshine (hrs)	Wind speed (m/s)
	Min.	Max.		9:00 hrs	15:00 hrs		
January	26.82	33.60	6.95	68.11	41.56	5.60	3.85
February	28.70	34.27	17.65	70.00	41.26	5.89	4.24
March	29.03	34.77	64.14	76.26	53.07	5.54	4.51
April	28.28	32.97	114.71	80.26	61.56	5.77	4.51
May	27.18	32.51	146.49	81.74	68.48	5.98	3.96
June	25.91	30.18	171.16	84.07	74.07	5.22	3.97
July	24.9	28.42	175.03	87.15	75.78	3.41	4.52
August	24.59	28.27	138.72	87.33	76.78	2.83	4.98
September	25.14	29.51	207.12	85.85	73.59	3.84	4.45
October	26.03	30.76	139.53	83.30	66.41	4.86	3.36
November	26.91	32.70	15.24	79.33	52.89	6.37	3.06
December	26.42	33.11	6.9	73.48	47.56	6.38	3.31

Source: NIMET 2023

4.2.10 Rainfall

Rainfall patterns indicate the onset of the wet season around March/April, peaking between June and September, with annual cumulative rainfall exceeding 1,200 mm. The dry season spans November to February, characterized by low precipitation and high evapotranspiration

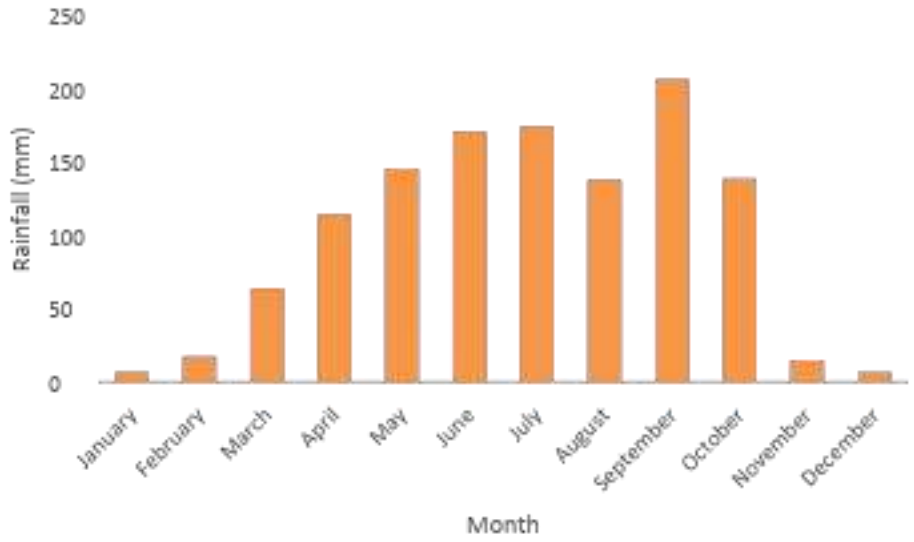


Figure 4.3: Average rainfall characteristics of the project area in Oyo State (1991–2023)

(Figure 4.3). This seasonal distribution necessitates irrigation infrastructure for dry season farming and proper drainage systems to prevent waterlogging during the wet season.

4.2.11 Ambient Temperature

The project area experiences consistently warm temperatures year-round. The highest mean monthly temperatures occur between February and April (up to 34.8 °C), while the lowest are recorded in July and August (around 28 °C). The narrow temperature range reflects the influence of tropical maritime air masses. Such thermal consistency supports the cultivation of maize, cassava, vegetables, and legumes proposed under the Ijaye Agro-Industrial Hub (Figure 4.4).

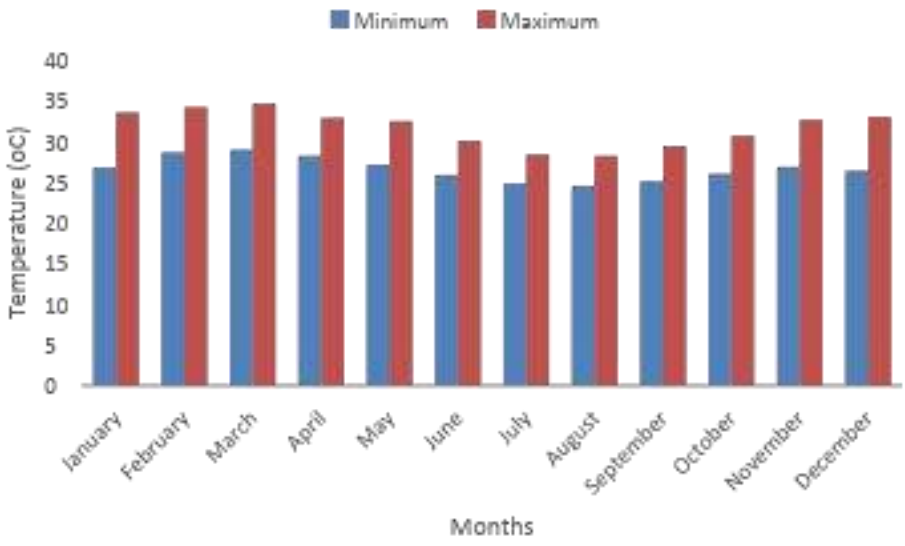


Figure 4.4: Monthly Mean Temperature Characteristics of the Project Area in Oyo State (1991–2023)

4.2.12 Relative Humidity

Relative humidity remains moderately high year-round, ranging between 68% (January) and 87% (August). Morning humidity levels are consistently higher than afternoon readings, indicative of strong diurnal variation and active evapotranspiration (Figure 4.5). This condition favours plant germination and reduces dust-related nuisance during construction phases.

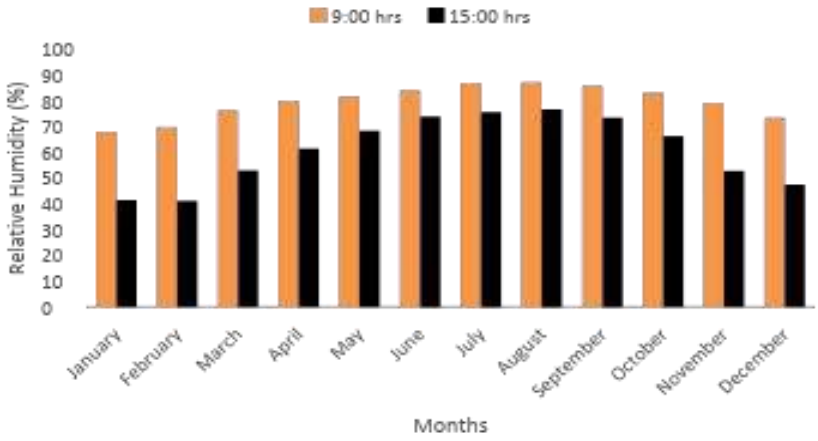


Figure 4.5: Monthly relative humidity characteristics of the project area in Oyo State (1991–2019)

4.2.13 Wind Direction and Speed

Wind speeds average between 3.06 and4.98 m/s (Figure 4.6), with higher velocities during the transition months (August–September). This is adequate for natural aeration and dispersal of air pollutants from farm and processing activities, reducing localized emissions and odors. The absence of extreme winds suggests low risk of structural damage to farm infrastructure.

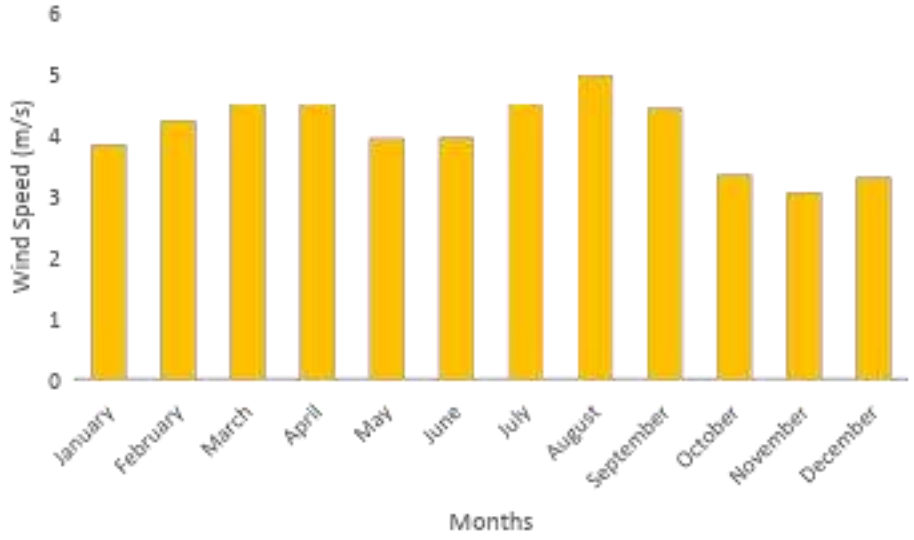


Figure 4.6: Monthly average wind speeds of the project area in Oyo State (1991–2023)

4.2.14 Sunshine Hours

Sunshine duration shows an inverse trend with rainfall, with the longest daily sunshine (above 6 hours/day) observed during dry months (November–February), and the shortest (below 3.5 hours/day) during peak rainy months (July–August) (Figure 4.7). The relatively stable sunshine supports solar-powered agricultural operations such as irrigation pumps and dryers.

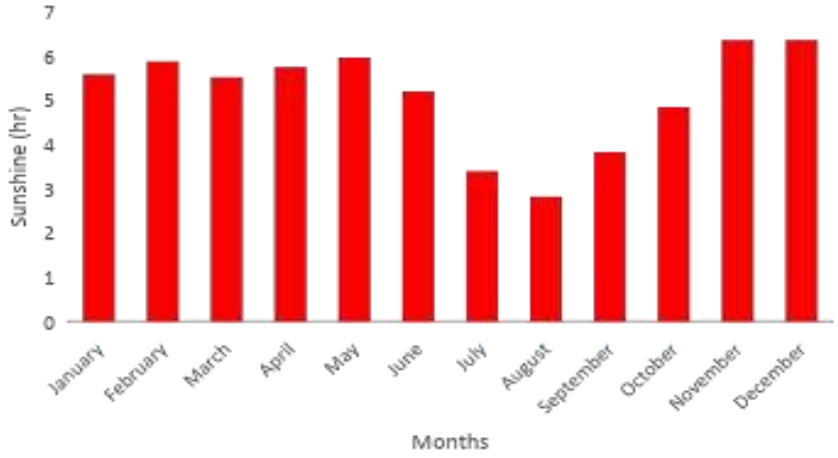


Figure 4.7: Monthly average of sunshine hours for the project area in Oyo State (1991–2023)

4.3 Geology and Hydrogeology

The map of Oyo State showing the geological characteristics is presented in Figure 4.8 Akinyele LGA of Oyo State is mainly composed of undifferentiated schist and gnesiss (Figure 4.8). Oyo State is well drained with a river flowing from the upland in the north–south direction. The major water source at Ijaye is the stream (Odo Iya Alaso) within it.

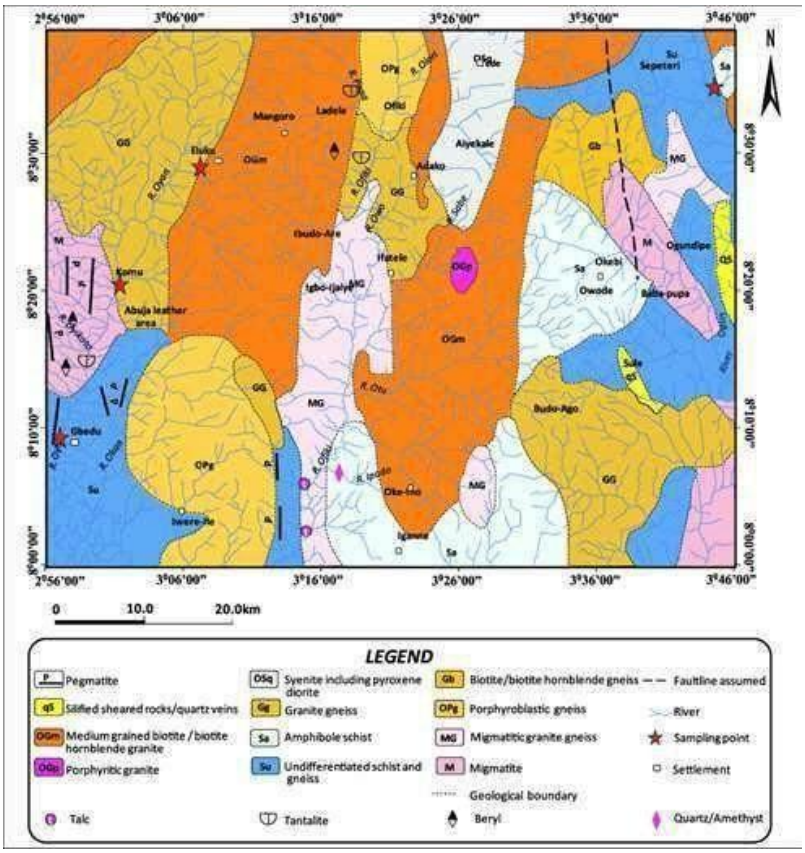


Figure 4.8: Map showing description of geology and hydrogeology of Oyo State

4.4 Ambient Air Quality characteristics

In line with ToR, four (4) sampling locations were sampled in the study area for ambient air quality and noise. The ambient concentrations of air pollutants and noise measured are presented in Table 4.5.

Table 4.5: Concentration of ambient air quality in the Project area

Parameter	SP1		SP2		SP3		SP4		SP5		SP6		SP7	
	Rainy	Dry	Rainy	Dry	Rainy	Dry	Rainy	Dry	Rainy	Dry	Rainy	Dry	Rainy	Dry
$PM_{2.5}$ (µg/m³)	14.3	18.5	11.3	14.0	4.00	18.0	11.4	16.0	12.4	22.5	11.2	17.5	10.7	18.0
PM_{10} (µg/m³)	18.4	25.9	14.3	22.7	10.19	26.1	16.19	24.8	18.9	31.5	17.1	26.7	19.2	26.7
NO_2 (mg/m³)	nd	nd	nd	0.001	nd	nd	nd	nd	nd	0.002	0.001	0.002	0.002	0.005
SO_2 (mg/m³)	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
CO_2 (ppm)	504	532	201	562.5	432	470	433	470	516	548	504	512	402	478
CO (ppm)	nd	4.01	2.10	6.32	nd	4.04	4.35	6.62	0.12	5.32	6.22	6.76	5.97	6.88
VOC (ppm)	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
H_2S (mg/m³)	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Noise (dBA)	32.8	37.42	30.11	33.22	30.43	38.92	34.16	31.92	39.36	33.61	31.76	38.78	37.91	42.24

Source: Field Survey, 2021 and 2025

The concentrations of air quality parameters recorded in the study area were compared with the Nigerian Ambient Air Quality Standards (NAAQS) and the World Health Organization (WHO) Air Quality Guidelines, adopted by the World Bank. Also, the ambient noise levels recorded in the area were compared with the FMEnv standards and the World Bank Noise Level Guidelines. The summary of these limits is provided in Tables 4.6 to 4.8.

Table 4.6: Air Quality Standards.

Pollutant	Averaging Time	FMEnv Limit (mg/m^3)	WHO Guidelines (mg/m^3)	NESREA Limits (mg/m^3)
CO	1-hour	11.4	-	10
NO_2	1-hour	0.075 - 0.113	0.2	0.2
$PM_{2.5}$	24-hour	0.025	0.025	0.025
PM_{10}	24-hour	0.050	0.050	0.050
SO_2	1-hour	0.026	0.5	0.35

Culled from FMEnv's Guidelines and Standards for Environmental Pollution Control in Nigeria (1991); the World Bank Group Environmental, Health and Safety (EHS) General Guidelines 2007 and the NESREA's National Environmental (Air Quality Control) Regulations, 2014

Table 4.7: Noise Exposure Limits for Nigeria

Duration per Day, Hour	Permissible Exposure Limit dB(A)
8	90
6	92
4	95
3	97
2	100
1.5	102
1	105
0.5	110
0.25	115

Source: Guidelines and Standards for Environmental Pollution Control in Nigeria, 1991

Table 4.8: World Bank Noise Level Guidelines

Receptor	One Hour LAeq (dBA)	
	Day time (07:00 -22:00)	Night time (22:00 -07:00)
Residential; institutional; educational	55	45
Industrial; commercial	70	70

Source: World Bank General EHS 2007

Figure 4.9: Air quality, noise, and water sampling locations map

4.4.1 Air Quality Characteristics

Air pollution is a major environmental health problem affecting both developed and developing countries worldwide. Air quality and ambient noise measurements were conducted at seven (7) representative sampling points (SP1–SP7) during both rainy and dry seasons.

This dual-season assessment provides a realistic understanding of atmospheric variations influenced by climatic and human factors.

Parameters analyzed include Particulate Matter ($PM_{2.5}$ and PM_{10}), Nitrogen Dioxide (NO_2), Sulphur Dioxide (SO_2), Carbon Dioxide (CO_2), Carbon Monoxide (CO), and Noise Level (dBA).

4.4.1.1 Particle Matter ($PM_{2.5}$ and PM_{10})

Particulates are tiny solid or liquid particles in the air. Major sources of particulate pollution are factories, power plants, refuse incinerators, motor vehicles, construction activity, fires, and natural wind-blown dust. High concentrations of total suspended particles are known to irritate the mucous membranes and may initiate a variety of respiratory diseases. Fine particulates may cause cancer and aggravate morbidity and mortality from respiratory dysfunctions.

4.4.1.2 $PM_{2.5}$ (Fine Particulate Matter)

$PM_{2.5}$ concentrations ranged between 4.00 µg/m³ (SP3, rainy) and 22.5 µg/m³ (SP5, dry). Values were generally higher in the dry season across all locations, attributable to increased dust resuspension, reduced atmospheric moisture, and minimal precipitation.

Spatially, SP5 consistently recorded the highest values in both seasons, suggesting greater anthropogenic activity, possibly from vehicular movement or open soil exposure.

Conversely, SP3 and SP7 showed relatively lower concentrations, representing background or vegetated areas.

All readings are within WHO and FMEnv standards (≤25 µg/m³), indicating no particulate pollution risk.

4.4.1.3 PM_{10} (Coarse Particulate Matter)

PM_{10} concentrations ranged from 10.19 µg/m³ (SP3, rainy) to 31.5 µg/m³ (SP5, dry). Seasonal comparison shows an average increase of 30–40% in dry season values, reflecting the influence of dust-laden winds and unpaved surfaces.

4.4.2 Carbon monoxide (CO)

CO is a colorless, odorless, and tasteless gas. It results from the incomplete combustion of natural gas, diesel, or gasoline in traffic engines. High concentrations of CO generally occur in areas with heavy traffic intensity and congestion. Other sources include industrial processes, non-transportation fuel combustion, and natural sources, such as wild fires. After inhalation, CO binds to haemoglobin and reduces oxygen delivery, causing hypoxia; high concentrations and/or prolonged exposure can be fatal or produce irreversible neurological damage.

Carbon monoxide concentrations across the sampling locations ranged from 0.12 ppm (SP5, rainy season) to 6.88 ppm (SP7, dry season). Values were generally higher during the dry season, consistent with increased combustion-related activities such as generator use, open burning, and vehicular emissions, coupled with reduced atmospheric dispersion caused by lower humidity and possible temperature inversions.

The elevated CO levels observed at SP6 and SP7 likely reflect proximity to minor traffic routes or domestic biomass-burning sites. In contrast, SP2 recorded measurable CO only in the dry season (2.10 ppm), while SP4 showed low rainy season concentrations (0.12 ppm) and non-detectable levels in the dry season, suggesting spatial and temporal variability linked to localized and intermittent emission sources.

Overall, CO concentrations across all locations remained below the FMEnv permissible limit of 10 ppm, indicating that ambient carbon monoxide levels within the Project area are consistent with a natural and unpolluted environment, posing no health or environmental hazard.

4.4.2.1 Sulfur dioxide (SO_2)

Sulfur dioxide is a colorless, pungent gas that readily reacts with water vapour to form acidic compounds, contributing to environmental acidification. Major anthropogenic sources include the combustion of sulfur-containing fossil fuels and metal smelting processes. Prolonged exposure to SO_2 can irritate the respiratory tract and cause damage to both human health and materials.

In the present study, SO_2 was not detected (below the detection limit of 0.01 mg/m³) at any of the seven sampling locations during both the rainy and dry seasons. This indicates the absence of significant SO_2-emitting sources such as industrial combustion, diesel-powered machinery, or sulphur-rich fuel use within and around the Project area.

The results confirm that the Project environment is predominantly non-industrial, with air quality consistent with natural background conditions and well within FMEnv air quality standards.

4.4.2.2 Nitrogen dioxide (NO_2)

Nitrogen dioxide (NO_2) is a reddish-brown, highly reactive gas commonly produced by high-temperature combustion processes, such as vehicle emissions and generator use. It is a key traffic-related air pollutant and a precursor to photochemical smog. Prolonged exposure to elevated NO_2 levels can impair respiratory health and contribute to the formation of secondary pollutants (ozone and nitrate aerosols).

In the present study, NO_2 concentrations were below detection limits (0.001 mg/m³) at most stations during both the rainy and dry seasons. However, trace amounts were detected at SP6 (0.001 mg/m³) and SP7 (0.002–0.005 mg/m³) during the dry season. The highest recorded value (0.005 mg/m³ at SP7, dry season) is well below the FMEnv guideline limit of 0.2 mg/m³, indicating no significant vehicular or industrial combustion sources within the Project area.

The slight seasonal increase in NO_2 during the dry season likely reflects intermittent local combustion activities (such as domestic fuel use, generators, or minor traffic) and reduced atmospheric dispersion. Nonetheless, all recorded values remain far below both FMEnv and

WHO 2021 air quality guideline thresholds, confirming that ambient NO_2 levels pose no health or environmental concern.

Continued seasonal monitoring is recommended as part of the Project's environmental management plan, especially if local traffic or generator use intensifies over time.

4.4.2.3 Volatile Organic Compounds (VOCS)

Volatile organic compounds are a class of air pollutants characterized by high volatility in the ambient environment. Their concentration in the air is determined by processes such as emissions, evaporation, deposition, and photochemical reactions under the sunlight. VOCs are also considered contributors to global warming by Intergovernmental Panel for Climate Change (IPCC) because of their chemical reactivity and their potential to produce tropospheric ozone and other photochemical oxidants.

VOCs were not detected in either season at the provided detection limit. This indicates that at the time of sampling, there were no sustained emissions of the measured VOCs above the instrument/lab M If the project will involve fuel handling, solvents or other VOC sources during construction/operation, targeted speciated VOC sampling (benzene, toluene, ethylbenzene, xylenes) with lower MDLs is recommended to ensure compliance with health benchmarks. Concentrations of VOCs were below the detection limit of 0.01 mg/m^3 at all sampling locations, and this is consistent with the natural environment.

4.4.2.4 Hydrogen Sulfide

Hydrogen sulfide (H2S) is a toxic, odorous and corrosive gas, which is rapidly oxidized to SO_2 in the atmosphere. Its presence in the atmosphere could result from storage tank and process vents. The recorded level of H_2S within the study area was below the detection limit of 0.01ppm for both seasons, indicating the absence of the pollutant gas.

4.4.2.5 Carbon Dioxide (CO_2)

Carbon dioxide (CO_2) is a naturally occurring, colorless, and odorless gas that plays a fundamental role in the global carbon cycle. It is emitted from natural processes such as respiration, decomposition, and ocean-atmosphere exchange, as well as anthropogenic sources including fossil fuel combustion, land clearing, and industrial activity. Although CO_2 is not directly toxic at ambient concentrations, it is a key greenhouse gas contributing to global warming and climate change.

In the study area, CO_2 concentrations ranged from 201 ppm (SP2, rainy season) to 562.5 ppm (SP2, dry season). Values were generally lower during the rainy season, reflecting enhanced vegetation uptake and greater atmospheric mixing, while higher concentrations in the dry season are attributed to increased combustion activities, biomass burning, and reduced vegetation cover.

All measured values fall within the typical natural background range (350–600 ppm) and are well below any environmental or health thresholds of concern. The observed seasonal variations are consistent with natural ecosystem processes and mild anthropogenic influence, indicating no adverse impact on local air quality.

4.5 Noise Characteristics

Measured ambient noise levels across the sampling locations ranged from 30.11 dBA to 42.24 dBA. The lowest value (30.11 dBA) was recorded at a relatively undisturbed location, while the highest value (42.24 dBA) reflects localized increases likely associated with human activity and minor traffic presence.

Spatially, locations corresponding to SP6, SP7, and nearby access corridors exhibited relatively higher noise levels, whereas SP2 and SP3 remained the quietest, consistent with their low activity and more isolated environmental setting.

All recorded values are well below the Federal Ministry of Environment (FMEnv) daytime guideline limit of 55 dBA, confirming that the project area is characterized by a low-noise, rural acoustic environment with minimal anthropogenic disturbance.

Environmental Implications

- The dominant seasonal effect indicates that meteorological factors (wind, rainfall, and humidity) play a greater role than human emissions.
- Dry season elevations are natural and not indicative of pollution.
- The absence of SO_2 and low NO_2/CO levels confirms that no industrial or major vehicular emission sources exist within the area.
- Noise levels are very low, supporting the conclusion of a tranquil and predominantly rural setting.

In summary, the results demonstrate that ambient air quality and noise levels across all seven locations are excellent and well within regulatory limits for both the rainy and dry seasons.

Spatial and temporal variations are minor and natural, primarily influenced by weather conditions and human activity patterns.

This baseline, therefore, provides a reliable reference for future impact comparisons once project construction and operations commence.

4.6 Soil Quality

Soil environmental conditions are one of the baselines against which potential impacts of an activity can be measured. The critical soil properties that usually form the basis for impact evaluation include physical properties, fertility indices, and chemical and microbial composition.

The physico-chemical and microbial results for soil samples from the study area are provided in Tables 4.9 and 4.10.

Table 4.9: Physico-chemical properties of soil (0–15 cm) from the study area

Parameter	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	Sample 7
pH	7.39	7.45	7.41	7.36	7.60	7.89	8.24
Moisture Content (%)	3.06	3.87	1.44	12.35	1.55	1.86	1.95
Total organic carbon (%	6.67	6.05	6.118	5.318	6.77	6.23	4.39
CEC ($cmol_cKg^{-1}$)	1.003	1.043	2.410	3.102	2.111	2.001	2.186
Chloride (mg/Kg)	21.191	19.281	20.122	20.424	19.546	21.110	32.114
Nitrate (mg/Kg)	0.568	0.516	0.552	0.493	0.630	0.550	0.554
Sulphate (mg/Kg)	1.89	1.92	4.25	4.22	5.92	5.36	1.39
Phosphate (mg/Kg)	0.095	0.117	1.170	1.402	1.180	1.240	1.467
Cu (mg/Kg)	0.065	0.072	0.008	0.012	0.005	0.017	0.210
Pb (mg/Kg)	nd	nd	nd	nd	nd	nd	nd
Fe (mg/Kg)	57.36	60.21	71.99	77.22	60.88	75.88	81.05
Zn (mg/Kg)	1.31	1.44	1.37	1.52	1.34	1.71	2.11
Ni (mg/Kg)	nd	nd	nd	nd	nd	nd	nd
Mg (mg/Kg)	0.131	0.165	0.604	0.615	0.527	0.507	0.034
Sand %	52.63	57.89	67.32	52.45	56.01	59.78	65.02
Silt %	10.53	5.26	7.99	24.24	16.67	12.78	10.08
Clay %	36.84	36.85	24.69	23.31	27.32	27.44	24.90

Table 4.10: Predominant species of microorganisms isolated from soil samples in the study area

S/N	Sample code	THB (cfu/mL)	THF (cfu/mL)	TCC (cfu/mL)	Predominant species of microorganisms isolated
1.	SP1	$2.4x10^4$	$9.0x10^1$	nd	*Pseudomonas sp, Bacillus sp, Proteus sp, Actinomycetes sp, Sacharomyces cerevisae, Aspergillus niger. Aspergillus flavus; Trichoderma spp.*
2.	SP2	$1.4x10^4$	$2.0x10^1$	nd	*Pseudomonas sp, Bacillus sp, Proteus sp, Actinomycetes sp, Sacharomyces cerevisae, Aspergillus niger. Aspergillus flavus; Trichoderma spp.*
3.	SP3	$3.1x10^4$	$3.0\ x10^1$	nd	*Bacillus ssp; Fusarium spp; Clostridium sp Aspergillus flavus. Actinomycetes sp, Sacharomyces cerevisae*
4	SP4	$2.1x10^4$	$2.0x10^1$	nd	*Pseudomonas sp, Bacillus sp, Proteus sp, Actinomycetes sp, Sacharomyces cerevisae, Aspergillus niger*
5	SP5	$5.0x10^4$	$1.0x10^1$	nd	*Pseudomonas sp, Bacillus sp, Proteus sp, Actinomycetes sp, Sacharomyces cerevisae, Aspergillus niger. Aspergillus flavus; Trichoderma spp.*
6	SP6	$2.2x10^4$	$1.0x10^1$	nd	*Pseudomonas sp, Bacillus sp, Proteus sp, Actinomycetes sp, Sacharomyces cerevisae, Aspergillus niger. Aspergillus flavus; Trichoderma spp.*
7	SP7	$5.0x10^4$	$2.0\ x10^1$	nd	*Pseudomonas sp, Bacillus sp, Proteus sp, Actinomycetes sp, Sacharomyces cerevisae, Aspergillus niger. Aspergillus flavus; Trichoderma spp.*

The results of the physico-chemical parameters analyzed in the soil samples from the seven sampling points across the rainy and dry seasons are discussed as follows:

Soils within the project area are predominantly sandy loam to sandy clay loam using Figure 4.10, indicating well-drained conditions with moderate structural stability. While the sandy fraction supports aeration and infiltration, it also implies low to moderate water and nutrient retention capacity, which is relevant for irrigation planning and potential nutrient loss pathways during project operations.

Soil pH ranges from neutral to slightly alkaline (7.36–8.24), providing generally favourable conditions for crop production, though with potential limitations for micronutrient availability in localized areas.

Key fertility indicators show moderate organic carbon content and low to moderate cation exchange capacity (CEC), reflecting soils that are biologically active but may require careful nutrient management to maintain productivity under intensive use.

Macronutrients and major ions fall within normal agronomic ranges, with no evidence of salinity or chemical constraints. Importantly, heavy metals (Pb, Cd, Ni, Cr) were below detection limits, confirming the absence of contamination and establishing a clean baseline condition.

Microbiological analysis indicates moderately active and ecologically stable soils, with beneficial microbial populations and no detectable coliform contamination, further supporting soil health and functionality.

Overall, the soils are suitable for the proposed agro-industrial activities, with key considerations for impact assessment including:

- Potential for nutrient leaching and soil degradation under intensive cultivation
- Need for soil conservation and organic matter management
- Sensitivity to agrochemical application and erosion if not properly managed

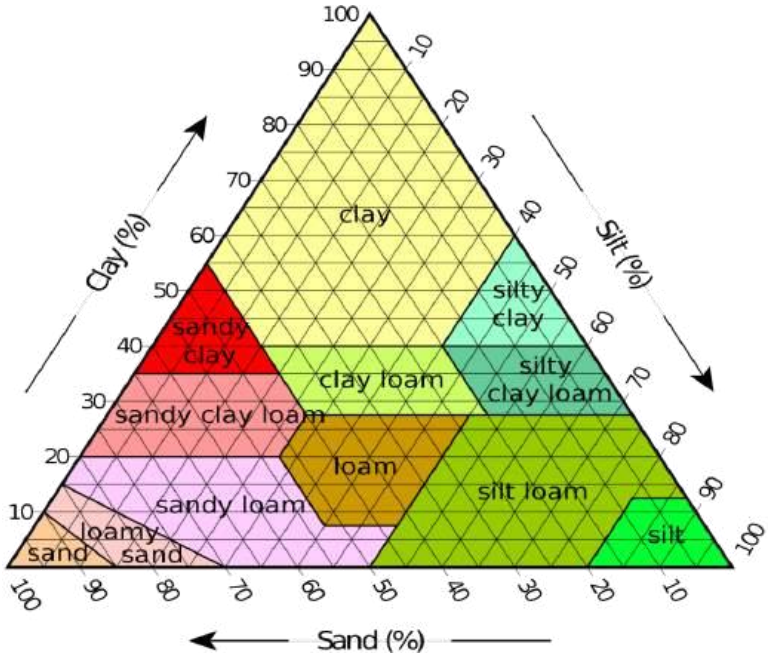


Figure 4.10: Soil texture triangle

4.7 Surface and Groundwater Quality

A surface water sample was collected from the Odo Iya Alaso stream (SP3), as indicated in Figure 4.9, while a groundwater sample (SP7) was obtained from a local well, as presented in Table 4.1. Plates 4.4a and 4.4b display the respective stream and well sampling locations.

Plate 4.4a: Pictures of water collection from the Odo Iya Alaso stream at the AIH proposed site

Plate 4.4b: Pictures of water collection from the Odo Iya Alaso stream at the AIH proposed site

The results of the physico-chemical analysis of surface and underground water samples collected from the study area are presented in Table 4.11. The results were compared with the surface water quality criteria for irrigation and reuse standards as enshrined in the National Environmental (Surface and Groundwater Quality Control) Regulations, 2011, and the National Guidelines and Standards for Water Quality (Water for Agricultural Uses-Irrigation), 1999.

Table 4.11: Physicochemical and microbial results of surface water (Odo Iyalaso) and well water samples (surface and underground)

Parameters	Surface water		Well water	NESREA limits	FMEnv
	Rainy	Dry		Irrigation and reuse standards	Water for Agricultural uses – Irrigation
pH	5.76	6.75	6.66	6.5-8.5	NS
Temperature ^{0}C	22.4	29.0	29.5	NS	NS
Conductivity µS/cm	203	257	224	NS	NS
TDS mg/L	98	129	446	NS	500
Appearance	amber	amber	Transparent	NS	NS
Total Hardness mg/L	161	192	292	NS	NS
Colour PtCo	15.00	15.56	7.08	NS	NS
Alkalinity mg/L	21	28	22	NS	NS
Turbidity NTU	8.0	13.0	7.25	NS	NS
DO mg/L	9.15	8.35	6.75	>4.0	7.5
BOD_5 mg/L	2.15	4.09	0.75	6.0	2.0
COD mg/L	18.94	21.14	11.44	30.0	NS
Chloride mg/L	46	60	42	350	100
Nitrate mg/L	0.32	0.44	nd	40.0	NS
Sulphate mg/L	nd	nd	nd	200	NS
Phosphate mg/L	nd	nd	nd	3.5	NS
Cu mg/L	nd	nd	nd	0.01	0.2
Pb mg/L	nd	nd	nd	0.1	0.2
Fe mg/L	2.03	4.55	4.03	0.5	5.0
Zn mg/L	nd	nd	nd	0.2	5.0
Ni mg/L	nd	nd	nd	0.1	0.2
Cd mg/L	nd	nd	nd	0.01	0.01
Cr mg/L	nd	nd	nd	0.5	0.1
Mn mg/L	nd	nd	nd	NS	0.2
Na mg/L	0.88	1.02	0.23	120	NS
K mg/L	1.43	1.27	2.22	50	NS
Ca mg/L	7.60	14.06	14.40	180	NS
Mg mg/L	1.12	5.65	14.80	40	NS
Oil/Grease mg/L	nd	nd	nd	0.1	NS
Total Heterotrophic Bacteria (cfu/ml)	$5.5x10^3$	$2.3 x 10^2$	$1.4x10^2$	-	-
Total Heterotrophic Fungi (cfu/ml)	$1.1x10^2$	No growth	No growth	-	-
Total Coliform (cfu/ml)	$5.0 x10^3$	$4.3x10^2$	$2.0 x 10^3$	$1.0x10^2$	$1.0x10^2$
BOD_5 mg/L	2.15	4.09	0.75	6.0	2.0
COD mg/L	18.94	21.14	11.44	30.0	NS
Chloride mg/L	46	60	42	350	100
Nitrate mg/L	0.32	0.44	nd	40.0	NS
Sulphate mg/L	nd	nd	nd	200	NS
Phosphate mg/L	nd	nd	nd	3.5	NS
Cu mg/L	nd	nd	nd	0.01	0.2
Pb mg/L	nd	nd	nd	0.1	0.2
Fe mg/L	2.03	4.55	4.03	0.5	5.0
Zn mg/L	nd	nd	nd	0.2	5.0
Ni mg/L	nd	nd	nd	0.1	0.2
Cd mg/L	nd	nd	nd	0.01	0.01

Parameters	Surface water		Well water	NESREA limits	FMEnv
Cr mg/L	nd	nd	nd	0.5	0.1
Mn mg/L	nd	nd	nd	NS	0.2
Na mg/L	0.88	1.02	0.23	120	NS
K mg/L	1.43	1.27	2.22	50	NS
Ca mg/L	7.60	14.06	14.40	180	NS
Mg mg/L	1.12	5.65	14.80	40	NS
Oil/Grease mg/L	nd	nd	nd	0.1	NS
Total Heterotrophic Bacteria (cfu/ml)	$5.5x10^3$	$2.3 x 10^2$	$1.4x10^2$	-	-
Total Heterotrophic Fungi (cfu/ml)	$2.0x10^2$	$1.1x10^2$	$0.2x10^2$	-	-
Total Coliform (cfu/ml)	$5.0 x10^3$	$4.3x10^2$	$2.0 x 10^3$	$1.0x10^2$	$1.0x10^2$

***NS – Not Specified, nd - Not Detected**

pH and Temperature

The pH values recorded for surface water were 5.76 (rainy) and 6.75 (dry). The rainy-season value indicates slightly acidic water, typical of runoff influenced by decomposing vegetation and organic acids. The dry-season value shows a shift toward neutrality and falls within the NESREA irrigation range (6.5–8.5), reflecting reduced dilution and increased mineral interaction during the dry months. Temperatures were 22.4 °C (rainy) and 29.0 °C (dry). The rainy-season temperature is consistent with cooler conditions and cloud cover, while the dry-season increase reflects greater solar intensity and reduced water volume. Both temperatures fall within normal limits for tropical surface waters and support typical biological and chemical processes.

The pH of the well water was 6.66, within the NESREA permissible range (6.5–8.5) for irrigation and reuse. This value indicates that the groundwater is slightly acidic to near neutral, reflecting natural geochemical interactions with soil minerals rather than contamination from surface runoff.

The measured temperature was 29.5°C, which is typical of shallow groundwater in tropical regions where subsurface conditions tend to equilibrate with warm ambient temperatures. This temperature supports normal biological and chemical processes and present no limitations for agricultural use.

Electrical Conductivity and total dissolved solids (TDS)

EC values were 203 µS/cm (rainy) and 257 µS/cm (dry). The slight increase during the dry season is associated with evaporation-driven ion concentration. Although no NESREA limit exists for EC in irrigation water, these values indicate freshwater of low salinity, suitable for agricultural uses.

TDS values were 98 mg/L (rainy) and 129 mg/L (dry), far below the FMEnv limit of 500 mg/L. Both seasons indicate low mineral content, meaning the water poses no risk of soil salinization or adverse crop effects.

The electrical conductivity of 224 µS/cm indicates low salinity, indicating that the groundwater is freshwater. This value suggests minimal dissolved ions and confirms suitability for irrigation, as high salinity can impair soil permeability and crop growth.

TDS was 446 mg/L, remaining below the FMEnv limit of 500 mg/L for agricultural water. This indicates that the groundwater contains a moderate level of dissolved minerals, but is still safe for irrigation without risk of soil salinization or salt accumulation.

Turbidity, color, and appearance

The surface water exhibited amber coloration during both seasons, with color values of 15.0–15.56 PtCo, suggesting mild staining by dissolved organic substances, especially humic materials from vegetation.

Turbidity levels were 8.0 NTU (rainy) and 13.0 NTU (dry). The dry-season increase reflects suspended particles from reduced flow and disturbance of sediments. Although NESREA does not specify limits for irrigation turbidity, these values remain aesthetically acceptable and do not indicate high levels of suspended solids.

The well water was reported as transparent, with a color value of 7.08 PtCo, showing that it is visually clear and contains very low amounts of dissolved or suspended organic matter.

The turbidity measured 7.25 NTU, indicating low particulate content. Although no NESREA turbidity limit exists for irrigation water, this value reflects good aesthetic and physical quality, characteristic of groundwater protected from surface contamination.

Dissolved Oxygen (DO), BOD, and COD

DO levels were 9.15 mg/L (rainy) and 8.35 mg/L (dry) for surface water. Both exceed the NESREA minimum (>4.0 mg/L), indicating good aeration and supporting healthy aquatic processes. A slightly lower dry-season DO is likely due to reduced mixing and increased microbial activity.

The BOD_5 values were 2.15 mg/L (rainy) and 4.09 mg/L (dry). These are well below the NESREA irrigation limit (6.0 mg/L) and fall within the FMEnv threshold (2.0 mg/L) only marginally in the dry season. BOD levels indicate low to moderate biodegradable organic matter, consistent with natural inputs from vegetation (Figure 4.11).

The COD values were 18.94 mg/L (rainy) and 21.14 mg/L (dry), both below NESREA's 30 mg/L limit. These data confirm that oxidizable pollutants are minimal, and chemical contamination is not significant.

The DO level was 6.75 mg/L for underground water, which exceeds the NESREA requirement (> 4.0 mg/L) for surface water and indicates good oxygenation. While groundwater typically

has lower DO due to limited aeration, this value may reflect some oxygenation during sampling or shallow recharge.

The BOD_5 was 0.75 mg/L, well below the NESREA limit (6 mg/L) and FMEnv's 2 mg/L guideline for irrigation. This very low value shows negligible biodegradable organic pollution, meaning the groundwater is clean and free of significant organic contaminants (Figure 4.11).

The COD was 11.44 mg/L, also far below the NESREA limit (30 mg/L), confirming low oxidizable pollutant levels and absence of chemical contamination from industrial or domestic sources.

Generally, the oxygen balance shows low organic pollution and a healthy aquatic environment.

BOD Level in mg/liter	Water Quality
1 - 2	**Very Good:** There will not be much organic matter present in the water supply.
3 - 5	**Fair:** Moderately Clean
6 - 9	**Poor:** Somewhat Polluted - Usually indicates that organic matter present and microorganisms are decomposing that waste.
100 or more	**Very Poor:** Very Polluted - Contains organic matter.

Figure 4.11: BOD water quality chart. Source: www.pharmaguideline.com

Hardness and Alkalinity

Total hardness was 161 mg/L (rainy) and 192 mg/L (dry). These values classify the water as moderately hard, with slightly higher levels in the dry season due to concentration effects. Alkalinity values were 21 mg/L (rainy) and 28 mg/L (dry), indicating low to moderate buffering capacity, meaning the water can resist sudden pH shifts.

The total hardness measured 292 mg/L, classifying the groundwater as hard. Hardness in groundwater typically results from natural dissolution of calcium and magnesium minerals. Hard water does not pose any risk for irrigation, and the minerals present can provide supplementary nutrients for plant growth.
Alkalinity was 22 mg/L, indicating low buffering capacity. Although the water is not strongly buffered, the pH is still stable and within acceptable irrigation limits.
Both parameters pose no restriction for irrigation use.

Cations and Anions Cations for surface water

- Na: 0.88 mg/L (rainy), 1.02 mg/L (dry)
- K: 1.43 mg/L (rainy), 1.27 mg/L (dry)
- Ca: 7.60 mg/L (rainy), 14.06 mg/L (dry)
- Mg: 1.12 mg/L (rainy), 5.65 mg/L (dry) Cations for underground water
- Sodium (Na): 0.23 mg/L

- Potassium (K): 2.22 mg/L
- Calcium (Ca): 14.40 mg/L
- Magnesium (Mg): 14.80 mg/L

These values are low and fall well below NESREA and FMEnv limits. They indicate no salinity hazard and no risk of sodium-induced soil structure deterioration. The presence of Ca and Mg reflects natural mineralization typical of groundwater.

Anions for surface water

- Chloride: 46 mg/L (rainy), 60 mg/L (dry)—below NESREA limit (350 mg/L)
- Nitrate: 0.32–0.44 mg/L—extremely low, indicating no nutrient enrichment
- Sulphate and Phosphate: not detected—confirming absence of eutrophication risk
- Anions for underground water
- Chloride: 42 mg/L
- Nitrate: Not detected
- Sulphate: Not detected
- Phosphate: Not detected

Chloride is significantly below the 350 mg/L NESREA limit, showing low salinity. The absence of nitrate, sulphate, and phosphate indicates no fertilizer infiltration, septic leakage, or nutrient pollution, confirming that the groundwater source is well protected from anthropogenic impacts.

Heavy Metals

All toxic metals (Cu, Pb, Cd, Zn, Ni, Cr, Mn) were below detection, indicating no industrial or metallic pollution in the surface water.

Iron levels were 2.03 mg/L (rainy) and 4.55 mg/L (dry). Both exceed NESREA's limit (0.5 mg/L) but remain below FMEnv's permissible level (5.0 mg/L). The elevated Fe is characteristic of natural lateritic soils rich in iron oxides, not anthropogenic contamination.

Overall, heavy metal content poses no environmental or agricultural risk.

Oil and Grease

Oil and grease were below detection limits (nd) in both seasons, confirming the absence of hydrocarbon contamination and petroleum-derived residues in the surface and underground water.

Surface and Underground Water Microbiological Characteristics

Microbiological assessment of the water samples revealed low to moderate bacterial presence and generally minimal fungal activity across the sampling locations. Total Heterotrophic Bacteria (THB) ranged from 5.5×10^3 cfu/mL in the surface water to 1.4×10^2 cfu/mL in the irrigation water, reflecting natural background bacterial populations commonly associated with surface and shallow groundwater systems influenced by organic matter. Total Heterotrophic Fungi (THF) values were particularly low, with 1.1×10^2 cfu/mL recorded in the surface water

and no fungal growth detected in both the well water and irrigation water samples. These very low fungal counts indicate limited fungal activity, good water quality with respect to organic decomposition, and the absence of significant nutrient enrichment that typically favours fungal proliferation.

Total Coliform (TC) counts showed wider variability, ranging from 5.0×10^3 cfu/mL in surface water to 1.0×10^2 cfu/mL in irrigation water. The higher coliform values may reflect localized contamination arising from surface runoff, soil wash-off, animal activities, or decaying organic material, whereas the lower values fall within acceptable limits and indicate relatively cleaner water sources at those points. Despite these fluctuations, there is no consistent evidence of severe or widespread microbial contamination across the water bodies.

Overall, the microbiological characteristics of the water suggest variable bacterial and coliform loads influenced by natural environmental factors, while the generally low or absent fungal presence confirms good water quality in terms of organic pollution. Continued monitoring is recommended to determine whether the elevated coliform levels observed in surface water are episodic or linked to specific seasonal or site-related activities.

4.8 Terrestrial Flora and Fauna

4.8.1 Terrestrial Flora

Vegetation assessment was undertaken to characterize site-specific ecological conditions and establish a baseline for impact evaluation. The study focused on species composition, vegetation structure, distribution patterns, and the presence of economically important flora within the Project area.

The Project site, located in Ijaye within Akinyele LGA of Oyo State, lies within the derived savanna ecological zone. Field observations indicate that vegetation in the area reflects a regenerating mosaic system influenced by past anthropogenic disturbance (e.g., historical land use and settlement), but now exhibiting substantial natural recovery. The vegetation structure is characterized by a mixture of secondary woody species and herbaceous cover, typical of derived savanna landscapes in southwestern Nigeria.

Across the sampling locations, vegetation is dominated by a combination of cultivated and semi-naturalized species. Frequently encountered species include *Manihot esculenta*, *Musa paradisiaca*, *Elaeis guineensis*, *Carica papaya*, *Mangifera indica*, *Azadirachta indica*, *Zea mays*, *Talinum triangulare*, *Pennisetum purpureum*, *Theobroma cacao*, *Terminalia catappa*, *Psidium guajava*, and *Calotropis procera*. The presence of these species indicates a landscape shaped by agroforestry practices and smallholder cultivation, rather than intact primary vegetation.

Although some built structures exist within the area, vegetation regeneration has occurred over time, resulting in moderate plant cover and species diversity. No evidence of highly sensitive or undisturbed primary forest ecosystems was observed within the immediate Project footprint.

Vegetation cover in Akinyele Local Government is predominantly the derived Savanna type (Figure 4.12), characterized by broadleaved species with tall tussocky grasses of Guinea affinities, mixed up with fine-leaved species of thorny trees with continuous short and feathery grass cover. However, the soutwestern half of the state belongs to the southern Guinea savanna

zone, while the mid-altitude ecosystems as well as derived savanna zones are spread across the southeastern part of the state (Figure 4.12).

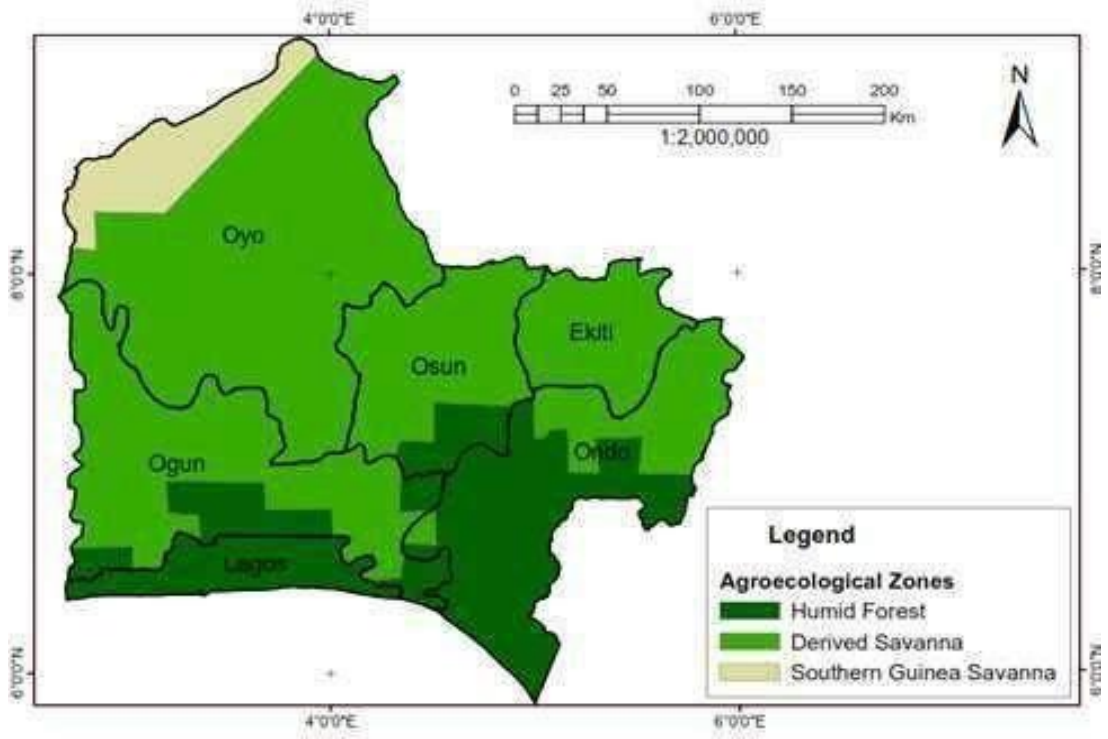


Figure 4.12: A map showing the different ecological zones within Oyo State

4.8.2 Study Area

The study area falls within the derived savanna zone of Oyo State. The natural ecosystem within the study area (Plate 4.5) was observed not to have been significantly altered by human interference, though there are structures built many years ago, the zone has regenerated its initial vegetation. Some flora species (shown in Plate 4.6) observed to be abundant across sampling locations within the proposed project location include *Manihot esculenta*; *Musa paradisiaca*, *Elaesis guineensis, Carica papaya; Mangnifera indica; Azadiracta indica, Zea mays, Talinum triangulae, Pennisetum purpureum, Theobroma cacao, Carica papaya, Terminalia catappa, Psidium guajava*, and *Calotropis procera.*

Plate 4.5: Sample pictures of vegetation in the study area

Plate 4.6: Vegetation species encountered across sampling locations. Field survey 2021 and 2025

The ecology team consulted some stakeholders between April 16 to October 10, 2021, and October 8–13, 2025, in Ijaye, Akinyele LGA, Oyo State. Useful information regarding the flora and fauna composition of the Project area was provided by indigenous farmers and settlers who gave accounts of indigenous/endemic species found within and around the Project area (Plate 4.7).

Plate 4.7: Team comprising Federal and State Ministry of Environment Officials, Agro4you (Consultants), Oyo State Agribusiness Development (OYSADA) Baale, residents, farmers, and community leaders

4.8.3 Sampling Methodology and Data Acquisition

Vegetation Assessment

Vegetation sampling was conducted using the belt transect method to enable systematic evaluation of species composition and relative abundance across the Project area. Within each transect, sampling plots of 50 m² were established at designated intervals; this dimension therefore refers to the plot size per sampling point rather than the total transect extent. This clarification is important, as the transects themselves covered broader sections of the site, while the 50 m² plots served as standardized units for detailed vegetation assessment.

The adoption of 50 m² plots is considered appropriate for the objectives of this study, given the relatively homogeneous and anthropogenically influenced nature of the derived savanna vegetation within the Project area. The site does not exhibit pronounced vegetation heterogeneity or complex stratification that would necessitate larger sampling units. Instead, the selected plot size allowed for efficient and consistent capture of herbaceous species, shrubs, and juvenile trees, which collectively dominate the vegetation structure. Furthermore, the study was designed to provide a baseline ecological characterization for impact assessment purposes, rather than a comprehensive phytosociological survey requiring large-area sampling.

A total of seven sampling locations were assessed to ensure adequate spatial coverage of the Project footprint. Plant identification was carried out both in the field (in-situ) and through herbarium verification (ex-situ) using standard taxonomic references. Representative specimens were collected and preserved as herbarium records to provide a verifiable reference for the floristic composition of the study area and to support future monitoring activities.

Results

Vegetation assessment was carried out at the seven (7) strategic locations within and around the Project site. A transect size of 50 square meters was adopted for proper assessment of species. The geographical coordinates of the vegetation sampling points are presented in Table 4.13 (see Annex 1). Assessment of vegetation at various sampling locations was based on the following:

- Physiognomy, floristic composition, and biodiversity assessment
- Vegetation types encountered
- Plant species distribution and richness
- Inventory of economic plants
- *Physiognomy, Floristic Composition, and Biodiversity Assessment*

Ecosystems in Nigeria are naturally endowed with a diverse array of plant forms, including trees, shrubs, herbs, ferns, climbers, and other non-wood forest resources (Olajide, 2003). The IUCN's (International Union of Conservation of Nature) Red List of Threatened Species provides taxonomic, conservation status, and distribution information on plants, fungi, and animals that have been globally evaluated using the IUCN Red List Categories and Criteria. This system is designed to determine the relative risk of extinction, and the primary purpose of the IUCN Red List is to catalog and highlight those plants and animals that face a higher risk of global extinction (i.e., those listed as **Critically Endangered**, **Endangered,** and **Vulnerable**).

The ecological status of the species encountered was evaluated and classified appropriately according to the following threat categories (**IUCN Red List of Threatened Species Version 2018-1**) as applicable (Table 4.12 and Figure 4.13).

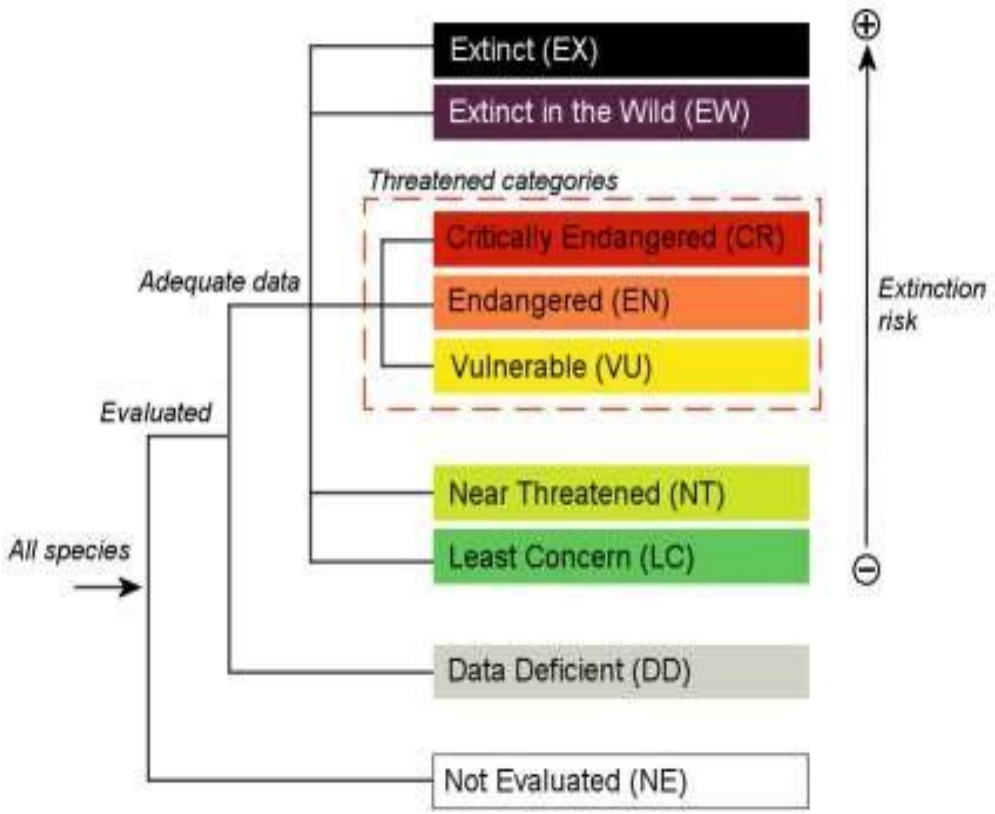


Figure 4.13: IUCN Red List Categories and Criteria

Table 4:12 IUCN categorization

S/N	IUCN CATEGORY	No of Plant Species	Percentage (%)
1.	Near Threatened (NT)	1	4.6
2.	Data Deficient (DD)	5	27.3
3.	Least Concern (LC)	3	13.6

The floristic composition and habitat description of the sample transect points in the Proposed project site are shown in Tables 4.13 (see Annex 1). Plant species encountered were assessed and evaluated as Near Threatened, Data Deficient, Least Concern, and Not Evaluated with a percentage of 4.5%, 27.3%, 13.6%, and 54.6%, respectively, as shown in Figure 4.14.

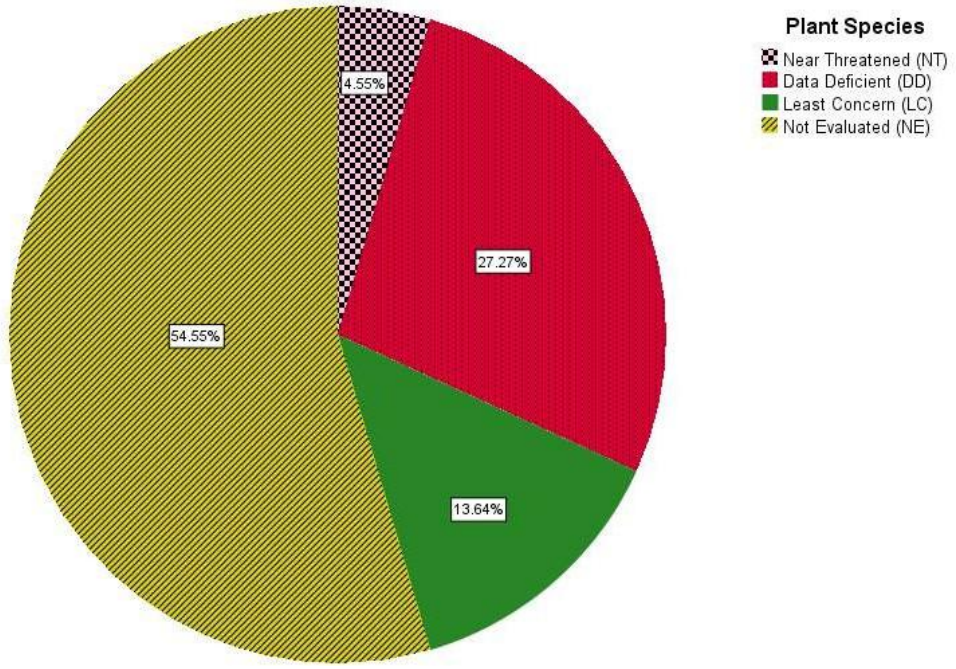


Figure 4.14: Percentage of IUCN Evaluation for plant species encountered. Field survey 2021 and 2025

A summary of the evaluation for the diverse status of species encountered is presented in Table 4.14. From the study, 21 plant species were identified, belonging to 21 families and 21 genera. Plant species were observed to occur as herbs, grasses, shrubs, and trees, with a percentage distribution of 22%, 11%, 33%, and 33%, respectively (Figure 4.15). Shrubs and tree species were abundant. Some of the plant and fruit species encountered during the study are shown in Plate 4.6.

Table 4.14: Species biodiversity status across the study area.

S/N	Plant species	Family Names	Common names	Habits	IUCN status
1.	*Azadiracta indica*	Meliaceae	Neem tree	Tree	NE
2.	*Capsicum annum*	Solanaceae	Pepper	Shrub	NE
3.	*Talinum triangularea*	Talinaceae	Gbure	Shrub	LC
4.	*Musa paradisiaca*	Musaceae	Banana	Herb	NE
5.	*Blighia sapida*	Sapindaceae	Ackee	Tree	NE
6.	*Elaesis guineensis*	Arecaceae	Palm tree	Tree	NE
7.	*Manihot esculenta*	Euphorbiaceae	Cassava	Shrub	NE
8.	*Gmelina arborea*	Lamiaceae	Malena tree	Tree	NE
9.	*Anacardium occidentale*	Anacardiaceae	Cashew tree	Shrub	NE
10.	*Cucuminus sativus*	Cucurbitaceae	Cucumber	Herb	NE
11.	*Lantana camara*	Verbenaceae	Common lantana	Herb	NE
12.	*Chromolaena odorata*		Ewe Akintola (YL)	Herb	NE
13.	*Sida acuta*	Malvaceae	Common wire weed	Shrub	DD
14.	*Pennisetum purpureum*	Poaceae	Elephant grass	Grass	DD
15.	*Momordica charantia*	Cucurbitaceae	Ewe Ejirin (YL)	Grass	NE
16.	*Nwebouldia laevis*	Bignoniaceae	Ewe Akoko (YL)	Tree	LC

S/N	Plant species	Family Names	Common names	Habits	IUCN status
17.	*Gliricidia sepium*	Fabaceae	Agun maniye (YL)	Shrub	NE
18	*Arundo donax*	Poaceae	Giant weed	Grass	LC
19	*Carica papaya*	Caricaceae	Pawpaw	Tree	DD
20	*Brassica oleracea*	Brassicaceae	Brussels	Herb	DD
21	*Calotropis procera*	Apocynaceae	Sodom Apple	Shrub	DD
22	*Zea mays*	Poaceae	Corn	Shrub	NE
23	*Oryza sativa*	Poaceae	Rice	Shrub	NE
24	*Psidium guajava*	Myrtaceae	Guava	Tree	NT
25	*Basella alba*	Basellaceae	Malabar Spinach	Herb	LC
26	*Cola acuminata*	Sterculiaceae	Kola	Tree	NE
27	*Caesalpinia pulcherrima*	Fabaceae	Pride of Barbados	Tree	NT

KEY: * YL- Yoruba Language, *DD- Data Deficient, *NE- Not Evaluated, *LC- Least Concern, *NT –Near Threatened.

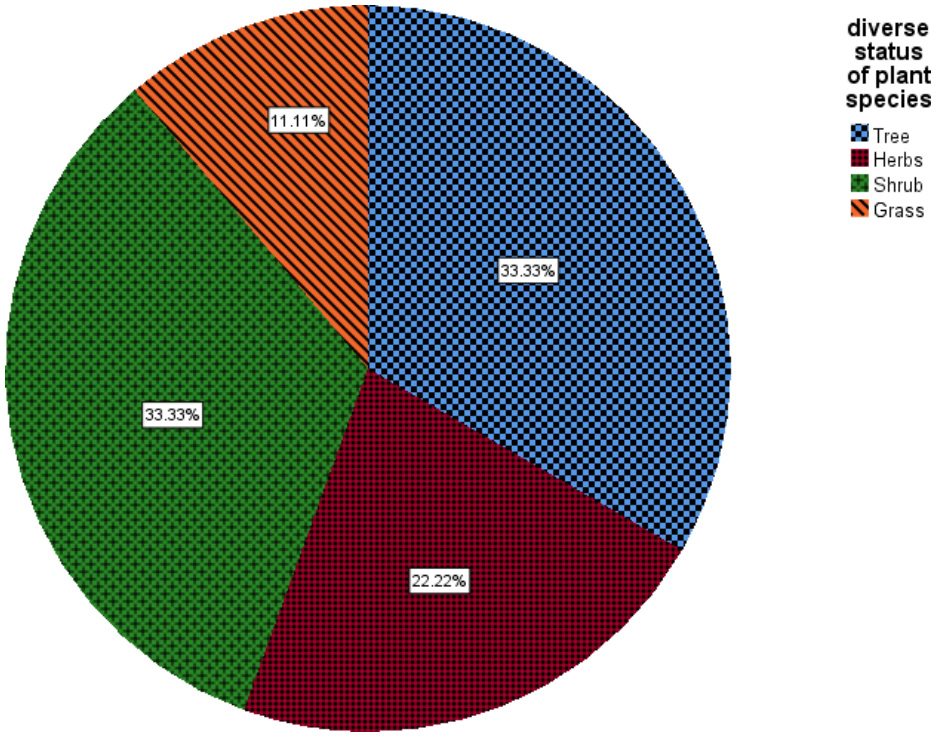


Figure 4.15: Percentage distribution of various life habits observed during the ecological survey.

Field survey 2021 and 2025.

Plate 4.7: A: Manihot esculenta, B: Musa paradisiaca, C: Caesalpinia pulcherrima, and D: Elaesis guineensis encountered within sample transect locations.

Field survey 2021 and 2025

❖ *Plant Species Distribution and Abundance*

The Project area recorded a variety of plant species. Species noted to be richest and widely distributed across sample transect locations include: *Parkia biglobosa, Azadiracta indica, Piliostigma reticulatum, Hyptis suaveolens*, and *Vitex doniana.* Table 4.15 shows the distribution and abundance of plant species encountered within sample transect locations.

Table 4.15: Distribution and abundance of plant species across sample transect locations.

PLANT SPECIES	FAMILY NAMES	SP1	SP2	SP3	SP4
Azadiracta indica	Meliaceae	-	-	1	5
Brassica oleracea	Brassicaceae	20	130	140	260
Talinum triangularea	Talinaceae	100	120	10	89
Musa paradisiaca	Musaceae	22	23	7	8
Blighia sapida	Sapindaceae	-	2	-	-
Elaesis guineensis	Arecaceae	23	56	-	21
Manihot esculenta	Euphorbiaceae	-	1200	1850	240
Gmelina arborea	Lamiaceae	2	2	-	30
Anacardium occidentale	Anacardiaceae	-	6	3	-
Calotropis procera	Apocynaceae	-	15	27	12
Lantana camara	Verbenaceae	-	20	-	-
Chromolaena odorata		-	-	2	-
Sida acuta	Malvaceae	-	5	-	-
Pennisetum purpureum	Poaceae	1068	-	-	-
Momordica charantia	Cucurbitaceae	1	3	-	10
Nweboulдia laevis	Bignoniaceae	-	10	-	-
Gliricidia sepium	Fabaceae	-	10	30	-
Zea mays	Poaceae	-	400	240	220
Carica papaya	Caricaceae	3	7	40	17
Arundo donax	Poaceae	-	12	4	7
Oryza sativa	Poaceae	-	-	-	2020
Psidium guajava	Myrtaceae	2	-	-	1
Basella alba	Basellaceae	10	-	-	2
Cola acuminata	Sterculiaceae	-	-	146	-
Caesalpinia pulcherrima	Fabaceae	-	-	57	-

❖ *Inventory of Economic Plants*

Economic plants are essential to the well-being of mankind and have a variety of uses, including food, vegetables, fruit, oilseed, sugar, medicinal beverages, timber, paper production, ornamentals, etc. Table 4.16 presents the economic plants observed in the study area.

Table 4.16: Economic Importance of flora species encountered.

Plant species	Family Names	Habits	Economic Importance
Azadiracta indica	Meliaceae	Tree	Medicinal
Capsicum annum	Solanaceae	Shrub	Food
Talinum triangularea	Talinaceae	Shrub	Vegetable, Medicinal
Musa paradisiaca	Musaceae	Herb	Food, Medicinal
Blighia sapida	Sapindaceae	Tree	Medicinal
Elaesis guineensis	Arecaceae	Tree	Food, Medicinal
Manihot esculenta	Euphorbiaceae	Shrub	Food
Gmelina arborea	Lamiaceae	Tree	Fuel wood
Anacardium occidentale	Anacardiaceae	Shrub	Food, Medicinal
Quercus		Tree	Fuel wood
Lantana camara	Verbenaceae	Herb	Medicinal
Chromolaena odorata		Herb	Medicinal
Sida acuta	Malvaceae	Shrub	Fodder
Pennisetum purpureum	Poaceae	Grass	Fodder
Momordica charantia	Cucurbitaceae	Grass	Fodder, Medicinal
Newbouldia laevis	Bignoniaceae	Tree	Medicinal
Gliricidia sepium	Fabaceae	Shrub	Fodder
Zea mays	Poaceae	Shrub	Food
Carica papaya	Caricaceae	Tree	Food, medicinal
Cola acuminata	Sterculiaceae	Tree	Cash crop, medicinal
Basella alba	Basellaceae	herb	Food, medicinal
Brassica oleracea	Brassicaceae	Herb	Vegetable, food
Psidium guajava	Myrtaceae	Tree	Food, medicinal

Terrestrial Fauna

Field surveys were conducted to determine the types of wildlife present within the study area. Fauna species were taxonomically identified, and biodiversity statuses were verified.

The sampling methods used for wildlife assessment were in accordance with the acceptable international standards. Indirect survey methods (footprint, nest type, feeding site, voice, fecal samples and shell types) were used.

In addition, Focus Group Discussions (FGDs) were held with farmers and hunters in the Project area. Semi-structured interviews of locals were conducted to ascertain the diversity of the fauna assemblage endemic to the study area. This was carried out to provide complementary (confirmation of the species observed and perceived) and supplementary (addendum to fill

inventory gaps, usually caused by behavioral adaptations of animals) information about the animals found in the study area.

The study area recorded very minimal presence of fauna (Plate 4.8). Tables 4.17 to 4.19 list the species present in the study area.

Table 4.17: Domestic animals within the study area

Fauna Species	Common name	Family	IUCN
Bos bovidae	Cow	Bovidae	LC
Ovis aries	Sheep/Ram	Bovidae	LC
Capra aegagrus hircus	Goat	Bovidae	LC
Canis lupus familiaris	Dog	Canidae	LC
Gallus gallus domesticus	Chicken	Phasianidae	LC
Numida meleagris	Guinea fowl	Numididae	LC
Rabbit Rabbit Rabbi	Rabbit	Leporidae	LC

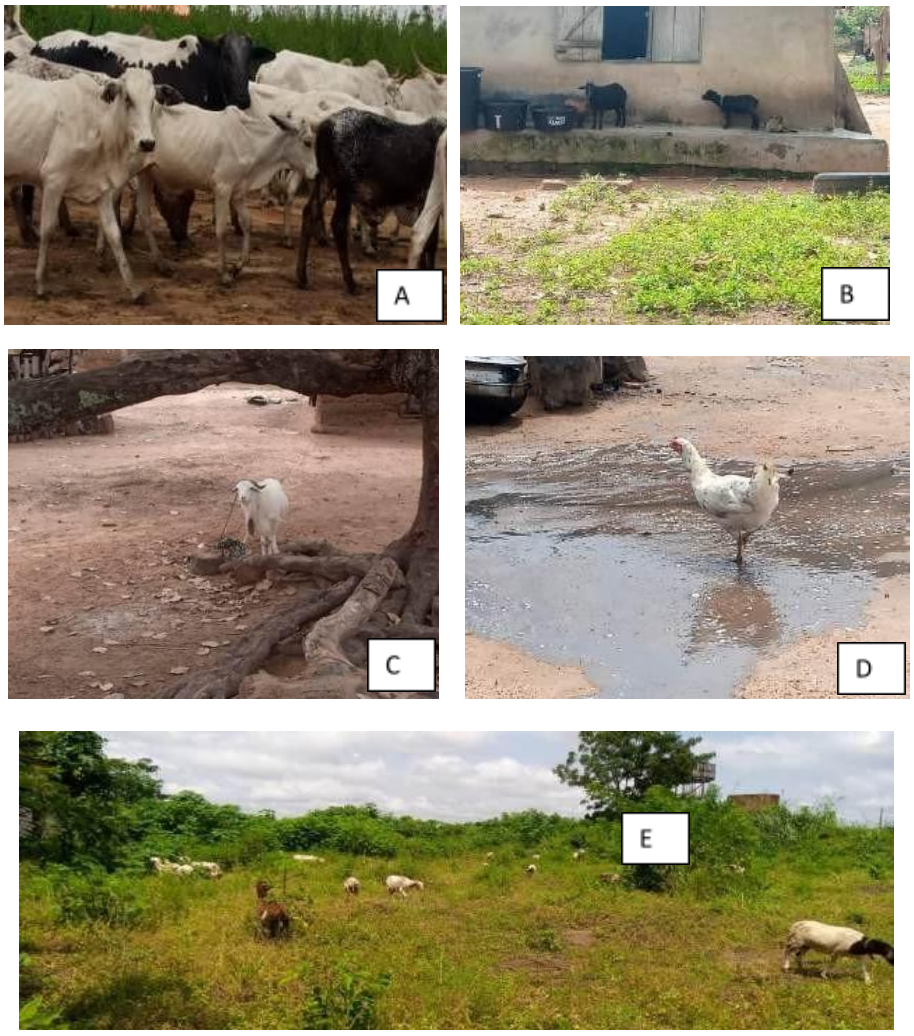


Plate 4.8: A - Bos bividae (cows); B- Capra aegagrus hircus (goat), C and E- Ovis aries (Sheep/Ram) D –

Gallus gallus domesticus (chicken) observed within the study area. Field survey 2021 and 2025

Table 4.18: Wildlife in the study area.

Fauna Species	Common name	Family	IUCN
Cercopithecus tantalus	Tantalus Monkey	Cercopithecidae	LC
Agama	Agama lizard	Lacertilidae	LC
Thryonomys swinderianus	Cane Rat	Thryonomyidae	LC
Heliosciurus gambianus	Gambian Sun Squirrel	Sciuridae	LC
Xerus erythropus	Stripped Ground Squirrel	Sciuridae	LC
Crocuta	Spotted Hyaena	Hyaenidae	NT
Cricetomys gambianus	Gambian Giant Rat	Cricetidae	LC
Thryonomys swinderianus	Cane Rat or Grasscutter	Thryonomyidae	LC
Hystrix cristata	Crested Porcupine	Hystricomorpha	LC
Viverra civetta	African Civet	Viverridae	LC
Naja melanoleuca	Black Cobra	Elapidae	LC

Table 4.19: Bird species in the study area.

Scientific name	Common name	Local name	Family	IUCN
Bubulcus ibis	Cattle Egret	Balbeelaa	Ardeidae	LC
Streptopelia semitorquata	Red-eyed dove	Kurciyaa	Columbidae	LC
Ploceus cuculatus	Village weaver	Kaabaree	Ploceidae	LC
Elanus caeruleus	Black-shouldered Kite	Shirwa	Accipitridae	LC
Centropus senegalensis	Senegal Coucal	Ragon mazaa	Cuculidae	LC

4.9 Land Use

The purpose of the land use study is to understand the existing land use and land cover types within the Project area. A 2-km radius from the proposed Project site was considered and selected as the wider study area for the land-use study. The result of the land use study is presented as surveyed.

4.9.1 Existing Land Use within the Project Site

The land use composition of the Project site can be categorized into four major classes: vegetation, farmland (crop), uncultivated land, and housing. The estimated area covered by each of the land use types is presented in Table 4.20. The forest reserve is 28,000 ha, with 2,341.15 ha declassified and gazetted.

Table 4.20: Existing Land Use within the Project Site boundary

S/N	Land use/ Land cover	Area (Ha)
1	Declassified forest	2,341.15
2	Farmland	290
3	Vegetation and wetland	370
4	Housing (dilapidated old forest guard houses)	2

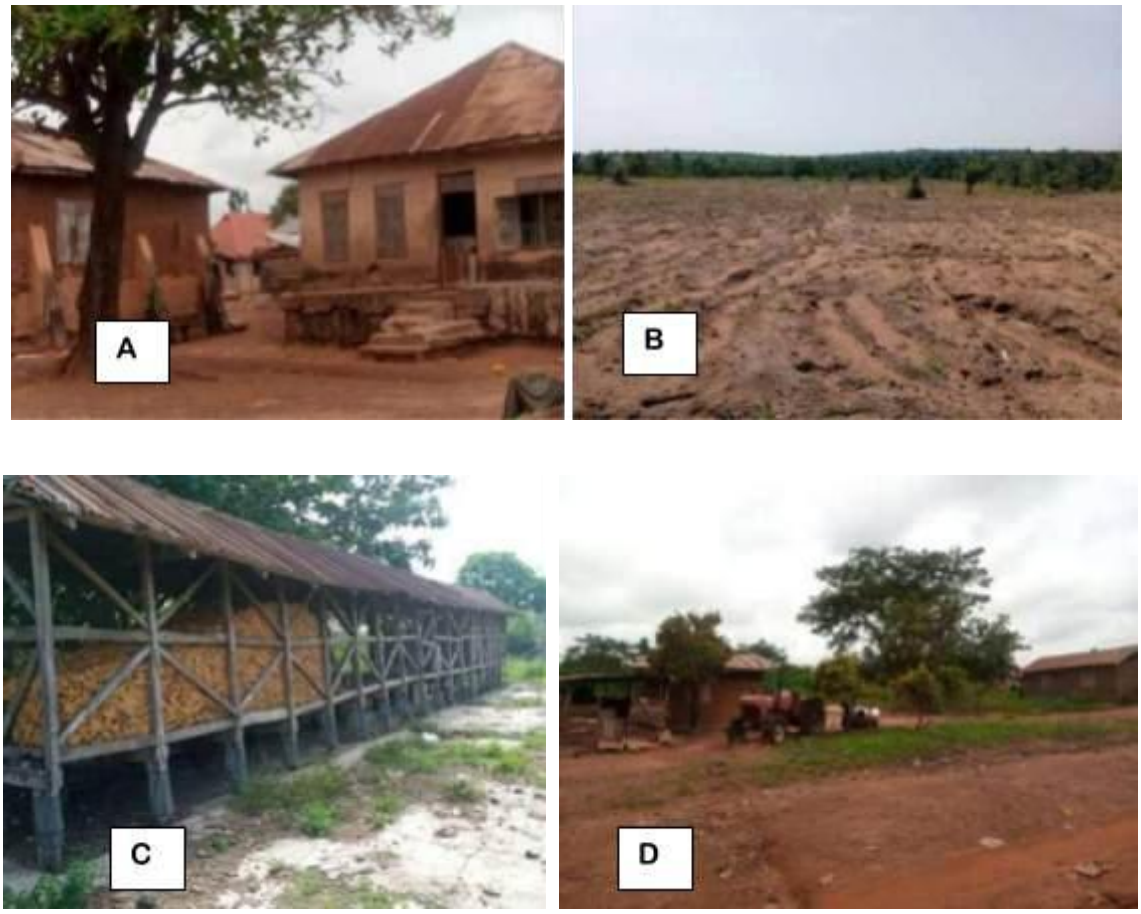


Plate 4.9: A – Housing unit; B - cleared land area observed within the Project site; C- dilapidated abandoned building, and D – abandoned tractor.

Field Survey, 2021 and 2025

Uncultivated land and forest reserve: This class was the second most dominant land cover type within the Project site (Plate 4.9). It consists mainly of the cleared vegetation and harvested crops within the Project site boundary.

Farmland: Crops grown include cassava, palm trees, vegetables, and poultry (Plates 4.10 and 4.11). The community is aware of the Project and has agreed to key Government initiatives.

Plate 4.10: A view of farmland within the Project site. Field Survey, 2021 and 2025

Vegetation and wetland: This class consists of the yet-to-be-cleared processing plant area within the Project site boundary (Plates 4.11a and b). The vegetation types are mainly forest trees and shrubs, which were sparsely distributed.

Plate 4.11a: Vegetation class within the Project site.

Field Survey, 2021 and 2025

Plate 4.11b: Signpost showing location of AIH, Ijaye.

Field Survey, 2025

Settlement: Communities that fall within a 2-km radius of the Project site are Ijaye Community, Atan, and Aruna. There are farm housing units within the area. Other structures in this class within the 2-km radius include the local markets and the garri processing factory (Plate 4.12).

Plate 4.12: Sample pictures of settlement types and occupations within the wider study area.

Field Survey

4.9.2 Climate change, land use, and tenure

Due to the envisaged climate change contribution from conventional agricultural practices, climate-smart agriculture policies will be adopted to mitigate the consequences of climate change. As a result, this report proposes reducing the number of hectares allocated for industrial layout and housing to reduce tree felling.

Current Land Use Patterns

Data obtained from field surveys and community consultations indicate that the majority of land in Ijaye is utilized for crop production (approximately 88%), while smaller portions are used for livestock farming (6%), residential development (3%), and other uses such as trading spaces, roads, and sacred sites (3%).

The dominant crops cultivated include maize, cassava, cocoa, soybean, palm oil, and vegetables, with each crop occupying distinct portions of farmland based on soil suitability and market value. Cassava and maize are widely grown for both household consumption and commercial sale, while cocoa and palm oil serve as major cash crops contributing to household

income. Vegetables and legumes (such as soybean) are cultivated mainly in low-lying areas where soil moisture is higher during the dry season.

Livestock rearing—particularly goats, poultry, and fish farming—is practiced as a supplementary livelihood, often integrated into crop-based systems. Farm sizes vary considerably, ranging from 1 to 5 hectares for smallholders to larger plots under cooperative ownership or private investment.

Land Tenure and Ownership

While all land in Oyo State is vested in the Governor under the Land Use Act, families and individuals in the Ijaiye community maintain legitimate customary and statutory rights of occupancy, which entitle them to use, transfer, and inherit land in accordance with established legal processes. Survey data show that 47% of respondents acquired land through inheritance, while 33% purchased their farmland, and 15% obtained land through community. Only a small proportion (5%) operate on leased or rented lands.

Land Suitability and Utilization

Field observations and soil assessments indicate that most of the land in Ijaye is fertile and well-drained, suitable for the cultivation of root, tuber, and cereal crops. The area's gently undulating topography supports rain-fed agriculture, though sections of the terrain are prone to erosion and seasonal flooding. These challenges are exacerbated by deforestation and inadequate soil conservation practices.

4.10 Socioeconomic and Health Conditions of the Study Area

4.10.1 Introduction

This section provides information on the socioeconomic and health conditions of the identified communities within the Project's area of influence (AoI). The socioeconomic baseline assessment for the Ijaye Agro-Industrial Hub (AIH) was undertaken to understand the prevailing demographic, livelihood, and institutional conditions within the project's area of influence. The data provides critical insights into community structure, resource utilization, infrastructure access, health conditions, and perceptions toward the proposed project. This baseline serves as a reference point for identifying, predicting, and managing potential social and environmental impacts throughout the project lifecycle.

Oyo State is divided into 33 Local Government Areas (LGAs), and the proposed Project site falls under Akinyele LGA. A 2 km radius Area of Influence (AoI) was delineated around the Project site as the primary zone for socio-economic assessment, based on the anticipated spatial extent of direct impacts such as land use changes, noise, dust, and increased human activity. The AoI encompasses the surrounding communities of Ijaye, Atan, and Aruna, which fall within this boundary and are considered the primary receptors of Project-related impacts. This delineation was further reviewed against potential indirect impact pathways to ensure that all materially affected communities are captured within the assessment.

The socio-economic baseline presented in this section focuses on the communities within the Project's Area of Influence (AoI), namely Ijaye, Atan, and Aruna, which are the primary receptors of potential Project impacts. The analysis is based on field data collected within these

communities, capturing key aspects such as livelihoods, land use, population characteristics, and access to services.

Relevant state- and national-level data are included only where necessary to provide context for interpreting site-specific conditions and to benchmark observed patterns within the AoI. The emphasis of the assessment remains on localized socio-economic conditions directly linked to the Project area to ensure relevance for impact evaluation and mitigation planning.

4.10.2 Coverage Area

The socioeconomic data gathering exercise was conducted in the three communities identified within the Project's AoI.

4.10.3 Data Gathering Approach

A combination of research methods was employed for the socioeconomic survey. These include:

- Review of secondary data.
- Reconnaissance survey.
- Key-Informant Interviews (KII) with community leaders.
- Focus Group Discussions (FGDs) with groups of men, women, and youth.
- Household (HH) Surveys.
- Direct field observations.

❖ **Questionnaire Surveys**

The household socioeconomic survey was done in Ijaye, Atan and Aruna communities. A total of 106 questionnaires were distributed, and all were retrieved. The sample size per community was based on the estimated population size of each community. In deciding the sample size for this study, the following steps were taken:

- Estimation of the communities' population size. The average household size and the number of communities were randomly determined, and the sample size for each community was drawn.
- Determination of the desired precision of results. This explains the closeness of the sample to the population's true value and how it predicts the population's true value. The difference between the sample and the real population is called the sampling error. For this study, the sampling error was put at ±10%.
- Determination of the Confidence Level, which is expressed as a percentage and represents how often the true percentage of the population who would pick an answer lies within the confidence interval. A 90% confidence level was used.
- Estimation of the Degree of Variability. This is the degree to which the attributes or concepts being measured are distributed throughout the population. The higher the degree of variability in the distribution of a concept in the target audience, the larger the sample size must be to obtain the same level of precision. The target

population for the survey is homogenous, which makes it easier to measure variability, and was therefore set at about 10%.

- Estimation of the Response Rate. Direct contact/observation increases response; therefore, the response rate was set at 80%.
- Based on this information, the equation for determining the sample size is as follows:

$$n = \frac{NZ^2pq}{E^2(N-1) + Z^2pq}$$

Where:

n = sample size required

N = number of people in the population

p = estimated variance in population, as a decimal: (0.10 for 10%)

q = 1-p

E = +- error (i.e. 0.1)

Z = based on confidence level: 1.645 for 90% confidence

❖ Direct/Field Observations

The survey also used observational methods, in which notes were taken on activities in the field. This method is useful for obtaining qualitative data and studying the current state of the socio-environment.

❖ Literature sources and field survey

To aid this study, relevant published and unpublished materials were obtained, including the Internet, census documents of the National Population Commission, local books, United Nations documents, the World Bank, and other resources specific to the Project area.

4.10.4 Overview of Key Socioeconomic Indicators

Nigeria is Africa's most populous countrywith an estimated population of 205 million, and population growth rate of 2.62 % per year (www.worldpopulationreview.com). Approximately 51% of the national population is male, against 49% female. Nigeria is a multi-ethnic and cultural society with diverse languages such as Hausa, Yoruba, Igbo, among others. The key socioeconomic indicators for Nigeria are summarized in Table 4.21.

Table 4.21: Key socioeconomic indicators for Nigeria.

Socioeconomic Indicator	National Level	Source
Population	205 million (2020)	World Population Review http://worldpopulationreview.com/countries/nigeria-population/
Population Growth Rate (% per annum)	2.62 (2020)	World Population Review http://worldpopulationreview.com/countries/nigeria-population/
Total Dependency Ratio	88.2% (2020 estimate)	CIA Fact Book https://www.cia.gov/library/publications/the-worldfactbook/geos/ni.html
Youth Dependency Ratio	83% (2020 estimate)	CIA Fact Book https://www.cia.gov/library/publications/the-worldfactbook/geos/ni.html
Elderly dependency Ratio	5.1% (2020 estimate)	CIA Fact Book https://www.cia.gov/library/publications/the-worldfactbook/geos/ni.html
Life Expectancy at birth	53.7 years (2020 estimate)	World Population Review http://worldpopulationreview.com/countries/nigeria-population/
Literacy Level	59.6% (2015 estimate)	CIA Fact Book https://www.cia.gov/library/publications/the-worldfactbook/geos/ni.html
HDI Value	0.527	CIA Fact Book https://www.cia.gov/library/publications/the-worldfactbook/geos/ni.html
Religion	Islam 50% Christianity 40% Traditional 10%	CIA Fact Book https://www.cia.gov/library/publications/the-worldfactbook/geos/ni.html
GDP per capita (as at 2017)	$2,406.73	World Population Review http://worldpopulationreview.com/countries/nigeria-population/

(Source: Adapted from different online sources as indicated)

Demographic Profile and Ethnic Groups

Oyo State and Akinyele LGA Profile

Oyo is located in the Southwest geopolitical zone of Nigeria. The capital city of the state is Ibadan. Ibadan, Ogbomosho, Iseyin, Eruwa, Igboora, and Saki are the main urban areas of the state. Oyo State is homogenous, mainly inhabited by the Yoruba ethnic group, who are

primarily agrarian. The indigenes mainly comprise the Oyos, Oke-Oguns, the Ibadans, and the Ibarapas. Oyo State is one of the major economic hubs in Nigeria.

According to the National Population Commission (NPC) census of 2006, the population of the State is 5,580,894. Using the population growth rate of 2.61% for Nigeria (Worldometer population 2018), the 2018 projected population of the State is 5,726,555 people. The population of Akinyele LGA in 2006 was 103,261. It occupies a total of 986 km^2 (National Population Commission, 2006).

It has dilapidated old forest guard and farm housing units with abandoned equipment built many years ago (Plate 4.15).

The communities within the study area are semi-rural settlements characterized by a mix of indigenous and migrant populations. The dominant language is Yoruba, reflecting the ethnic composition of the host communities. However, there is also a small presence of non-indigenous residents, particularly from northern states such as Benue and Niger, who have settled in the area for farming, trade, and other livelihood opportunities. The Ijaye Agro-Industrial Hub is supported by several key community infrastructure and social service facilities that contribute to the well-being of residents and workers within the project area. These amenities include educational institutions, a health centre, and a fuel station, all of which play an essential role in sustaining community resilience and productivity.

Educational Facilities:
The hub hosts both a community primary school and a secondary school, providing accessible basic and post-basic education to children within the Ijaiye community and surrounding communities. These schools help reduce pupils' travel distance and enhance literacy and skill development essential for future workforce supply to the agro-industrial zone.

Health Center
A functional community health centre is located within the hub (Plate 4.13), providing primary healthcare services to residents. The facility is staffed by a medical doctor, supported by four health technicians and nurses, including Mrs Olaore Darasimi. The available workforce ensures basic medical consultations, maternal and child healthcare, and first-aid services are readily accessible.
However, the health center experiences critical gaps in human resources and support services. There is no resident pharmacist or trained pharmacy technician, limiting the centre's capacity for proper drug dispensing and pharmaceutical care. Additionally, the absence of cleaners or sanitary support staff poses challenges for maintaining optimal hygiene and infection prevention standards within the facility.

Plate 4.13: A health center located within Atan, Ijaye, Akinyele Local Government

Filling Station

A community filling station (Plate 4.14) located near the site plays an important role in supporting mobility, small-scale commercial activities, and farm operations. It provides fuel for motorcycles, vehicles, and agricultural machinery used by residents and businesses within the area.

Plate 4.14: Filling station within Atan, the site for AIH

Overall, while existing infrastructure meets the basic needs of the community, some facilities—especially the health center—require strengthening to adequately serve a growing

population and to meet future demands associated with the expansion of the Ijaye Agro-Industrial Hub.

Plate 4.15: Sample pictures of abandoned farm equipment and local oil palm production.

Economics, Livelihoods, and Employment
National Profile

Nigeria is Africa's largest economy but is currently struggling due to the global fall in the price of oil, the country's main source of foreign exchange earnings and government financing. Growth expectations for the economy have continued to deteriorate as a result. There is hope however, that the economy will rebound in no time because of the positive growth recorded in critical sectors such as agriculture, solid minerals, and transport.

The country has a thriving labor force population of about 73.4 million or 39.4% of her total population (NBS, 2016). The country's labor force participation rate is 64.5 percent for women and 70.3 percent for men (NBS, 2016). About 61 percent of the population of Nigeria lives below the poverty line of USD1 per day (Global Economy).

Project AoI

- **Demographic and household characteristics**

Farming is the major livelihood activity in these communities, involving about 80% of residents (Figures 4.17 a – g). The demographic analysis reveals that the Ijaye project area is characterized by a predominantly male population (74.3%), reflecting the gendered nature of agricultural labor in the community. The age distribution indicates that the majority of respondents fall within the 46–60-year age group (57%), with an additional 26% above 60 years, suggesting a mature and experienced farming population.

A significant proportion of respondents are married (71%), and most households have between six and ten members, implying strong family cohesion and availability of household labor for farming activities. The educational profile is relatively high for a rural setting — approximately

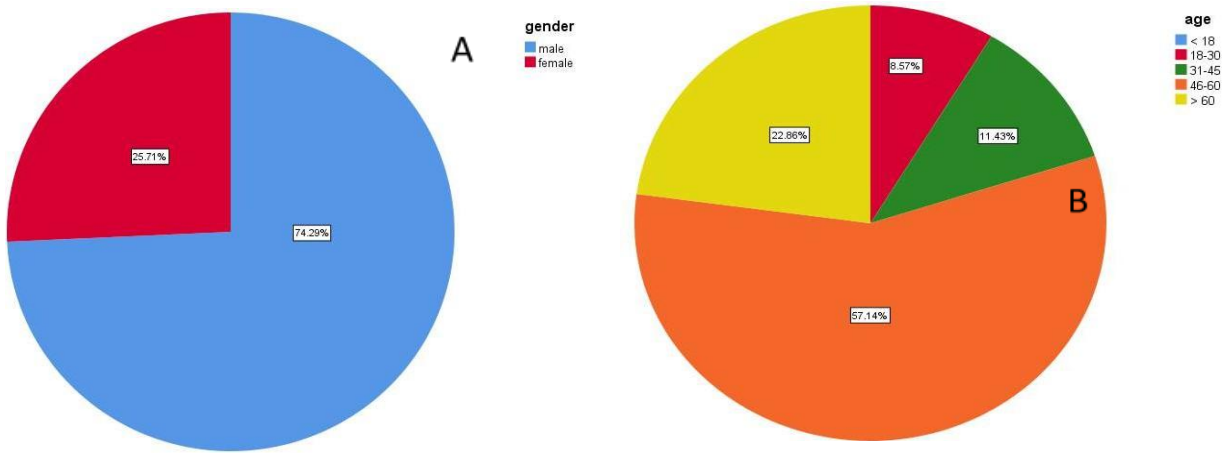
75% of respondents attained secondary or tertiary education, which enhances the community's potential to adopt improved agricultural technologies. Furthermore, more than 80% of respondents have resided in the area for over ten years, demonstrating high social stability and deep-rooted land-tenure arrangements.

These characteristics portray a well-established, stable rural farming community with moderate educational attainment and the potential to effectively participate in capacity-building and agribusiness interventions.

An analysis of household assets indicates that the local population's wealth and livelihood base are primarily agricultural. Farm equipment accounts for about 48.8% of total assets, while livestock accounts for 24.4%. Other household assets include residential houses (12.2%) and vehicles (9.8%). This distribution confirms that the Ijaye community's economic structure is predominantly agrarian, with limited diversification into non-farm enterprises. Consequently, most households depend directly on crop production, livestock rearing, and related value chain activities for sustenance and income generation.

The dominance of farm equipment and livestock as household assets has critical implications for establishing the Ijaye Agro-Industrial Hub (AIH). Since farming tools and animals constitute the major productive assets, any intervention in land use or resettlement must prioritize asset-based compensation over generic cash payments. The proposed project must ensure that affected households maintain or restore their productive capacity by facilitating access to replacement farm tools, improved inputs, and animal stock. This approach is vital for maintaining livelihood stability and minimizing economic displacement.

The demographic and asset profile also indicates economic vulnerability, as most residents have limited financial savings or non-farm investments. The loss or disruption of agricultural assets would, therefore, directly affect household income and food security. A well-designed Resettlement Action Plan (RAP) and Livelihood Restoration Framework will be essential to ensure that affected persons regain access to farmland, maintain income levels, and continue agricultural activities without long-term economic loss.



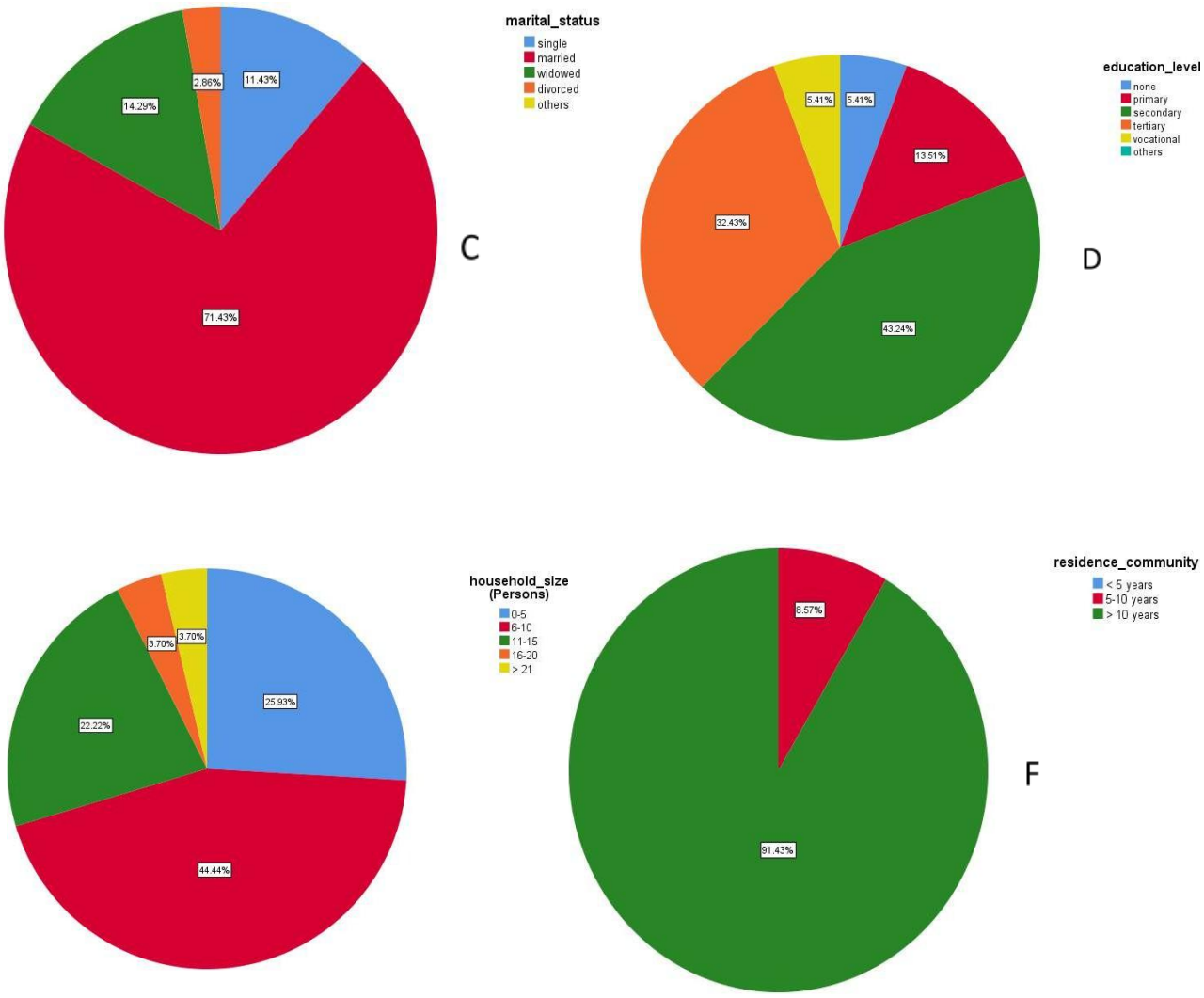


Figure 4.17 a–f: Demographic and household characteristics of residents of AoI

The social baseline also reveals key challenges along the agricultural value chain that justify establishing the agro hub. The most prominent problems identified are poor road networks (37.9%) and lack of access to stable markets (22.7%), which hinder the movement of goods and restrict farmers' ability to sell their produce at fair prices. These infrastructural limitations often result in significant postharvest losses, reduced income, and discouragement among younger farmers. The Ijaye Agro-Industrial Hub is therefore designed to function as a centralized agricultural and commercial service node, providing farmers with efficient logistics, improved market access, and on-site processing facilities to strengthen local value chains.

Other significant constraints identified include inadequate input supply (18.2%) and limited access to agricultural credit (15.2%). These challenges further justify the development of the hub as a multi-functional agribusiness service centre. The project should integrate dedicated spaces for input distribution (fertilizers, improved seeds, and agrochemicals) and financial services, enabling farmers to access credit, insurance, and cooperative financing within the same complex.

Although postharvest losses (6.1%) represent the smallest proportion of reported challenges, they remain a significant environmental and economic concern. Losses during storage and transport contribute to reduced profitability and increased greenhouse gas emissions. The Ijaye Agro-Industrial Hub's infrastructure must therefore incorporate cold storage units, drying platforms, silos, and small-scale processing plants to minimize waste, enhance value addition, and maximize the economic returns from the community's agricultural assets.

In summary, the demographic and socioeconomic characteristics of the Ijaye community reveal a population that is deeply dependent on agriculture, economically vulnerable to displacement, and constrained by infrastructural and market deficiencies. The establishment of the Ijaye Agro-Industrial Hub provides a critical opportunity to address these weaknesses through integrated support systems, value chain linkages, and livelihood protection measures that enhance both productivity and resilience.

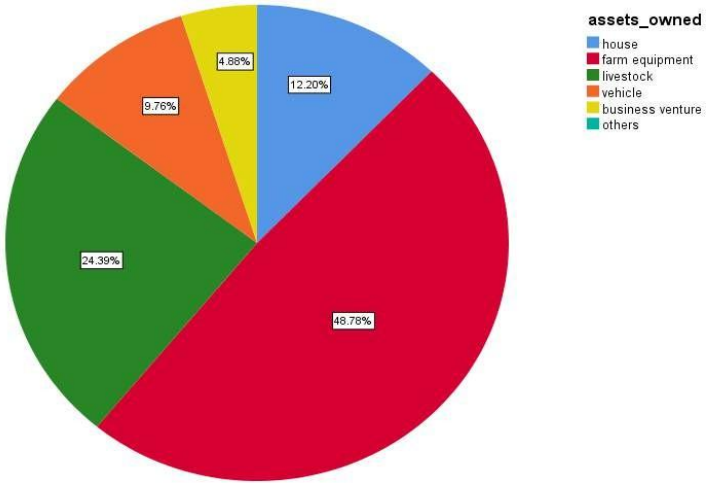


Figure 4.17g: Demographic and household characteristics of residents of AoI

❖ Socioeconomics and livelihood indicator

The dominant occupation within the Ijaye community is farming (82.9%), highlighting the agrarian nature of the community (Figures 4.18 a–c). The major crops cultivated include maize, cassava, cocoa, and palm oil, representing both food and cash crop value chains. Additionally, some farmers are engaged in vegetable and livestock production, notably poultry, goats, and fish farming.

Land ownership is primarily inherited (47%) or purchased (33%), reflecting secure tenure systems that encourage long-term agricultural investment. However, only a small fraction of farmers operates under communal arrangements.

Income levels are modest, with most households earning below ₦100,000 monthly, although farming remains their primary livelihood. Land use patterns are dominated by crop farming (88%), followed by small-scale livestock and mixed farming.

Survey results show that the dominant crop cultivated in Ijaye is cocoa, accounting for approximately 29.8% of total farm outputs (Figures 4.18 a–-c). This reflects the area's long-standing tradition in perennial cash crop production and its potential for agro-industrial processing. Maize and cassava follow closely, each representing about 19.2% of total cultivation. These two crops serve as the primary food crops, forming the dietary staples for most households while also being marketed for income generation.

Palm oil production constitutes about 14.4%, emphasizing its importance as both a household commodity and a raw material for small-scale agro-processing consumption (Plates 4.16 A–D). Yam and vegetables each contribute 6.7%, representing important supplementary food sources and sources of income diversification, particularly among women farmers engaged in subsistence and market gardening. Rice, though less common, accounts for 3.8% of total crop production and is cultivated mainly in low-lying areas with better water retention.

Generally, the crop distribution demonstrates a balanced agricultural economy combining cash crops (such as cocoa and palm oil) with food crops (such as maize, cassava, yam, and vegetables). This diversity provides a strong foundation for the Ijaye Agro-Industrial Hub, particularly in the design of processing facilities targeting the major value chains of cocoa, cassava, maize, and palm oil, which collectively represent over 80% of the community's agricultural output.

Plate 4.16: Major occupations of residents of Ijaye and its environs

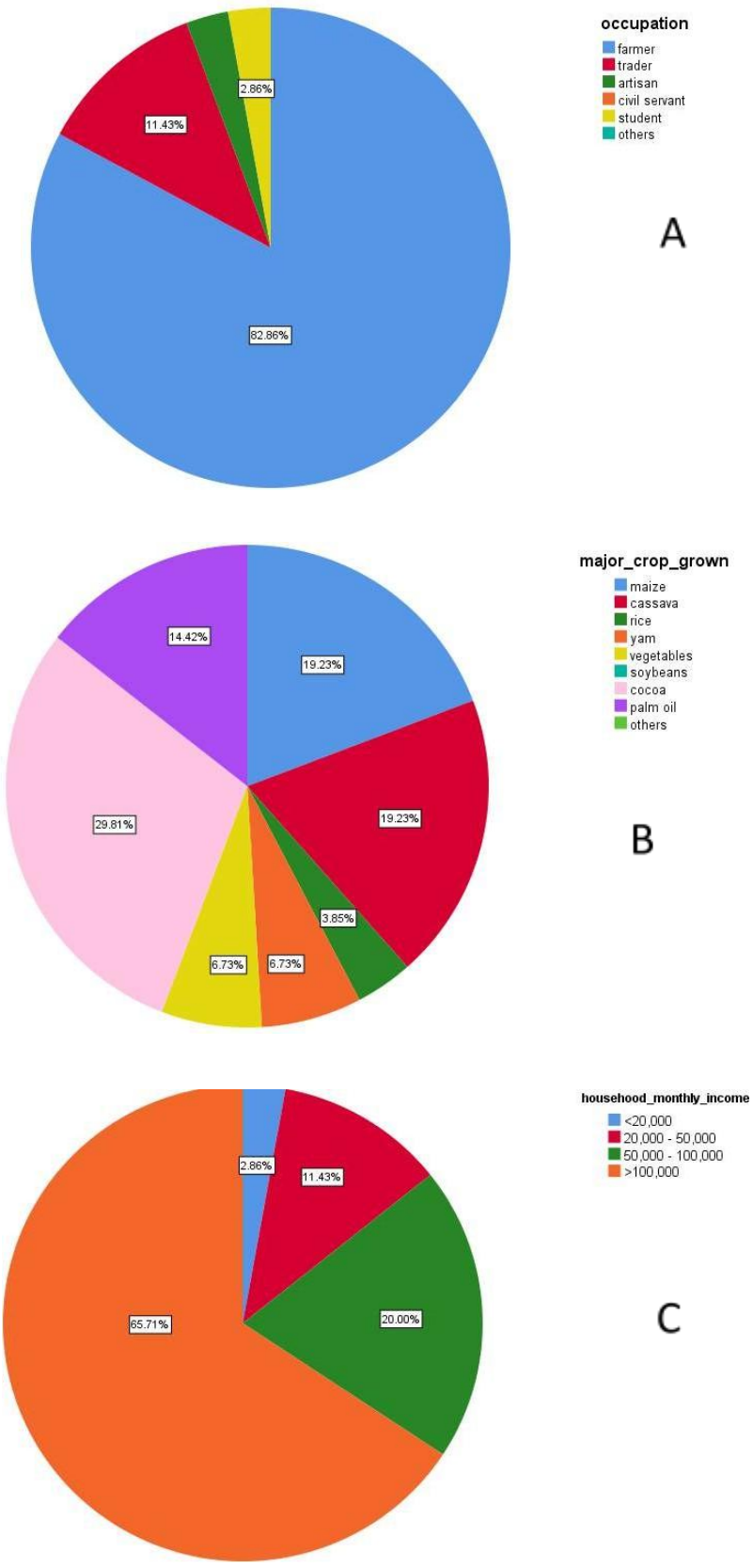


Figure 4.18 A–C: Socioeconomic and livelihood indicators of respondents within the Ijaiye community.

Roads, public transportation, and infrastructural facilities

The main challenges in the value chain are dominated by poor roads, representing the largest share at 37.88%, followed by poor markets at 22.73% (Figure 4.19a). This infrastructure deficit has direct and profound implications for the residents. The 37.88% contribution from poor roads is the most critical factor, as poor infrastructure directly escalates the environmental footprint of the entire value chain. Substandard road surfaces lead to higher fuel consumption and increased greenhouse gas (GHG) emissions due to slow speeds, congestion, and frequent vehicle idling. Furthermore, unpaved or damaged roads are a major source of dust pollution (PM), negatively affecting both air quality and surrounding crops and ecosystems. As part of the State Government's Agroprocessing Zone development plan, a six-lane access road has been proposed to facilitate traffic flow and accommodate heavy-duty vehicles associated with agricultural processing and logistics. However, this decision has generated concerns among local residents, many of whom prefer a two- or four-lane alternative to minimize property displacement, safeguard existing structures, and preserve community assets.

Figure 4.19b shows inadequate social amenities levels, revealing significant deficits in public services, with the top three challenges being electricity (29.21%), roads (24.72%), and water (12.36%). Electricity (29.21%) is the single largest inadequate amenity. A lack of reliable power forces communities and businesses to rely on alternative sources, typically diesel or petrol generators. In an ESIA context, this means an environmental impact of increased air pollution (NO_x, SO_2, particulate matter) and higher Greenhouse Gas (GHG) emissions per unit of energy compared to grid power.

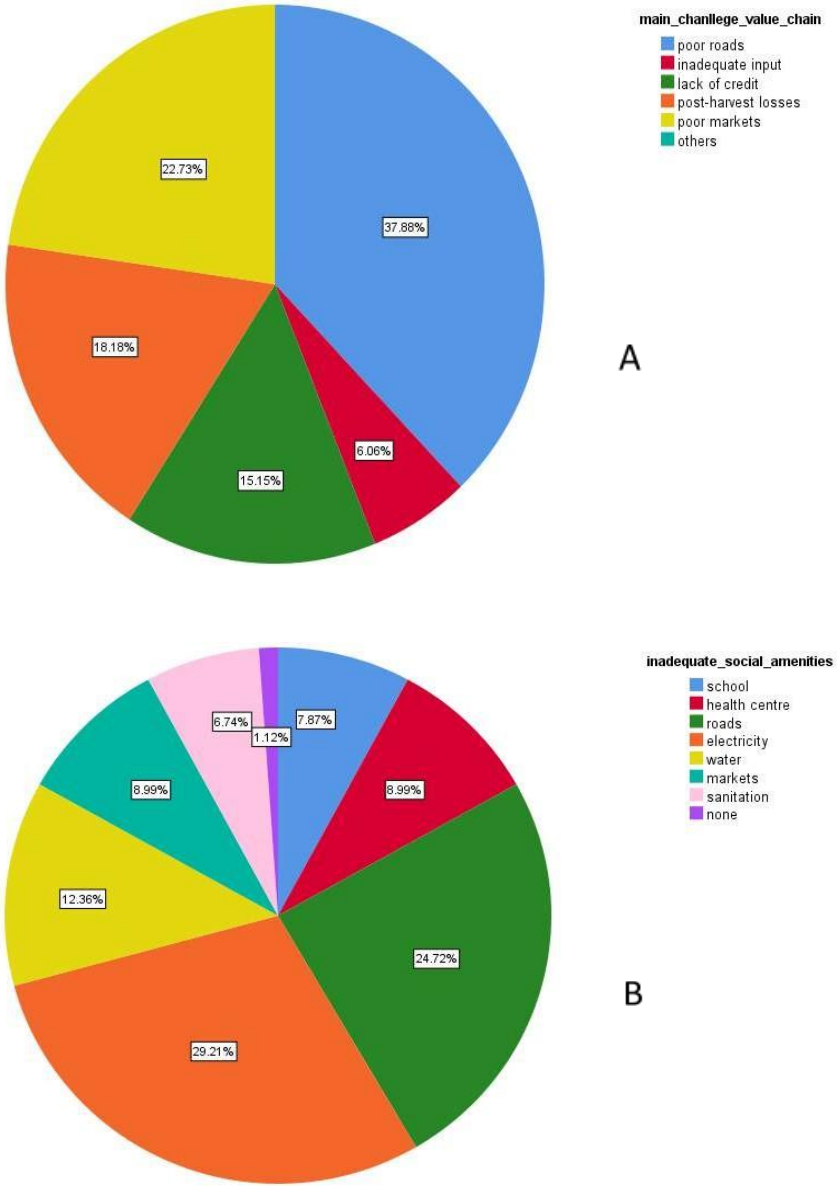


Figure 4.19 A–B: infrastructural facilities of respondents within the Ijaiye community.

At Ijaye and Atan, cars, lorries, motorcycles, and tippers are used to convey their goods (plates 4.17 A, B, C, and D). Ijaye and Atan, as well as other adjoining communities have road networks, though deplorable (Plate 4.18).

Plate 4.17: Road networks within and outside proposed AIH center

Plate 4.18a: Social infrastructures at proposed AIH site A – abandoned borehole, B - electric cables and wires without a transformer and C – fallen poles

Plate 4.18b and c: Social infrastructures at Ijaiye A – abandoned borehole, B - electric cables and wires without a transformer, and C – fallen poles

Water resources, sanitation, and waste management

According to the World Bank, 58% of the Nigerian population had access to an improved water source in 2008. Such access was significantly better in urban areas than in rural areas (World Bank, 2010). According to the 2006 national census, 10% of households in the state have piped water within their dwellings and another 15% have access to piped water outside the house. Over a fifth of households rely on rainwater as their primary water source. The main source of water for domestic use in this community is hand-dug wells and streams. Most of the sources usually dry up during the dry season.

Potable water is limited, with most households relying on streams, hand-dug wells, and rainwater harvesting. About 93.8% of respondents have access to educational facilities, while 87.5% have some access to health centers, though these are often under-equipped (Figure 4.19b).

❖ **Water Availability, Quality, and Sources**

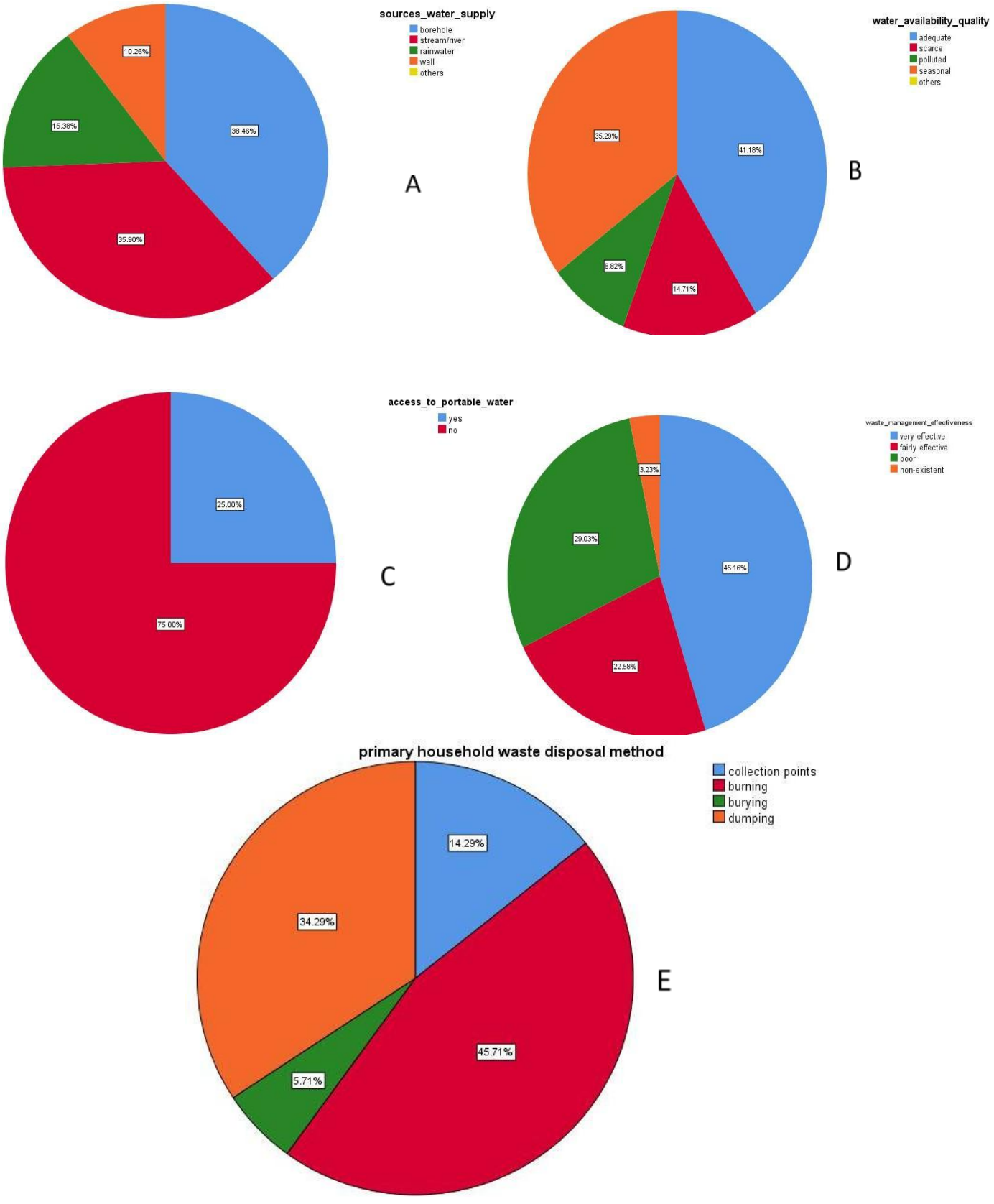
Despite 41.18% of respondents reporting adequate water availability/quality, the remaining majority face significant issues, with seasonal availability (35.29%) and outright scarcity (14.71%) being the dominant constraints (Figures 4.20a–c). Furthermore, the pollution of water sources affects an additional 8.82% of the population, establishing a serious public health and environmental concern. This vulnerability is directly linked to reliance on primary water sources: the majority of the population depends on boreholes (38.46%) and stream/river water (35.90%). This heavy reliance on surface water and shallow groundwatersources, which are susceptible to both seasonal depletion and contamination, means that any proposed development must strictly avoid increasing water demand or contributing to pollution.

❖ Waste management, pollution, and sanitation

Ineffective waste management practices severely compound the environmental vulnerability. The chart on waste management effectiveness indicates that the majority of existing systems are either poor (29.03%), fairly effective (22.58%), or non-existent (3.23%), leaving nearly 55% of waste unmanaged (Figure 4.20d). This poor disposal directly correlates with the identified water pollution (8.82%) and the environmental challenge of waste disposal (4.17%). Uncontrolled solid and liquid waste (including human waste, which is related to the 1.12% inadequate sanitation figure from the second chart) is a primary driver of pathogen and chemical contamination in rivers and streams. Consequently, the project, particularly those involving new cold storage or processing facilities (aimed at reducing postharvest losses at 6.06%), must prioritize the establishment of best-practice, integrated solid and liquid waste management systems that operate to standard, preventing any project-related contamination of the critical water resources.

The household waste management practices in Ijaye and its environs reflect a predominantly informal system with limited institutionalized collection services. Data obtained from the socioeconomic survey show that, of the sampled respondents, 45.7% dispose of household waste by burning, 34.3% through open dumping, 14.3% at collection points, and 5.7% by burying (Figure 4.20e). This indicates that more than 80% of residents engage in environmentally unsafe disposal methods.

The reliance on burning and open dumping poses significant environmental risks, including air pollution from incomplete combustion, surface water contamination, and potential breeding of disease vectors. These practices reflect the lack of formal waste-collection infrastructure and low environmental awareness among residents.



Figures 4.20a–e: Water management, disposal and sanitation reported by the respondents within the Ijaiye community.

Considering these findings, the ESIA identifies waste management as a priority area for mitigation and environmental enhancement within the Ijaye Agro-Industrial Hub project. The following measures are recommended:

- Provision of central collection points with covered bins at strategic community and project locations to discourage open dumping and burning.
- Partnership with local government councils and private waste operators for regular waste evacuation and transportation to approved dumpsites.
- Development of an integrated waste management plan for the Ijaye Agro-Industrial Hub, including segregation at source (organic, recyclable, and hazardous components).
- Promotion of composting and reuse of organic wastes from farm operations to support soil fertility improvement.
- Environmental education and awareness programs for residents and project staff to encourage proper waste handling.
- Periodic monitoring of waste generation, collection, and disposal through environmental audit mechanisms.

These interventions align with NESREA's National Environmental (Sanitation and Waste Control) Regulations, 2009, and will significantly reduce potential pollution load from project and community sources.

Electricity Supply

This community is connected to the national grid (Plate 4.17), but participants at the FGD sessions complained that the frequency is erratic. Infrastructure access remains a critical development challenge in Ijaye. The community has no access to electricity (100%) (Figure 4.21). A lack of reliable power forces communities and businesses to rely on alternative sources, typically diesel or petrol generators. In an ESIA context, this means increased environmental impacts, including increased air pollution (NOx, SOx, particulate matter) and higher Greenhouse Gas (GHG) emissions per unit of energy compared to grid power.

Respondents identified roads (31%), electricity (28%), and water supply (22%) (Figure 4.18b) as the most pressing infrastructural needs. Poor road networks hinder market access, especially during the rainy season, and limit the transportation of farm produce.

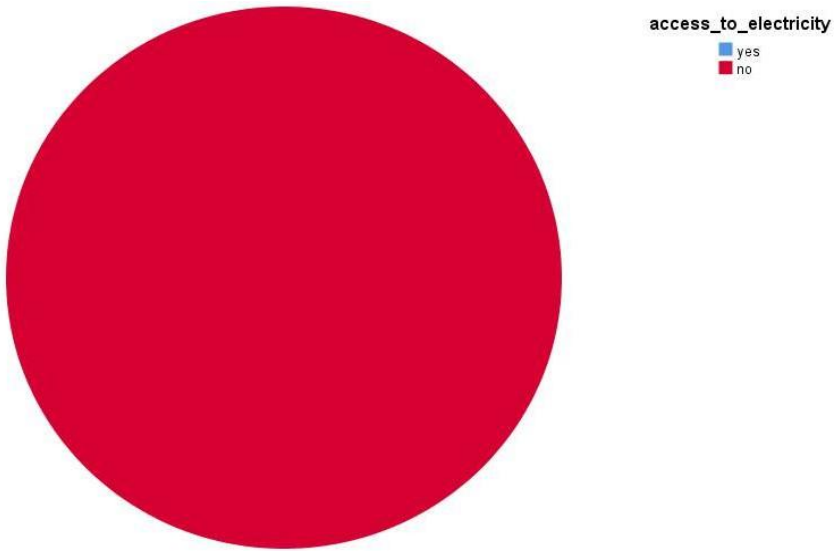


Figure 4.21: Electricity supply among residents of the project area

Major Environmental Challenges

The key environmental issues (Figure 4.22) identified in Ijaye include:

- Deforestation (35%) resulting from extensive land clearing for cultivation, fuelwood collection, and charcoal production. This has reduced vegetation cover and increased vulnerability to erosion and biodiversity loss.
- Soil erosion (32%), particularly on sloped farmlands and along footpaths, caused by unplanned land clearing, inadequate soil cover, and lack of erosion control measures.
- Flooding (11%) during heavy rainfall periods due to poor drainage systems and blockage of natural waterways by refuse and silt.
- Drought episodes, which intermittently affect water availability and reduce farm productivity during the dry season.
- Pest infestation and declining soil structure, resulting from prolonged monocropping, inadequate rotation, and chemical overuse.

Collectively, these environmental pressures contribute to land degradation, loss of soil fertility, and reduced agricultural productivity, threatening the long-term sustainability of the

farming ecosystem in Ijaye. The observed environmental conditions indicate moderate ecological stress in the project area. These challenges are primarily linked to unsustainable land use, deforestation, poor waste management, and limited environmental awareness among farmers. If left unmanaged, these issues could undermine the productivity goals of the proposed Ijaye Agro-Industrial Hub (AIH).

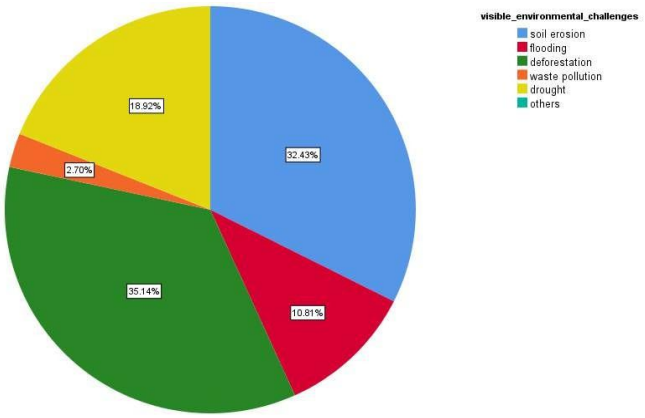


Figure 4.22: Major environmental challenges faced by residents of Ijaye Agricultural

Grievance Redress Mechanism (GRM)

A structured and accessible Grievance Redress Mechanism (GRM) will be established to ensure timely and transparent resolution of stakeholder concerns throughout the project lifecycle. The GRM will include:

- Multiple entry points (community leaders, dedicated grievance officers, phone lines, and written submissions) to enhance accessibility.
- Grievance registration and tracking system, including a grievance log and unique case identification for monitoring resolution status.
- Defined resolution timelines and escalation procedures from community level to the Project Implementation Unit (PIU), with provisions for independent mediation where necessary.
- Confidential, inclusive, and culturally appropriate processes, ensuring accessibility for vulnerable groups, including women, youth, and persons with disabilities.

Integration of GBV/SEA/SH Safeguards

Given the potential risks associated with labour influx and project activities, the GRM will incorporate specific protocols for Gender-Based Violence (GBV), Sexual Exploitation and Abuse (SEA), and Sexual Harassment (SH). These include:

- Confidential reporting channels that allow survivors to report incidents safely and anonymously where desired.

- Survivor-centred approach, ensuring respect, non-discrimination, and protection from retaliation.
- Immediate referral pathways to qualified GBV service providers (healthcare, psychosocial support, legal assistance) in line with national and international guidelines.
- Dedicated and trained focal persons within the PIU to handle GBV/SEA/SH cases sensitively and appropriately.
- Strict confidentiality protocols, ensuring that sensitive information is not disclosed without consent.
- Mandatory Codes of Conduct for all workers, including sanctions for violations related to SEA/SH.
- Awareness and sensitization programmes within host communities and among workers to prevent GBV/SEA/SH incidents.

GBV-related grievances will be handled separately from standard grievance processes, with priority given to survivor safety, confidentiality, and timely support, rather than formal investigation timelines.

The perception of the Ijaye community toward the proposed Ijaye Agro-Industrial Hub project was assessed through socioeconomic surveys and community consultations. The findings reveal a predominantly positive attitude toward the project, indicating a strong level of social acceptance and readiness to engage.

Among the respondents, 56.3% were strongly supportive, 37.5% were supportive, 3.1% were neutral, and 3.1% were opposed to the project. This shows that approximately 94% of respondents expressed favorable opinions, while resistance or indifference was minimal (Figures 4.23a–e).

The high level of support reflects the community's recognition of the potential socioeconomic benefits associated with the Ijaye Agro-Industrial Hub initiative, including:

- Employment opportunities during construction and operational phases.
- Enhanced market access for local farmers and traders.
- Improved infrastructure and services, such as roads, water supply, and waste management.
- Capacity development and technology transfer, particularly in modern agricultural practices.

The minimal opposition (3.1%) and neutrality (3.1%) may be attributed to concerns about land acquisition, compensation, and potential displacement, or lack of detailed information about project components. Such reservations underscore the importance of continuous stakeholder engagement and transparent communication.

Preferred Communication Channels

Survey data further show that 77.8% of respondents prefer community meetings as the main communication channel for project updates, while smaller proportions opted for posters

(11.1%), radio (7.4%), and digital platforms (3.7%). This preference highlights the community's trust in face-to-face communication and the role of traditional information-sharing systems in rural settings.

Given this feedback, the ESIA emphasizes the need for a participatory and inclusive stakeholder engagement plan that builds on local structures and traditional institutions. Community meetings should be held regularly, particularly:

- Prior to major construction activities.
- During environmental and social monitoring phases.
- When reporting on mitigation progress and project milestones.

The ESIA survey results show that community members prefer resolving complaints and grievances through traditional and community-based structures (Figures 4.23a-e). Specifically, 85% of respondents indicated they would channel grievances through community leaders, 10% through the project office, and 5% preferred the local government.

Additionally, 51.4% of respondents expressed confidence in existing grievance resolution processes, 43.2% indicated dissatisfaction, and 5.4% were unsure. This distribution underscores the need to strengthen grievance handling frameworks and ensure accessibility, fairness, and transparency during project implementation.

The ESIA therefore recommends establishing a multi-tier Grievance Redress Mechanism (GRM) that integrates both formal and community-based systems as follows:

- First Level – Community-Based Redress: Grievances shall first be lodged with community leaders or local grievance committees, who will record, acknowledge, and attempt to resolve issues within 7 days.
- Second Level – Project Grievance Office: Unresolved issues will be escalated to the Project Implementation Unit (PIU), where a dedicated Grievance Officer will document and mediate complaints within a defined timeline (14 days).
- Third Level – Independent Review/Local Government Mediation: If grievances remain unresolved, the complainant may appeal to a Local Government Committee or a neutral third-party mediator for independent resolution.
- Final Level – Legal Recourse: As a last resort, complainants may seek redress through the formal judicial system in accordance with Nigerian law.

The GRM will ensure:

- Accessibility to all community members (including women, youth, and vulnerable groups).
- Confidentiality and non-retaliation for complainants.
- Clear timelines and feedback mechanisms.
- Periodic review and reporting of grievance trends.
- Periodic review and reporting of grievance trends.
- Equal access for women, youth, and vulnerable groups
- Multiple reporting channels (in-person, phone, written, digital)
- Systematic documentation and tracking of grievances

Grievance Redress Mechanism (GRM) – Resolution Pathway Table

Level	Stage / Step	Description of Action	Responsible Party	Timeline	Output / Decision	Escalation Trigger
Level 1	Grievance Uptake / Lodging	Grievance is submitted through available channels (community leader, GRM desk, phone, email, suggestion box, contractor liaison officer). Complaint is logged and assigned a unique ID.	Community Liaison Officer (CLO) / GRM Desk Officer	Within 24–48 hours of receipt	Grievance registered and acknowledged to complainant	If not acknowledged within timeline
Level 1	Screening & Classification	Complaint is reviewed, categorized (environmental, social, land, labour, GBV-sensitive, etc.), and priority level assigned.	GRM Committee (Project Level)	Within 2–3 working days	Complaint classified and routed appropriately	If grievance is complex or sensitive
Level 1	Initial Resolution	Attempt is made to resolve grievance at	CLO + Community Leaders +	Within 5–7 working days	Resolution agreed and	If complainant is dissatisfied OR no

	(Community Level)	community/project level through dialogue, mediation, or immediate corrective action.	Contractor Representative		documented OR unresolved case	resolution reached
Level 2	Project-Level Grievance Committee Review	Formal review by Project Grievance Redress Committee (including OYSADA, safeguards team, and local authority reps). Investigation may include site visits and stakeholder consultations.	Project GRM Committee (OYSADA-led)	Within 10–14 working days	Formal decision issued and communicated	If complainant rejects decision OR issue is high-risk (e.g., land acquisition dispute)
Level 3	State-Level Escalation	Escalation to State-level authorities (e.g., Oyo State Ministry of Environment / relevant MDAs). Independent	State Government / Regulatory Authority	Within 15–21 working days	Final administrative resolution provided	If grievance remains unresolved or involves legal rights

		review may be conducted.				
Level 4	Judicial / External Mechanism	Complainant may seek redress through formal judicial system or external mechanisms (e.g., AfDB Independent Recourse Mechanism).	Courts / AfDB IRM	As per legal procedures	Legally binding resolution	Final stage (no further escalation within GRM)

A Grievance Register will be maintained to capture details including complaint type, date received, responsible party, resolution timeline, and closure status.

GRM Budget and Implementation

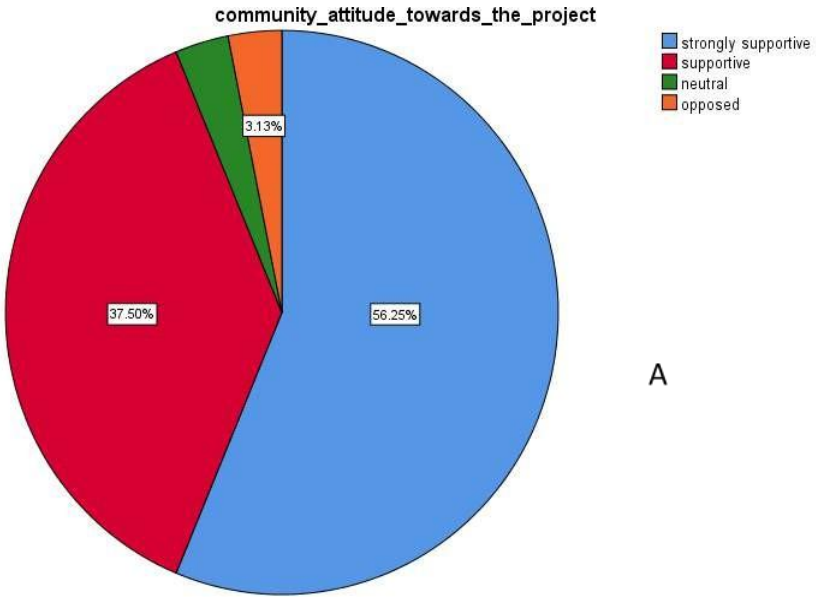
A dedicated budget of ₦10,800,000 has been allocated for GRM implementation which is 10% of total ESMP budget. This covers:

- Establishment of grievance offices and communication channels
- Staffing (Grievance Officers and community liaison personnel)
- Community awareness and sensitization campaigns
- Documentation, reporting, and monitoring systems

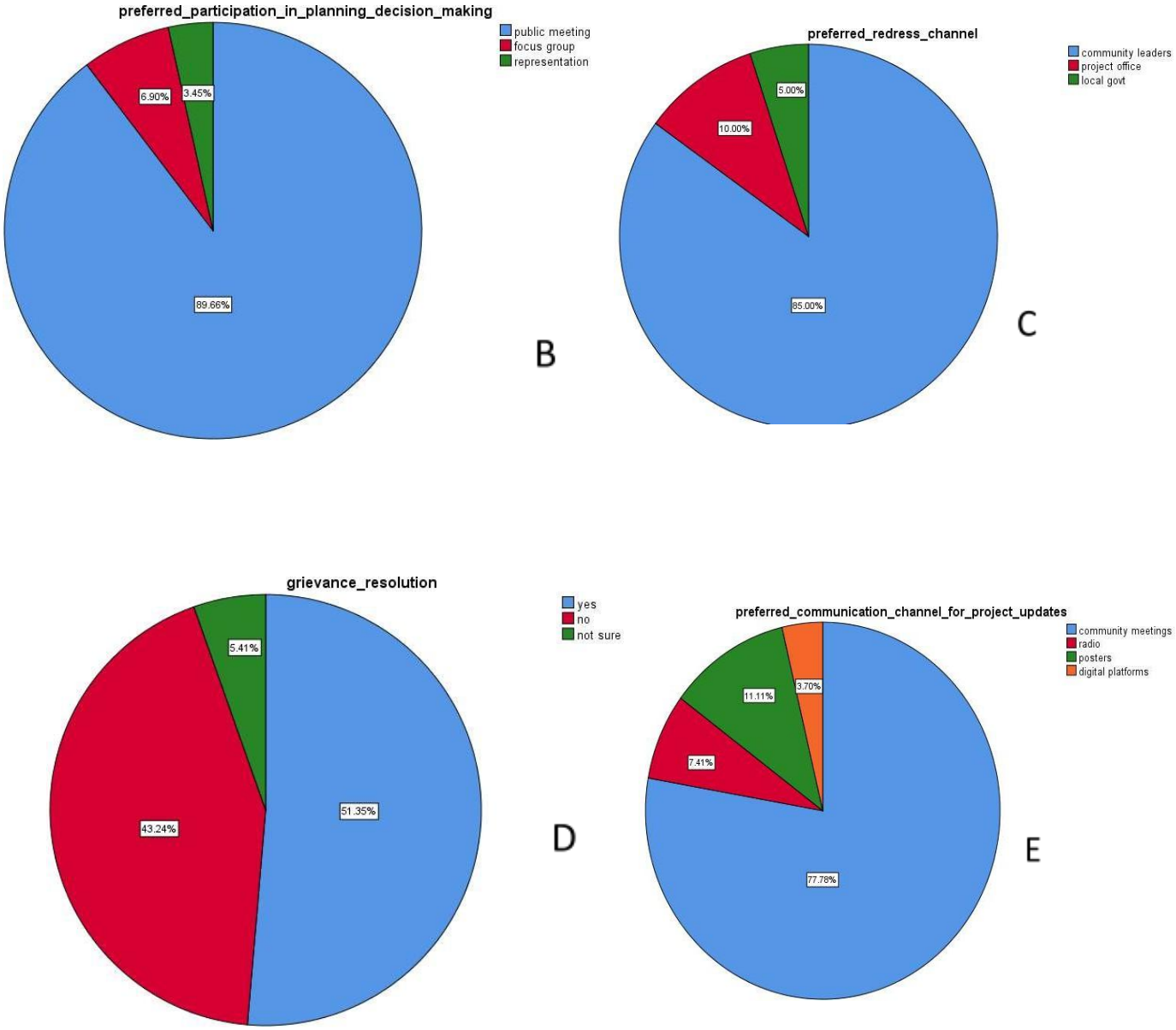
The PIU will oversee GRM implementation, while contractors will support community-level engagement and awareness.

The proposed redress framework will be guided by A f D B Environmental and Social Standard (OS 10) on stakeholder engagement and grievance redress, ensuring that all project-related concerns are addressed promptly and effectively.

Overall, the community's positive disposition toward the Ijaye Agro-Industrial Hub project presents a strong foundation for successful implementation. However, maintaining this goodwill requires transparent communication, active grievance redress, and visible community benefits from project activities. Continuous sensitization, feedback mechanisms, and local involvement in decision-making will sustain community trust and minimize potential conflicts during project execution.



Figures 4.23a: Results of stakeholder consultation showing preferred mechanisms for redress among residents of Atan and Camp at the Ijaye Agro-Industrial Hub.



Figures 4.23b-e: Results of stakeholder consultation showing preferred mechanisms for redress among residents of Atan and Camp at the Ijaye

Agro-Industrial Hub

Institutional strengthening and capacity building

Survey data also revealed that 62.5% of respondents were unaware of existing environmental and social management institutions, and only 37.5% were aware (Figures 4.24a–c). Among those aware, 57.1% rated the institutions as very effective, while 39.3% considered them fairly effective. Respondents identified training (44.2%) and funding (37.2%) as key measures to strengthen local capacity, followed by clear roles (14%) and legal backing (2.3%).

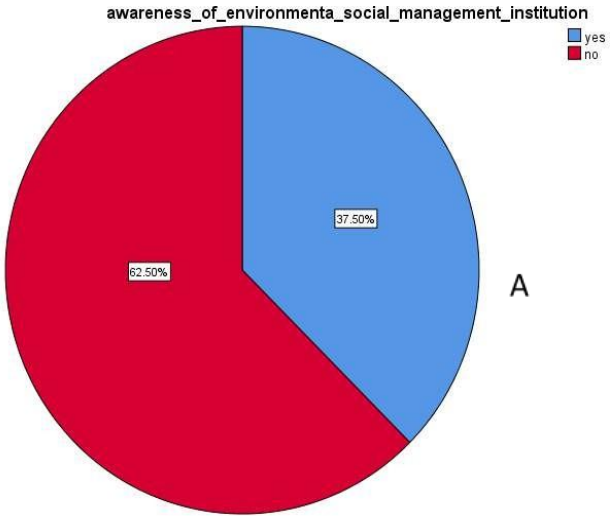
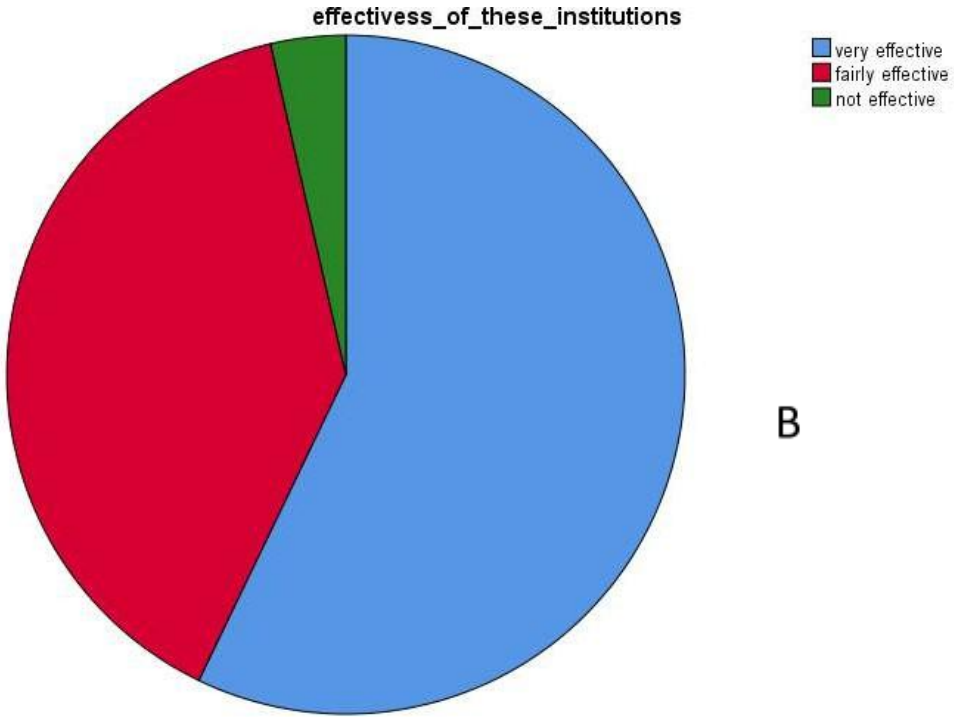


Figure 4.24a: Assessment of the need for institutional strengthening and capacity building as identified by residents of Atan and Camp at the Ijaye Agro-Industrial Hub.



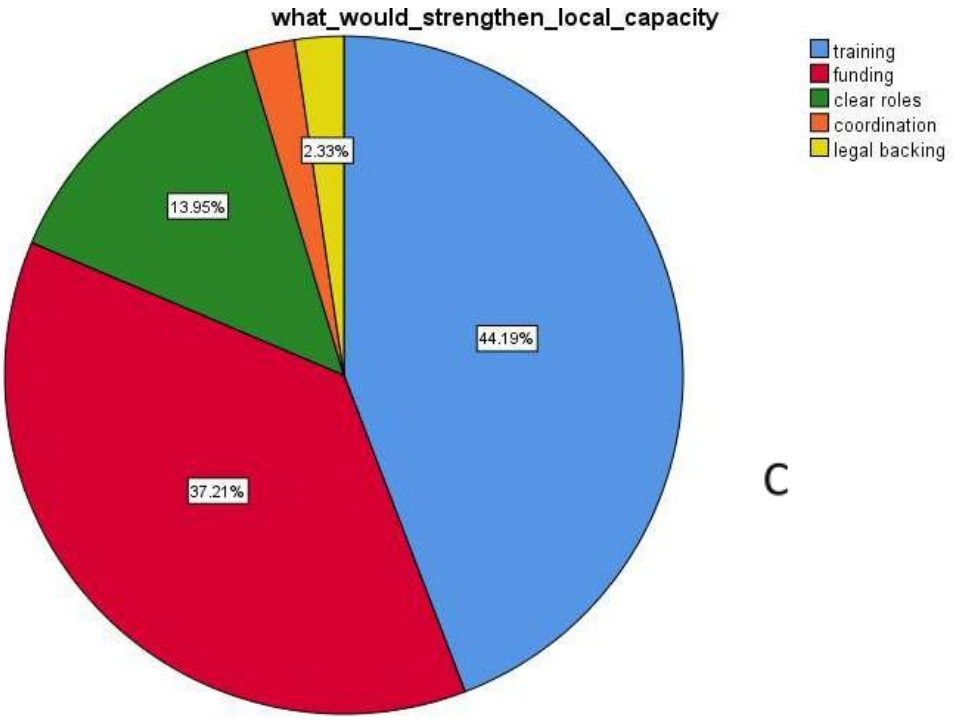


Figure 4.24b-c: Assessment of the need for institutional strengthening and capacity building as identified by residents of Atan and Camp at the Ijaye Agro-Industrial Hub.

4.11 Stakeholder Engagement

This section describes the activities the Project has carried out to engage and consult with the identified key stakeholders. It describes the process by which stakeholders were identified, the means by which they were consulted, and the outcomes of the consultations to date, some of which were discussed under socioeconomics and health. It further describes the actions that the Project took to disclose pertinent information to stakeholders.

4.11.1 Defining Stakeholder Engagement

Stakeholder engagement is an ongoing process of sharing project information, understanding stakeholder concerns, and building collaborative relationships. Stakeholder consultation is a key element of engagement and essential for effective project delivery. Disclosure of information is equally vital.

In line with current guidance from the AfDB OS 10 on stakeholder engagement, consultation should ensure "free, prior and informed consultation of the affected communities." In other words, effective consultation requires the prior disclosure of relevant and adequate project information to enable stakeholders to understand the risks, impacts, and opportunities.

The Project's consultation program was intended to ensure that stakeholder concerns are considered, addressed and incorporated in the development process.

4.11.2 Objectives

The stakeholder engagement process was designed to conform to the Nigerian EIA Act and AfDB Operational Safeguard (OS 10) on Stakeholder Engagement and Information Disclosure. For this Project, the key objectives for stakeholder engagement are:

- Inform and educate stakeholders about the Project.
- Gather local knowledge to improve the understanding of the environmental and social context.
- Better understand the locally important issues.
- Provide a means for stakeholders to have input into the project planning process.
- Take into account the views of stakeholders in the development of effective mitigation measures and management plans; and
- Lay the foundation for future stakeholder engagement.

4.11.3 Stakeholder Engagement Framework

Stakeholder engagement will be implemented through a structured and continuous process across all project phases:

- Pre-Construction Phase: Project disclosure, consultation on land acquisition, compensation, and livelihood concerns
- Construction Phase: Regular updates on project progress, impact management, and grievance resolution
- Operational Phase: Performance reporting, benefit-sharing discussions, and continuous feedback

- Annual Stakeholder Forums: Platforms for reviewing project performance and incorporating stakeholder feedback into adaptive management

Survey results indicate that 77.8% of stakeholders prefer community meetings, highlighting the importance of participatory engagement approaches.

In line with the Project's commitment to sustained and inclusive stakeholder engagement, it is recommended that engagement activities continue throughout the entire lifecycle of the Project in a structured and well-coordinated manner. To support this, a **standalone Stakeholder Engagement Plan (SEP)** has been developed, providing a comprehensive framework for ongoing consultations, information disclosure, grievance management, and stakeholder participation. The SEP will serve as a guiding document to ensure consistency, transparency, and responsiveness in stakeholder engagement across all phases of the Project.

4.11.4 Stakeholder Mapping (Identification and Analysis)

Mapping is the first step of stakeholder engagement and an essential part of stakeholder identification and analysis. It provides a more in-depth understanding of stakeholder group interests, how they may be affected and to what degree, and what influence they could have on the proposed Project.

The approach adopted for Stakeholder Mapping of the proposed Project was consistent with the relevant guidelines of the IFC on stakeholder engagement, and comprised the following:

- Identification of relevant stakeholders
- Categorization/analysis of the stakeholders

These are further discussed below:

❖ Identification of Stakeholders

Proper stakeholder identification forms the basis for robust stakeholder mapping. It involves determining who the project stakeholders are and their key groupings and sub-groupings. The approach used for identifying the project stakeholders includes delineating the project's geographic sphere of influence, determining the interest groups and relevant government regulatory authorities, and reviewing past stakeholder information and consultation relevant to the Project area.

The list of identified stakeholders relevant to the proposed Project is shown in Plates 4.19a–g (see Annex 2) and Table 4.23. This consists of individuals, groups, and organizations that may be affected by or may influence project development positively or negatively. The list was developed using international guidance, and the following groups are considered:

- Farmers and settlers' associations.
- Local community leaders.

- Community members, including vulnerable groups such as women, youth, and the elderly.
- Community-based organizations/associations
- Local businesses/cooperatives.

The list of identified stakeholders will be continuously revised as necessary throughout the Project life cycle in line with the stakeholder identification, analysis, and mapping procedure. This will ensure that all relevant parties have been and will continue to be considered as part of the Project engagement program.

Table 4.22: Summary of the process and stages of consultation for the EIA.

Stages/Procedure	Goals	Objectives
Project Scoping and Design	● Discuss project design ● Ensure compliance with FMEnv and OYSADA regulations and guidelines	● Adequate consultation with authorities ● Reduce conflict areas
Field Consultations	● Consult neighbouring community on socio-economic aspects ● Consult with public on health concerns such as air emissions and noise	● Ensure that the public, being the primary stakeholders, understand the project and its benefits ● Ensure the Project developer understands the concerns and issues raised by the local communities so that appropriate mitigation measures can be taken.
Environmental reviews, analysis, reporting and public presentation	● Present results of field study ● Discuss the potential impact/mitigation measures with proponent and regulators ● Present the report for public review ● Allow stakeholders determine whether their concerns are adequately addressed through the EIA report review process	● Seek approval of methodologies, results and Environmental Management Plan from State and Federal Regulators and the general public
Final Report	● Bridge the gaps observed at the in-house review	● Implement mechanism to ensure continuous consultation
Production of Final Report	● Finalize mitigation and disclose to stakeholders	● Mechanisms in place to ensure ongoing consultation and compliance with agreements
Implement EMP	● Disclose result of monitoring ● Implement public complaints/ grievance process	● Implement audit of proponent's project to assess social performance. ● Ensure meaningful on-going consultation with stakeholders. ● Evaluate lessons that could enhance proponent services to public
Final Evaluation	● Assess effectiveness of consultation process ● Consult stakeholders for their assessment	● Lessons learnt might be transferred to other projects.

Table 4.23: Summary of stakeholder engagement activities.

Stakeholder Group and Interest in the proposed project	Stakeholder Name	Stakeholder Level			Connection to the Proposed Project	Meeting
		National	Regional	Local		
Federal Ministryof Environment	Dr Kemi Oteruku			✓	Intention of Oyo State Government to build AIH	√
Federal Ministryof Environment	Mr Adefuke A.			✓	Intention of Oyo State Government to build AIH	√
State Ministry of Environment	Mrs Azeez Opeoluwa			✓	Intention of Oyo State Government to build AIH	√
OYSADA	Mr Ajetunmobi			✓	Intention of Oyo State Government to build AIH	√
Ministry Staff	Mr Monday James			✓	Intention of Oyo State Government to build AIH	√
Community leaders and chiefs	Baale of Atan			✓	Intention of Oyo State Government to build AIH	√
Community leaders and chiefs	Asoju Baale Oludayo Olaifa			✓	Intention of Oyo State Government to build AIH	
Community leaders and chiefs	Oloye Isa Lawal, Asipa Baale			✓	Intention of Oyo State Government to build AIH	√
Community leaders and chiefs	Mr Busari R. A.			✓	Intention of Oyo State Government to build AIH	√
Farmers' group	Mr Addo Davids			✓	Intention of Oyo State Government to build AIH	√
Ijaye Community members	Mrs Adijat Olasupo			✓	Intention of Oyo State Government to build AIH	√
Ijaye Community members	Mama Kuburat			✓	Intention of Oyo State Government to build AIH	√
Ijaye Community members	Mrs Deborah Folorunsho			✓	Intention of Oyo State Government to build AIH	√
Ijaye ommunity members	Mrs Ashiata Ogunlowo			✓	Intention of Oyo State Government to build AIH	√
Ijaye Community members	Mrs Halimot Arunlogun			✓	Intention of Oyo State Government to build AIH	√
Ijaye Community members	Mr Aremu Ashiru			✓	Intention of Oyo State Government to build AIH	√
Ijaye Community members	Mrs Amdalat Ojebola			✓	Intention of Oyo State Government to build AIH	√

4.11.5 Stakeholder Engagement Plan

To fulfil the objectives for stakeholder engagement, a stakeholder engagement plan has been developed, which will be implemented throughout the Project life cycle. The plan lays out a process for consultation and disclosure. The four stages of the Stakeholder Engagement Plan are as follows:

1. Scoping
2. EIA Study
3. EIA Disclosure
4. Project Execution.

The following sections describe the stakeholder engagement activities carried out to date (Table 4.24). The activities that are planned for later stages are also described.

4.11.6 Scoping Activities

At the scoping stage, project stakeholders were identified to understand the individuals, groups, and organizations that may be affected by or may influence project development positively or negatively. Initially, a broad list of potentially affected and interested parties (AIPs) was considered, such as:

- National, state, and local government.
- Government Agencies
- Local communities and individuals

The stakeholders' engagement meetings were held from April 16 to October 10, 2021, covering both the dry-to-rainy season transition and the peak rainy season periods. Additional meetings were held, and data were obtained between July and October, and 8 and 13, October 2025, respectively, at the respective offices of the identified stakeholders. The identified stakeholders were given the opportunity to participate and contribute to the EIA process. The stakeholder engagement documents include a Background Information Document. Some of the sample pictures of the stakeholders' consultation meetings are shown in Plates 4.17 to 4.19 (see Annex 2).

The initial scoping findings are presented in Table 4.25 (see Annex 1).

Table 4.24: Initial scoping consultation findings.

Stakeholder Group	Priority Issues	Conditions	Project response / mitigation meadsures during scoping	Status/Integration in ESIA/SEP/LRP and disclosures How the issues raised were addressed
Oyo Environmental Protection Authority (OYEPA)	EIA process and stakeholder consultation	- Audit must be conducted on the processing plant every three years. - EIA report will be submitted to OYEPA	- The mandatory audit will be carried by Oyo State Government after 3 years when the processing plant becomes operational.	Chapters 3, 5, 6 and 7(
Oyo State Ministry of the Environment	EIA process and stakeholder consultation	- Waste in the State is managed by private consultants accredited by OYEPA - The EIA report should contain operational and decommissioning mitigation plans.	- This will be captured in the EIA report.	Chapters 3, 5, 6 and 7
Oyo State Ministry of Agriculture	EIA process and stakeholder consultation	- Agricultural extension workers would be trained in the State to combat any outbreak. - There have not been any record of pesticide pollution or eutrophication in the State	- Agricultural extension officers in Oyo State will be trained on how to combat *Tuta Absoluta* and any other disease. - Oyo State Government will also carry out its farming activities in line with best environmental practice.	Has been integrated in SEP
Oyo State Ministry of Water Resources	EIA process and stakeholder consultation	- There is a dam and stream within the areafrom which farmers and the community get water for irrigation	- The equipment to be used by Oyo State Government are some of the best available in the market. - As part of the systems to be deployed in the farm, Oyo State Government will install a drip irrigation system, which is known to minimise water usage while farming.	Chapters 3, 5, 6 and 7
		- Best available technology should be adopted for the proposed irrigation system.	-	
		- They should also devise practical measures to minimise water usage in their processes.	-	
Community Leader Baale and Chiefs of Camp and Atanwinshola land	EIA process and stakeholder consultation	- Had no concerns about the project site and the nature of the project - He recommended that the project should involve community members He also added that the project should employ workers from the local communities around the project site.	- The team informed the community leader that the project proponent has plans to build AIH that will assist farmers and community members - The team responded that employment of labour from the local communities would be recommended to the project proponent.	Has been integrated in labour management plan Chapters 6 and 7

❖ **EIA Study Activities**

Engagement activities in the EIA study stage included consultations designed to introduce the Project to stakeholders who could potentially be affected by the Project. This was intended to refine the EIA scope by generating additional feedback on the EIA approach, key issues, and key stakeholders to be consulted, as well as to inform the development of mitigation for the Project.

Stakeholder Engagement Activities during Field Data Gathering

The summary of additional stakeholder engagement activities undertaken during the baseline data gathering in the identified communities within the Project's AoI is summarized in Table 4.25 (see Annex 1).

EIA Public Disclosure

As part of the formal regulatory process, OYMEnv will make a Public Notice for information and comment on the Project's draft EIA report. This notification is typically done through newspaper advertisements and radio announcements. The notification will provide:

- Brief description of the proposed Project.
- List of venues where the draft EIA report is on display and available for viewing.
- Duration of the display period.
- Contact information for comments.

The list of stakeholder groups that were consulted is highlighted in Table 4.25 (see Annex 1)

CHAPTER FIVE

5.

Associated and Potential Impacts

This chapter presents a comprehensive assessment of the potential environmental and socioeconomic impacts associated with the proposed Agro-Industrial Production and Processing Zone, which includes cocoa, cashew, cassava, maize, soybean and related agroprocessing activities. The assessment evaluates impacts across the pre-construction, construction, and operational phases, and includes potential cumulative impacts associated with other agricultural activities within the Ijaye agricultural corridor. Detailed mitigation measures for the identified impacts are documented in the next chapter (Chapter 6).

5.1 Impact Assessment Overview

The potential for environmental and social impact exists when an environmental aspect has been identified, i.e., when a project activity has been determined to interact with the biophysical and sociocultural environment. The significance of each impact is then determined.

The methodology used for assessing the potential and associated impacts of the proposed Project consists of five (5) major steps:

Step 1: Identification and description of project activities and their interaction (directly and indirectly) with the identified environmental and social receptors/resources in the Project's Area of Influence.

Step 2: Comprehensive preliminary identification of potential impacts as a result of the cause-and-effect relationship.

Step 3: Comparative assessment of impact importance; identification of impacts that are likely to be significant through application of a basic set of impact significance criteria to the preliminary information available about each impact.

Step 4: Detailed assessment of the identified focus area impacts characterization techniques, quantification of impacts to the extent possible and rigorous qualitative characterization of impacts that cannot be quantified; and

Step 5: Final assessment of the severity levels of impacts through application of the results of the quantitative and qualitative characterization of impacts developed in Step 4 to a set of objective impact severity criteria, identification of impacts warranting mitigation, and determination of residual impacts.

The impact assessment process adopted for this ESIA study is illustrated in Figure 5.1.

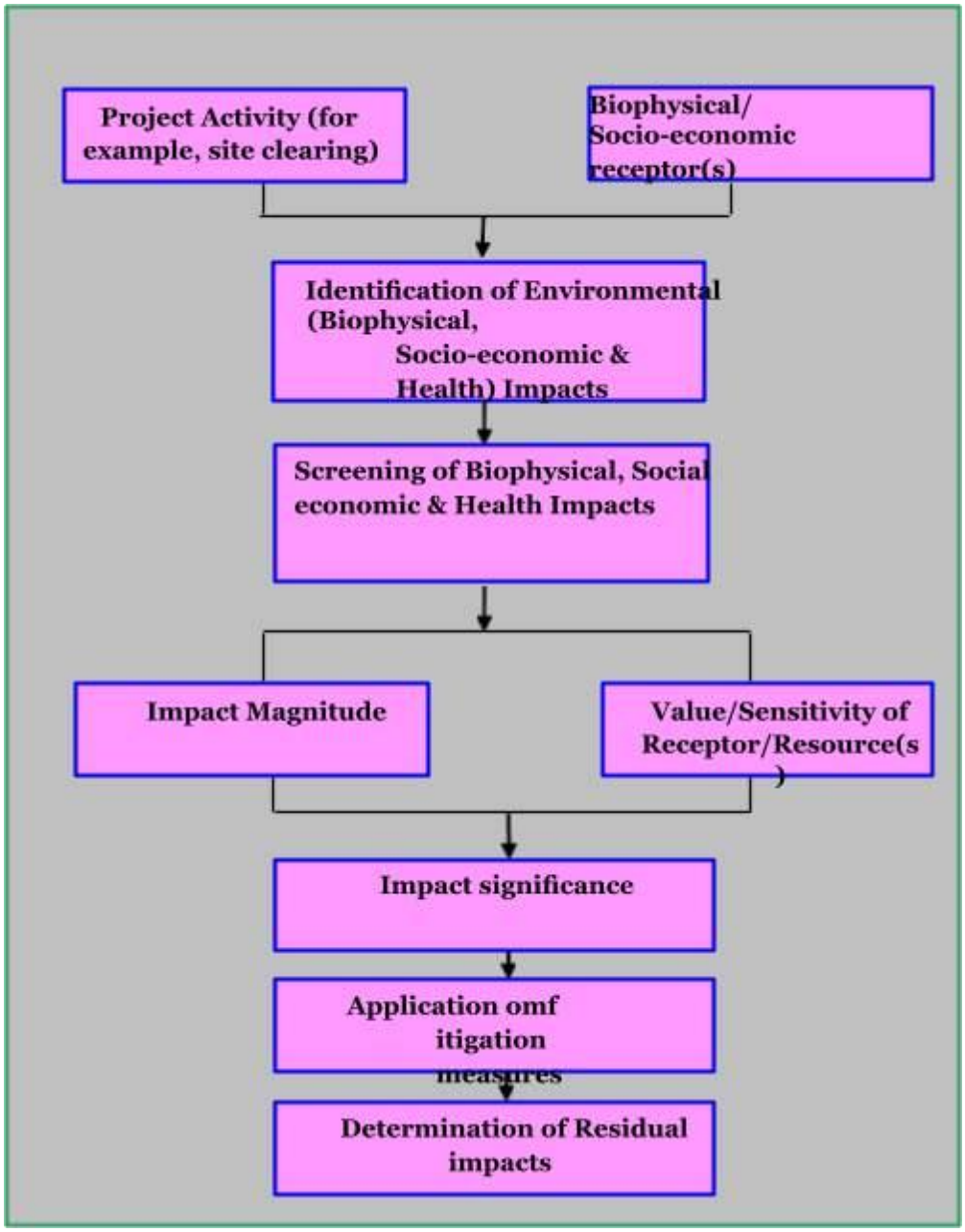


Figure 5.1: Overview of the Impact Assessment Process

The primary objectives of the impact assessment process are to:

- Establish the significance of identified potential impacts that may occur as a result of proposed Project activities.
- Differentiate between impacts that are insignificant and those that are significant based on their nature and reversibility. For biophysical components, insignificant impacts are those that are minor, localized, and can be naturally attenuated or restored within a short period. In contrast, for social components, insignificant impacts are those that are limited in scale, do not materially affect livelihoods or well-being, and can be effectively addressed through standard mitigation or management measures.

Significant impacts, whether biophysical or social, are those that are extensive, persistent, or cannot be readily reversed or adequately mitigated.

- Application of mitigation measures for the identified significant impacts and assessment of residual impacts.

The impact assessment aligns with:

- FMEnv EIA Act (Cap E12, LFN 2004)
- Oyo State Environmental Regulations
- African Development Bank (AfDB) Integrated Safeguards System (ISS)

In determining the significance of impacts, the factors considered included: magnitude of impacts (which is a function of the combination of the following impact characteristics: extent, duration, scale and frequency); value/sensitivity/fragility and importance of relevant environmental and social receptors; legal/regulatory requirements; and public perceptions (based on stakeholder consultation).

The assessment of impact significance is both in qualitative and quantitative terms. Qualitatively, the impact significance is ranked on four (4) widely accepted levels: **Major, Moderate, Minor, and Negligible/Very Low.** These rankings are used for both biophysical and sociocultural impacts.

The impact assessment discussed in this chapter covers the pre-construction, construction, and operation phase, while the environmental and social issues, including mitigation and management plans related to decommissioning activities, are discussed in Chapter 8.

5.2 Impact Prediction Methodology

Various impact prediction guidelines and methodologies have been developed and applied in various EIA activities. A structured and defensible methodology was adopted to ensure accuracy, transparency, and consistency in impact identification and evaluation. The process included:

i. Description of project phases and activities
ii. Identification of environmental and socioeconomic aspects
iii. Identification of receptors and resources
iv. Prediction of potential impacts
v. Screening & scoping of impacts
vi. Assessment of impact magnitude
vii. Assessment of receptor sensitivity
viii. Determination of impact significance
ix. Application of mitigation hierarchy

Assessment of residual impacts

Internationally acceptable methods of impact prediction and evaluation include the following:

- Checklist (Canter, 1977)
- Interaction Matrix (Leopold et al., 1971)

- Overlays Mapping (McHarg, 1968)
- Networks
- Battelle Environmental Evaluation System (Dee et al., 1972).
- Professional judgment & baseline data comparison
- IFC/World Bank EHS Guidelines

The Leopold Interaction Matrix method, compared to other impact prediction techniques, is simple, provides the same level of detail, requires comparable knowledge of the environment, and relies on limited data, unlike the other methods that rely on the availability of a large historical data bank. A modified Leopold Interaction Matrix was thus adopted for impact screening in this EIA.

5.3 Identification of Environmental and Socioeconomic Aspects and Impacts

5.3.1 Definition of Environmental and Socialeconomic Aspects

The International Organization for Standardization's Environmental Management Systems (EMS), ISO 14001, defines an environmental aspect as: "An element of an organization's activities, products or services that can interact with the environment."

To identify environmental and social aspects of the proposed Project, the planned project activities were considered in terms of their direct or indirect potential to:

- Interact with the existing natural environment including its physical and biological elements.
- Interact with the existing socioeconomic environment.
- Breach relevant policy, legal, and administrative frameworks, including national legislation, relevant international legislation/conventions, standards and guidelines, and corporate environmental policy and management systems.

The activities assessed covered both planned and unplanned events.

An aspect is an element of project activities that interacts with the environment. Examples include:

- Land clearing
- Soil excavation
- Agrochemical application
- Operation of boilers, dryers, and generators
- Movement of vehicles and machinery
- Workforce influx and community interactions

5.3.2 Definition of Impacts

An impact is any change to the environment or community resulting from a project activity.

Impacts may be:

- Positive or negative
- Direct or indirect

- Cumulative or standalone
- Short-term, medium-term, or long-term
- Reversible or irreversible

ISO 14001 defines an environmental impact as: “Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's activities, products or services.”

An environmental or socioeconomic impact may result from any of the identified environmental aspects. For example, Table 5.1 illustrates the links between project activities, environmental aspects, and potential impact.

Table 5.1: Links between project activity, environmental aspects and potential impacts.

Project Activity	Environmental / Social Aspect	Potential Impact (Positive/Negative)
Land clearing for multi-crop farms (soybean, cocoa, cashew, cassava, maize, vegetables)	Removal of disturbance soil vegetation,	Habitat loss, soil erosion, biodiversity reduction
Bush clearing & site preparation	Air emissions, noise, dust	Increased particulate matter, temporary noise disturbance
Construction of access roads, processing units & storage	Ground disturbance, material sourcing	Soil compaction, altered drainage, noise, increased traffic
Farm input delivery (seeds, fertilizers, agrochemicals)	Storage and handling of chemicals	Risk of spills, soil/water contamination
Planting operations (all crops)	Land preparation, machinery use	Dust emissions, noise, temporary air quality impacts
Fertilizer application	Nutrient loading	Soil nutrient improvement (positive), leaching (negative)
Pesticide/herbicide application	Chemical use	Environmental contaminatio n, worker exposure
Irrigation (cassava, maize, vegetables)	Water abstraction	Pressure on water resources, potential conflicts
Harvesting (all crops)	Increased human traffic, machinery movement	Soil compaction, noise, crop residue generation
Cocoa/cashew processing	Wastewater generation	Organic wastewater leading to pollution if unmanaged
Cassava processing	High-strength or ganic wastewater, by-product waste	Effluent pollution, odour, solid waste challenges
Soya/maize drying & storage	Grain dust, energy use	Fire risk, dust emissions
Employment	Job creation	Livelihood improvement, increased household income
Community interactions	Social change	Cultural shifts, potential conflicts
Transportation of produce	Traffic	Road accidents, increased noise

5.3.3 Potential Impact Characteristics

The following characteristics were also used to define potential impacts that may be associated with the proposed Project:

i. Negative: An impact that is considered to represent an adverse change from the baseline or to introduce a new undesirable factor.
ii. Positive: An impact that is considered to represent an improvement to the baseline or to introduce a new desirable factor.
iii. Direct: Impacts that result from the direct interaction between a planned project activity and the receiving environment.
iv. Indirect: Impacts that result from other activities that are encouraged to happen as a consequence of the Project.
v. Temporary: Temporary impacts are predicted to be of short duration, reversible and intermittent/occasional in nature.
vi. Short-term: Short-term impacts are predicted to last only for a limited period but will cease on completion of the activity, or as a result of mitigation measures and natural recovery.
vii. Long-term: Impacts that will continue for the life of the Project, but cease when the Project stops operating.
viii. Permanent: Potential impacts that may occur during the development of the Project and cause a permanent change in the affected receptor or resource that endures substantially beyond the project lifetime.
ix. On-site: Impact that is limited to the Project site.
x. Local: Impacts that affect locally important environmental resources or are restricted to a single (local) administrative area or a single community.
xi. Regional: Impacts that affect regionally important environmental resources or are experienced at a regional scale as determined by administrative boundaries.
xii. National: Impacts that affect nationally important environmental resources; affect an area that is nationally protected; or have macro-economic consequences.
xiii. Reversible: An impact that the environment can return to its natural state.
xiv. Irreversible: An impact that the environment cannot return to its original state, e.g. the extinction of an animal or plant species.
xv. Cumulative: Potential impacts that may result from incremental changes caused by other past, present or reasonably foreseeable actions together with the Project.
xvi. Residual: Both environmental and social impacts that will remain after the application of mitigation measures to Project impacts during each of the Project phases (pre- construction, construction, commissioning, operation, decommissioning).

5.3.4 Screening and Scoping for Potential Impacts

A modified version of the Leopold Interaction-matrix technique was employed to screen and scope for the potential environmental and social impacts of the proposed Project. The basis for the screening was derived from the following:

- Knowledge of the planned Project activities as summarized in Table 5.2.
- Detailed information on the environmental and socioeconomic settings of the AIH. The potential environmental and social receptors/resources that could be affected by the proposed Project are summarized in Table 5.3.
- Review of other EIA reports on similar projects/environment.
- Series of expert group discussions, meetings, and experience on similar projects.
- Review of similar agro-industrial projects
- Stakeholder engagement
- Field investigations and baseline measurements
- Evaluation of legal and regulatory requirements
- Identification of key receptors

Impacts not relevant to the project were screened out, while priority impacts were retained for deeper assessment.

Table 5.2: Summary of proposed project development phases and associated activities.

Project Phase	Activities
Pre-Construction	Land acquisition, stakeholder engagement, survey, clearing, access road preparation, mobilization
Construction	Installation of processing equipment for cocoa, maize, soybean, cassava, and building stores, warehouses, boreholes; road expansion
Operation	Crop production; application of fertilizers/pesticides; harvesting; processing (cassava, cocoa, cashew, maize, soybeans); storage; packaging
Decommissioning	Removal of structures, site restoration, waste disposal

5.3.4.1 Determining Receptor Sensitivity

Sensitivity refers to the importance or vulnerability of the receptor. Sensitivity levels:

- Low
- Medium
- High

Sensitivity determinants include:

- Ecological value

- Regulatory protection status
- Socioeconomic importance
- Community reliance on the resource

Table 5.3: Resource/receptors and impacts indicators considered.

Environmental Receptor	Comment	Impact Indicators
Physical		
Air Quality	Air quality within and around the proposed Project site.	Increased concentrations of gaseous and particulate pollutants (such as NOx, SOx, CO, VOC, PM 10, PM 2.5, CO 2)
Noise and Vibration	Ambient noise level within and around the proposed Project site.	Increased ambient noise and vibration level, night and day-time disturbance, communication impairment, etc.
Soil	The soils within and around the Project area.	Changes in physical, chemical and biological properties, loss of soil ecology and fertility, compaction, Erosion, etc.
Groundwater/Aquifers	The groundwater resources and aquifers in the Project's area of influence.	Groundwater level, changes in physical, chemical and biological properties, contamination, and availability of potable water.
Surface water	The surface water resources in the Project's area of influence.	Changes in physical, chemical and biological properties of surface water quality
Landscape/Topography	The geomorphological land forms and terrain of the Project area	Alteration in drainage pattern, changes in landscape.
Biology		
Terrestrial Flora	Plant species that occur in the area in which Project activities are proposed to occur.	Loss of terrestrial flora (economic plants, rare, or endangered species), introduction of new species.
Terrestrial Fauna	Terrestrial fauna such as reptiles, birds, etc. that rely on the project areas as a habitat and/or food source	Loss of terrestrial fauna; involuntary migration.
Socioeconomic Environment		
Land Use	Existing land use of the Project's area of influence.	Loss of land value.

Environmental Receptor	Comment	Impact Indicators
Visual Prominence	The aesthetic quality of the Project on the surrounding visual catchment.	The compatibility of the proposed infrastructure with the character of the locality .
Demography (Population)	The people living in area in which Porject activities are proposed to occur	Changes in total population, gender ratio, age distribution, etc.
Utilities	The utilities (e.g. power supply, water, sewerage services, etc) of the area in which Project activities are proposed to occur.	Changes in existing utilities, damage to public utilities, e.g., pipes, cables.
Infrastructure	The existing infrastructure such as road, waste handling facilities within Ijaiye	Access to health facilities, communication facilities, or waste management facilities
Employment/Income	The employment situation in the Project area.	Opportunities for local and national employment; changes in income level
Other (Health and Safety)		
Construction Workers	Workers' health and safety	Accidents, injury, fatality, exposure to nuisance (dust, noise), fire, etc.
Workplace Health and Safety	The health and safety of Employees involved with the operation.	Accidents, injury, exposure to nuisance (dust, noise), fire, explosion.
General Public	Community health and safety	Exposure to disease, accident, fire, explosion, etc.

Identified Project activities and environmental and socioeconomic receptors were integrated into a matrix with the Project activities on the Y-axis and environmental receptors on the X-axis, and the matrix was completed for each of the Project elements. The Leopold's Interaction matrix was subsequently assessed to identify every possible case of activity-receptor interaction. Where it was considered that an activity-receptor interaction was possible, the cell was marked, denoting an identified environmental aspect (denoted as in Table 5.4).

Table 5.4: Activity receptor interaction for impact screening.

Summary of Project Activities at Various Ph	Receptors															
	Physical					and	Biological		Socioeconomic					Others (Health and Safety)		
		Ambient Noise	Soil	Ground water Aquifers	Surface water	Landscape/ Topography	Terrestrial Flora	Terrestrial Fauna	Land Use	Population	Utilities	Infrastructure	Employment/ Income	Construction workers	Work place health and safety	GeneralPublic
Preconstruction																
Site selection/land take									·				·			
Mobilization of personnel and equipment to site	·	·								·		·	·			
Site clearing and preparation	·	·	·		·	·	·	·						·		
Construction/Installation																
Construction of processing plant and installation of equipment	·	·	·	·	·	·	·	·		·	·	·	·	·		·
Renovation of some existing structures	·	·	·											·		
Construction of fence for AIH	·	·	·				·	·						·		
Construction of pump house and installation of drip irrigation system	·	·	·		·									·		
Waste generation	·		·	·	·						·			·		·
Operation																
NurseTomato seedlings in greenhouses			·												·	

Summary of Project Activities at Various Ph	Receptors															
	Physical						Biological		Socioeconomic					Others (Health and Safety)		
	Quality	Ambient Noise	Soil	Ground water Aquifers	Surface water	Landscape/ Topography	Terrestrial Flora	Terrestrial Fauna	Land Use	Population	Utilities	Infrastructure	Employment/	Construction workers	Work place health and safety	GeneralPublic
Preconstruction																
Operation of water pump and drip irrigation system	·	·	·		·										·	
Cultivation of tomato, cassava, cocoa, vegetables			·	·	·	·					·				·	
Harvesting and sorting produce	·	·								·					·	
Processing crops at the plant		·		·	·					·	·	·			·	
Equipment maintenance and occasional repairs	·	·	·	·											·	
Utilities (water, diesel and electricity) consumption	·	·	·	·	·						·					·
Waste generation and disposal			·	·											·	·

• is used to establish an interaction between a particular environmental/social receptor and the project activities

5.4 Determination of Impact Significance

Once all environmental aspects were identified, the potential impacts resulting from the proposed Project activities were assessed. Three (3) stages were utilized to establish the significance of impacts as follows:

1. **Impact Magnitude** is a function of the combination of the following impact characteristics: extent, duration, scale and frequency.
2. Value/Sensitivity/Fragility and importance of the relevant Receptor.
3. **Identification of the impact significance,** which is the "product" of a combination of the above two key variables.

The magnitude of an effect is often quantifiable in terms of, for example, the extent of land take, or predicted change in noise levels, while the sensitivity, importance or value of the affected resource or receptor is derived from:

- Legislative controls.
- Designated status within the land use planning system.
- The number of individual receptors, such as residents.
- An empirical assessment based on characteristics such as rarity or condition; and
- The ability of the resource or receptor to absorb change.

The determination of significance also includes consideration of performance against environmental quality standards or other relevant pollution control thresholds, as well as compatibility with environmental policies.

Table 5.5: Impact magnitude criteria for biophysical impacts

Category	Ranking	Definition
High	4	• Regional to national scale impact resulting in: o Medium-term change and/ or damage to the natural environment and its ecological processes. o Reduction in regional habitat and species diversity. o Direct loss of habitat for endemic, rare and endangered species of fauna and/ or flora and for species' continued persistence and viability nationally and regionally (for species unable to disperse). • Natural habitat restoration time 5–10 years and requires substantial intervention. • Breach of environmental regulations and company policy and/or 100%–200% exceedance of international, national, industry and/ or operator standards for an emission parameter. • Sustained adverse national media attention. • Significant medium-term financial loss.
Medium	3	• Local to regional scale impact resulting in: o Short-term change and/or damage to the natural environment and its ecological processes. o Direct loss of habitat crucial for species' (including listed species) continued persistence and viability in the project area (for species unable to disperse).

Category	Ranking	Definition
		o Introduction of exotic species of fauna in invasive floral species replacing resident 'natural communities' within the project area. o Environmental stress lowers the reproductive rates of species within the project area. • Natural restoration time 2–5 years and requiring intervention. • Potential breach of environmental regulations and company policy and/or 50%-100% exceedance of international, national, industry and/ or operator standards for an emission parameter. • Complaints from the public, authorities and possible local media attention. • Medium-term financial loss.
Low	**2**	• Local scale impact resulting in: o Short-term change and/ or damage to the local natural environment and its ecological processes. o Short-term decrease in species diversity in selected biotopes/ areas within the project area. o Increased mortality of fauna species due to direct impact from project activities. • Natural restoration within 2 years requiring minimal or no intervention. • 10%–50% exceedance of international, national, industry and/ or operator standards for an emission parameter. • Public perception/ concern. • Short-term financial loss.
Negligible	1	• Impact largely not discernible on a local scale being absorbed by the natural environment; areas adjacent to disturbed areas absorb exodus of species able to disperse • Restoration within 6 months without intervention. • Up to 10% exceedance of international, national, industry and/or operator standard for an emission parameter. • Public perception/concern. • Minimal financial loss.
Beneficial	+	• Activity has net positive and benefial effect resulting in environmental improvement for example: - Ecosystem health. - Increase in magnitude or quality of habitat for rare and endangered species of fauna and flora as well as for those species known to naturally occur in the area. - Growth of 'naturally occuringg' populations of flora and fauna. • Positive feedback from stakeholders. • Potential financial gains.

5.5 Determining Magnitude for Socioeconomic Impacts

For socioeconomic impacts, the magnitude considers the perspective of those affected by taking into account the likely perceived importance of the impact, the ability of people to manage and adapt to change and the extent to which a human receptor gains or loses access to, or control over, socioeconomic resources, resulting in a positive or negative effect on their well-being. The quantitative elements are included in the assessment through the designation and consideration of scale and extent of the impact. Table 5.6 presents the impact magnitude criteria for socioeconomic impacts.

Table 5.6: Impact magnitude criteria for socioeconomic environmental impacts.

Magnitude Category	Description / Criteria
High Magnitude Impact	• Causes substantial, often irreversible changes to biophysical conditions. • Leads to long-term loss of soil productivity, major erosion, contamination, or habitat destruction. • Results in measurable impairment of surface/groundwater quality, biodiversity loss, or major landscape alteration. • Effects extend beyond the project footprint and may require significant restoration efforts.
Medium Magnitude Impact	• Produces moderate, site-specific biophysical changes that are reversible with mitigation. • Includes soil disturbance, moderate erosion, localized pollution, or short-term biodiversity displacement. • Effects generally occur within the project area and may persist during project activities but diminish afterward.
Low Magnitude Impact	• Results in minor, short-term and fully reversible biophysical changes. • Includes short-lived dust emissions, temporary noise, slight soil compaction, or limited vegetation disturbance. • No measurable effect on ecological function or long-term soil and water quality.
Negligible/No Impact	• No detectable change in environmental parameters. • Effects fall within natural baseline variability. • No influence on soil quality, water resources, biodiversity, or ecosystem processes.
Magnitude	Criteria
High	Irreversible changes; large-scale soil degradation; significant water pollution; major biodiversity loss
Medium	Reversible changes; moderate soil disturbance; localized pollution
Low	Minor, short-term, reversible impacts within project footprint
Negligible	No measurable environmental change

The sensitivity/fragility/value criteria for physical, biological and socioeconomic receptors are defined in Table 5.7.

Table 5.7: Physical, biological and socioeconomic receptor sensitivity/fragility/value criteria.

Sensitivity Level	Physical Environment	Biological Environment	Socioedonomic Environment
Low	Modified landscapes, stable soils, low erosion risk.	Common species; no protected habitats.	Communities with diversified livelihoods and strong coping mechanisms.
Medium	Erosion-prone soils, moderate flood risk.	Species of local interest; fragmented habitats.	Moderate vulnerability; reliance on a few livelihood sources (e.g., single-crop farming).
High	Steep slopes, fragile soils, wetlands.	Endangered species, critical habitats, wildlife corridors.	Vulnerable groups, limited livelihood options, low service availability.
Very High	Highly unstable or protected terrains.	Legally protected species/ecosystems.	Economically or socially fragile communities susceptible to project shocks.

5.5.1 Significance

The significance of the impact is determined by calculating the "product" of impact magnitude and severity/fragility of the relevant receptor(s). Figure 5.2 below illustrates the process for combining the impact magnitude with the receptor sensitivity.

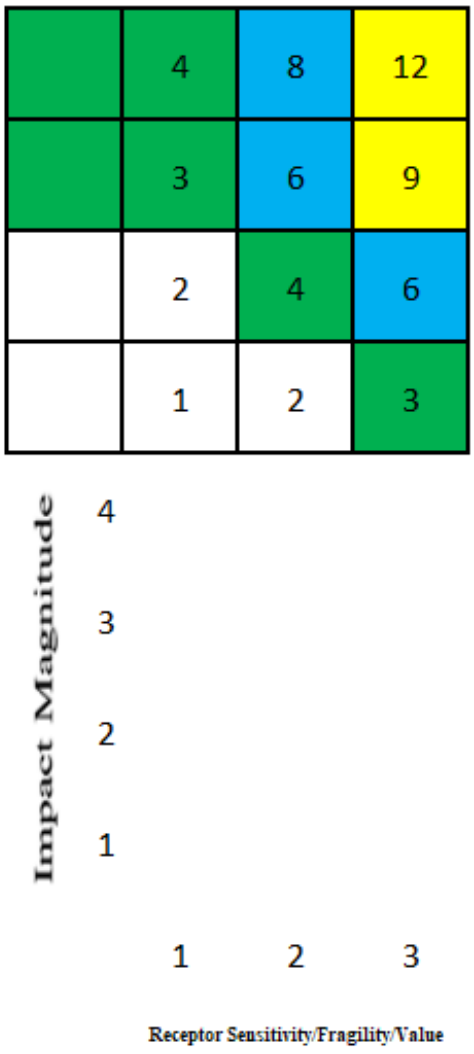


Figure 5.2: Impact Magnitude-Receptor Sensitivity Product Results

Based on its impact magnitude-receptor sensitivity/fragility/value score, each impact was again ranked into four (4) categories or orders of significance as illustrated in Table 5.8.

Table 5.8: Environmental impact significance rankings.

Ranking (Impact Magnitude x Sensitivity Receptor)	Significance
9-12	Major
6-8	Moderate
3 – 5	Minor
1-2	Negligible

Negligible impacts are where a resource or receptor (including people) will not be affected in any way by a particular activity, or the predicted effect is deemed to be "negligible" or "imperceptible" or is indistinguishable from natural background variations.

An impact of minor significance is one where an effect will be experienced, but the impact severity is sufficiently low (with or without mitigation) and well within accepted standards, and/or the receptor is of low sensitivity/value.

An impact of moderate significance is one within accepted limits and standards. Moderate impacts may cover a broad range, from a threshold below which the impact is minor, to a level just short of breaching a legal limit. The emphasis for moderate impacts is therefore on demonstrating that the impact has been reduced to a level that is ALARP (As Low As Reasonably Practicable).

The impact of major significant is one where an accepted limit or standards may be exceeded, or high magnitude impact occurs to highly valued/sensitive receptors/resources.

5.6 Determining the Significance of Potentials Impacts of the Project

To assist in calculating the overall significance of each identified potential impact, expert discussions were held and extensive use was made of screening matrices and predefined criteria for impact magnitude and the sensitivity/fragility/value/importance of resources/receptors. The significance (the "product" of impact magnitude and sensitivity/fragility/value/importance of resources/receptors) was developed (as shown in Table 5.9).

To minimize subjectivity, independent scores were thereafter statistically analyzed, and the results of the scores were judged as follows:

If variance, s2< 5% of the mean, subjectivity is minimal and the score is good; and

If s2> 5% but < 10% of the mean, the score is fair, and scorers were allowed to review their scores.

Table 5.9: Leopold's activity receptor interaction matrix (impact significance matrix).

Summary of Project Activities at Various Pha	Receptors															
	Physical						Biological		Socioeconomic					Others (Health and Safety)		
	Air Quality	Ambient Noise	Soil	Groundwater Aquifers	Surface water	Landscape / Topography	Terrestrial Flora	Terrestrial Fauna	Land Use	Population	Utilities	Infrastructure	Employment/ Income	Construction workers	Workplace health and safety	General Public
Preconstruction																
Site selection/land take									1(2)				++			
Mobilization of personnel and equipment to site	2(1)	2(1)						2(2)		2(2)	2(2)	2(2)	+			
Site clearing and preparation	2(1)	2(1)	2(2)		2(2)	2(2)	2(3)	2(3)						2(2)		
Construction/Installation																
Construction of processing plant and installation of equipment	2(1)	2(1)	2(2)	2(2)	2(2)	2(2)	2(2)	2(2)		2(3)	2(2)	2(2)	++	2(2)		2(2)
Renovation of some existing structures	2(1)	2(1)	2(2)											2(2)		
Construction of fence for tomato farm	2(1)	2(1)	2(2)				2(2)	2(2)						2(2)		
Construction of pump house and installation of drip irrigation system	2(1)	2(1)	2(2)		2(2)									2(2)		
Waste generation	2(1)		2(2)	2(2)	2(2)									2(2)		2(2)
Operation																
Nursery tomato seedlings in greenhouses			2(2)												2(2)	
Operation of water pump and drip irrigation system	2(1)	2(1)	2(2)		2(3)										3(2)	
Cultivation of maize, cassava and Soya beans	2(1)		2(2)	2(2)	2(2)	2(2)	2(2)	2(2)							2(2)	
Harvesting and sorting of farm produce	2(1)	2(1)													2(2)	
Processing of crops		2(1)		2(2)	2(2)										3(2)	
Equipment, maintenance and occasional repairs	2(1)	2(1)	2(2)	2(2)											3(2)	
Utilities (water, diesel and electricity) consumption	2(1)	2(1)	2(2)	2(2)	2(2)						2(3)					2(2)
Waste generation and disposal			2(2)	2(2)											3(2)	2(2)

5.7 Impact Discussion

5.7.1 Potential Positive Impacts

The proposed Agro-Industrial Hub farm and processing plant Project is aimed at demonstrating modern farming practices in the cultivation of multi crops, as well as processing the harvested soybean into double and triple concentrates. Farming in Nigeria is mostly done using old methods and technology, which often results in high losses. Reduction in these losses will lead to various multiplier effects, such as increased small- to large-scale business development, improved production activities, and increased local and regional economic activity.

Furthermore, the proposed Project will provide employment opportunities for qualified Nigerians (skilled and semi-skilled) from the immediate Project area and beyond. The employment opportunity will lead to the acquisition of new skills and the introduction of all manner of income-generating spill-over effects. For example, during the construction phase, about 150 workers would be engaged. The majority of workers (especially semi-skilled craftsmen) would be drawn from the local communities in the Project's area of interest.

Other potential benefits of the proposed Project include:

- Increase in food production.
- Technology transfer and acquisition of new skills during construction and operation.
- Revenue generation to the Government (for example, through taxes);
- Provision of support to the Government's Agricultural Promotion Policy.

The potential positive impacts of the proposed Project shall be enhanced throughout its life cycle. The recommended enhancement measures for the beneficial impacts inherent in the Project are provided in the next chapter of this report.

The summary of positive impacts is:

Development of cocoa, cashew, cassava, maize, and soybean cultivation and processing will generate significant socioeconomic benefits, including:

1. **Employment Generation**
   - Direct and indirect jobs across cultivation, harvesting, processing, logistics, and support services.
2. **Increased Household Income**
   - Farmers gain market access and premium value through processing facilities.
3. **Enhancement of Local Value Chains**
   - Processing facilities reduce postharvest losses and improve income stability.
4. **Infrastructure Improvement**
   - Improved rural roads, power supply, water supply, and communication networks.
5. **Capacity Building & Knowledge Transfer**
   - Good Agricultural Practices (GAP), agrochemical safety, mechanized operations.
6. **Boost to Local and State Economy**
   - Increased agricultural output contributes to food security and export potential.
7. **Community Development Support**

- Health centre, school facilities, youth empowerment, corporate social responsibility (CSR).

5.7.2 Potential Negative Impacts

The potential negative impacts associated with the proposed Project are discussed in the sub-sections below under the following headings:

- Potential impacts of the proposed soybean farm and processing plant
- Potential cumulative impacts of the proposed Project in relation to other development projects (existing and proposed) in the study area.

It is important to note that the impact significance ratings discussed in the sub-sections below are based on the Project design without mitigation measures, except those already built into the Project design. Implementation of additional mitigation measures (presented in the next chapter of this report) is expected to further reduce the impact ratings as low as reasonably practicable.

5.7.2.1 Potential Impacts of the Proposed Soybean Farm and Processing Plant

Pre-Construction Phase

Ensuring quality, safety, regulatory compliance, and adherence to international best practices is fundamental to the successful delivery of the Ijaye Agro-Industrial Hub (AIH) under the SAPZ Program.

While the detailed engineering designs and technical documentation are currently under development, this ESIA provides sufficient preliminary engineering criteria, conceptual layouts, and design assumptions derived from the approved Feasibility Study to enable a meaningful assessment of environmental and social impacts.

The pre-construction phase of the proposed Project entails the following key activities:

- Site selection/land take
- Mobilization of personnel and equipment to the site
- Site clearing and preparation

5.7.3 Project Overview and Scope

The AIH forms part of the SAPZ Program and integrates industrial, commercial, and residential infrastructure within a total geographical area of approximately:

- 3000 hectares (overall site area)
- 100 hectares (dedicated industrial processing zone)

The project encompasses:

- Engineering design and infrastructure layout development
- Site preparation and ground works
- Construction of processing and non-processing facilities
- Roads, culverts, drainage and utilities
- Installation and commissioning of utilities and processing equipment

- Operationalisation and post-construction support (5-year post-handover period)

The ESIA assessment is based on conceptual master planning outputs and feasibility study parameters.

5.7.3.1 Preliminary Design Criteria and Infrastructure Components

The preliminary engineering design framework is based on the Feasibility Study prepared for the SAPZ project and includes the following infrastructure components:

- Ground and Site Works

Description	Unit	Quantity
General Site Clearance	Ha	15
Compound Wall Fencing	Km	15.4
Gate & Gate House	Nr	1
Security Outposts	Nr	2

Design considerations include access control, environmental buffering, stormwater management, and security zoning.

5.7.3.2 Non-Processing Facilities

The AIH will include the following support infrastructure:

- Administration Office, R&D Centre & Disaster Management Unit
- QA/QC Laboratory
- Knowledge Centre & ICT Hub
- Procurement Centre
- Industrial/Employment Zone
- Community Vocational Centre
- Health Centre
- Residential/Duty Post
- Recreational/Playground Area

Preliminary design life assumption for buildings: 50 years.

5.7.3.3 Processing Zone Support Facilities

The processing zone will incorporate:

- Livestock Veterinary Clinic
- Poultry Quarantine Zone

- Poultry Collection and Processing Centre
- Poultry Breeding Centre

These facilities support priority agricultural value chains identified in the feasibility study.

5.7.3.4 Roads, Culverts, and Drainage Infrastructure

a. Road Network Components

Description	Unit	Quantity
Internal Roads (18 m width)	Km	3
Internal Roads (12 m width)	Km	9.5
Access Road (Dual carriage 7.3 m + 1.5 m shoulder)	Km	10
RC Side Drains & Crossings	Km	12
RC Drain	Km	0.5
Solar Street Lighting	Km	0.1
Truck Parking	Ha	0.3

b. Surface Drainage Design Assumptions

- Open rectangular drains
- Rainwater harvesting structures at 30m intervals
- Concrete culverts
- Flexible pavement system with crushed stone base
- Mean annual rainfall: 1050mm–1350mm (based on nearest meteorological station data)

Design life for roads and drainage: 25 years.

5.7.3.5 Energy Infrastructure Considerations

- Estimated total load demand: ~11 MW
- Solar component: approx. 1.1 MW
- Proximity to nearest 133 KVA substation: approx. 5 km

The energy system will integrate grid supply and renewable energy components.

Design life:

- Electrical systems and renewable infrastructure: 30 years
- Mechanical equipment: up to 50 years

5.7.3.6 Water Supply and Treatment Design Criteria

a. Water Demand

- Estimated available water resource: 6,900 m^3/day (50% surface water, 50% groundwater)

- Processing water demand assumptions: Cassava: 50 m^3/ton, Rice: 25 m^3/ton, Soybean: 25 m^3/ton

  Estimated water loss: **less than 10%**

  A Water Treatment Plant will be required for the surface water component.

  Design life:

- Water Treatment Plant: 50 years
- Pipelines: 25 years

  Hydrogeological surveys and groundwater investigations will guide borehole siting and capacity planning.

5.7.3.7 Waste Generation, Management and Sanitation

a. Estimated Waste Generation

- Domestic waste: 400g/person/day
- Human/sanitary waste: 10kg/ha/day
- Agricultural waste: 30kg/ha/day
- Industrial waste (hazardous & non-hazardous): 370kg/ha/day

b. Wastewater and Sewage System

A combined sewage system is proposed to manage domestic and industrial wastewater.

c. Treatment Technology Options

- Conventional treatment plant
- Sequencing Batch Reactor (SBR)
- Packaged treatment plant

Final selection will be based on environmental performance, lifecycle cost, and sustainability.

d. Design life:

- Waste Treatment Plant – 30 years

All waste handling and disposal will comply with national regulations and the ESMP.

5.7.3.8 Agroprocessing Equipment

Equipment selection will prioritize:

- Energy efficiency
- Climate-smart technology

- Gender inclusiveness
- Suitability for small and medium-scale farmers

Design life: **30 years.**

5.7.3.9 Durability and Asset Life Assumptions

Minimum asset life benchmarks:

Asset	Design Life (Years)
Civil & Structural Works	50
Buildings	50
Roads & Drainage	25
Steelwork	30
Mechanical Equipment	50
Electrical Systems	30
Waste Treatment Plant	30
Water Treatment Plant	50

A Durability Plan will address:

- Concrete specifications and cover requirements
- Steel protection systems (galvanization, coatings)
- Mechanical & electrical performance standards
- Environmental exposure conditions

5.7.3.10 Applicable Engineering Standards and Guidelines

The final engineering design will be informed by:

- AfDB Environmental and Social Safeguards
- Nigerian Building Code
- Federal Ministry of Environment Regulations
- Federal Ministry of Works Highway Design Standards
- WHO Water Quality Guidelines
- ASTM, BS, ISO standards (as applicable)
- National Environmental (Sanitation and Waste Control) Regulations

5.7.3.11 Conclusion

While detailed engineering drawings remain under development, this ESIA provides:

- Preliminary design criteria and capacity assumptions
- Conceptual infrastructure layout framework
- Quantitative infrastructure components

- Durability benchmarks
- Applicable standards and regulatory references

This level of detail is considered sufficient to support a robust environmental and social impact assessment at this stage of project development.

Table 5.10: Summary of potential impacts of preconstruction phase of the proposed Project.

Activity	Receptor	Associated/Potential Impact	Impact Significance
Land take	Herdsmen involved in livestock grazing	· Loss of grazing land	Negligible
Mobilization of personnel and equipment to site	Air Quality	· Decrease in ambient air quality	Minor
		· Increase in ambient noise level	Minor
	Social infrastructure and community safety	Increase in traffic volume, including potential for road accidents	Minor
Site clearing and land preparation	Terrestrial flora and fauna	Vegetation loss; disturbance/displacement of fauna due to noise associated with site clearing activities; direct impacts on soil-dwelling organisms	Minor
	Soil	Loss of top soil; soil compaction and degradation; increased erosion potential	Minor
	Surface water	· Decrease in surface water quality	Minor
	Air quality	· Decrease in ambient air quality	Minor
		· Increase in ambient noise levels	nor

Construction Phase

The construction phase of the proposed Project will entail activities such as civil works, including the installation of a drip irrigation system; the installation of processing plant equipment; renovation of existing facilities; and construction of ancillary facilities, including perimeter fencing. Waste generation is also associated with construction activities and can be significant if not properly managed.

Table 5.11 summarizes the potential impacts associated with the construction phase of the proposed Project.

Table 5.11: Summary of potential impacts of the construction phase of the proposed Project.

Activity	Receptor	Potential/Associated Impact	Impact Significance
Construction	Air quality	·Decrease in ambient air quality	Minor
		Increase in ambient noise level	
	Soil	Soil compaction, reduction in structural stability and percolative ability of soil, loss of soil dwelling organisms	Moderate
	Surface water	Decrease in surface water quality	Minor
		Increased sediment load in the water body	Minor
	Ground water	·Groundwater contamination	Minor
	Flora and fauna	Alteration of composition and diversity of plant species around project site	Minor
		Loss of fauna species	Minor
	Socio-economic and health (community health and safety)	Influx of migrant workers, increase in sexual transmitted disease	Moderate
		Road damage, traffic and safety impacts	Minor
	Health, safety and welfare of workers	Injury to construction workers due to construction activities	Moderate

Operational Phase

The operational activities associated with the proposed Project include nursery of soybean seedlings; operation of a drip irrigation system; cultivation of farm produce; harvesting and sorting of farm produce; processing of farm produce into concentrate; equipment maintenance and occasional repairs; and waste generation and disposal.

Table 5.12 summarizes the potential negative impacts associated with the operation phase of the proposed Project.

Table 5.12: Summary of potential impacts of the operation phase of the proposed project.

Activity	Receptor	Potential/Associated Impact	Impact Significance
Operation of the Soya beans farm and processing plant	Air quality and noise	Decrease in ambient air quality	Minor
		Increase in ambient noise level	Minor
	Soil	Reduction in structural stability and percolative ability of soil	Minor
	Surface water	Decrease in surface water quality	Moderate
	Groundwater	Decrease in groundwater quality, reduction in underground water reservoir (aquifer).	Minor
	Socio-economic and health	Traffic impacts	Minor
	Health, safety and welfare of workers	Injury to construction workers due to construction activities	Moderate

Potential Cumulative Impacts of the Proposed Project

The determination of potential cumulative impacts as a result of the proposed Project considered the activities which are known to be taking place in the vicinity of the Project site and/or activities planned for the near future in the area. Currently, the major development facility within the immediate surroundings of the proposed Project site is the Ijaye community.

5.8 Risk and Hazard Assessment

5.8.1 Overview

Risk assessment is the determination of a quantitative or qualitative estimate of risk related to a concrete situation and a recognized threat (also called hazard). The assessment of the risks and hazards associated with the proposed Project involves the following steps:

- Identification of hazards/risks
- Likelihood of occurrence
- Consequence/severity of the hazards

0 – 5 = Low Risk 6 – 10 = Moderate Risk 11 – 15 = High Risk 16 – 25 = extremely high unacceptable risk		Severity of the potential injury/damage				
		Insignificant damage to Property, Equipment or Minor Injury 1	Non-Reportable Injury, minor loss of Process or slight damage to Property 2	Reportable Injury moderate loss of Process or limited damage to Property 3	Major Injury, Single Fatality critical loss of Process/damage to Property 4	Multiple Fatalities Catastrophic Loss of Business 5
Likelihood of the hazard happening	Almost Certain 5	5	10	15	20	25
	Will probably occur 4	4	8	12	16	20
	Possible occur 3	3	6	9	12	15
	Remote possibility 2	2	4	6	8	10
	Extremely Unlikely 1	1	2	3	4	5

Figure 5.3: Risk Assessment Matrix

5.8.2 Project Specific Risks and Hazards

The potential risks and hazards associated with the proposed Project are described below, while the associated preventive measures are provided in the next chapter:

Fire and explosion

The possibility of fire occurring at the Project site is largely associated with the operation of crop processing equipment and the use of diesel-fueled generators. The processing equipment to be installed is subject to electrical faults like any other electrical installation, such as short circuits, ground faults, and reverse currents. These faults can create hot spots that ignite combustible material in their vicinity.

Fire and explosions could occur at the facility, potentially leading to reportable injuries and property damage. The overall risk prior to mitigation is rated moderate.

Security Threat and Attack

The proposed facility may be exposed to sabotage or attack, lowering planned production. Although the current insurgency in the country is largely limited to some states in the Northeast geopolitical zone, the likelihood of a coordinated attack at the Project site is remotely possible, and could result in reportable injury and damage to property. The overall risk rating is moderate.

Occupational Hazards

Workers may be exposed to occupational hazards when working during construction and operation in the Project area. The use of farm machinery such as tractors, Vibrotill, harrows, and ploughs may pose hazards to workers. In addition, operating the processing plant equipment may pose hazards to workers. Other associated occupational risks and hazards include direct contact with agrochemicals, exposure to heat, electricity shocks, and plant fires. The likelihood

of the hazards occurring is considered to be possible, while their severity may lead to reportable injury and limited damage to property. The overall significance is rated moderate.

5.9 Summary

In summary, the key unmitigated potential adverse impacts from the proposed Project activities have been evaluated in this chapter. The significance of these impacts could be minimized to acceptable levels if additional mitigation measures are put in place, thus allowing the project to be implemented in a sustainable manner. Sound and cost-effective mitigation measures for the identified negative impacts are presented in the next chapter of this report.

CHAPTER SIX

6.

Mitigation Measures

6.1 Introduction

Following the detailed description of the associated and potential impacts of the proposed Project in Chapter 5, the appropriate mitigation measures for the identified negative impacts are presented in this chapter, as well as the enhancement measures for the potential positive impacts. Oyo State Government will ensure that all mitigation measures proffered are implemented at all phases of the Project lifecycle to reduce the identified impacts on the environment.

The mitigation measures will ensure settlers are not needlessly exposed to air pollutants, water, and soil contaminants.

6.2 Mitigation Measures Approach

Mitigation refers to measures or interventions necessary to avoid, minimize, reduce, or offset adverse impacts. Approach for selecting appropriate mitigation measures followed the framework stated by UNEP (2002):

- Avoid adverse impacts as far as possible by the use of preventive measures.
- Remediate or compensate for adverse impacts which cannot be mitigated or residual impacts which cannot be further reduced.

In proffering mitigation measures for the various impacts identified in the previous chapter, preference was given to avoidance or prevention of adverse impacts and where not feasible, measures that are practicable and cost-effective using best available technology were suggested to reduce and/or minimize the impacts, while rehabilitation, restoration or compensation was considered as the last resort.

6.3 Mitigation Measures and Potential Residual Impacts

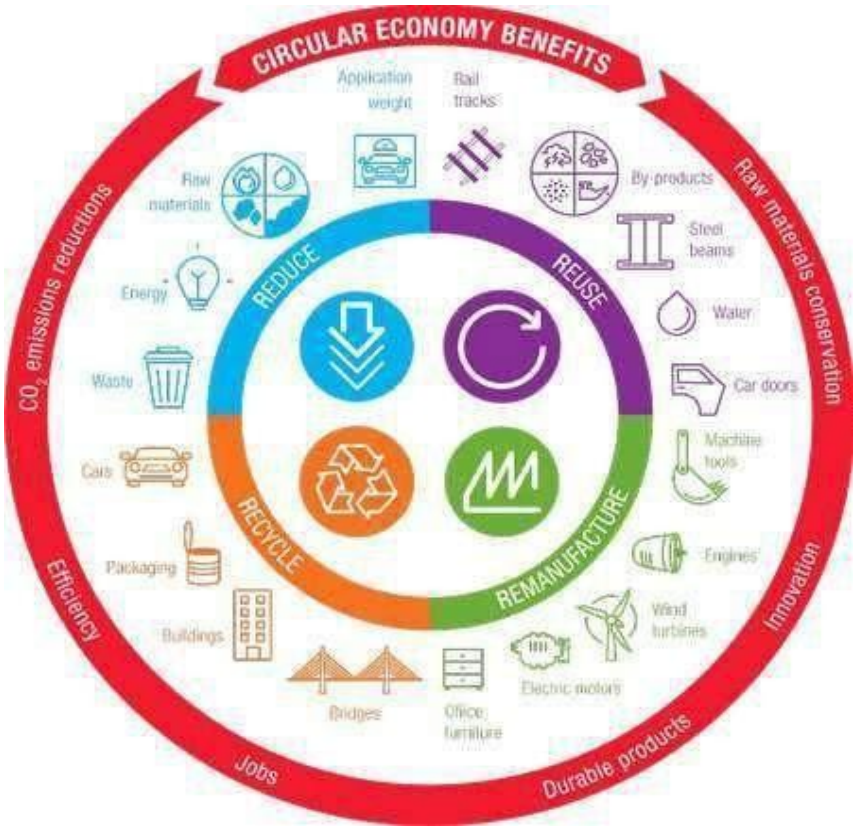
The recommended mitigation measures for the identified negative impacts associated with the proposed Project are provided in Table 6.1 (see Annex 1). The recommended mitigation measures are considered adequate to address the adverse impacts of the proposed Project to as low as reasonably practicable. The residual impacts of the proposed Project, following the implementation of the proffered mitigation measures highlighted in Table 6.1 (see Annex 1), are of negligible to minor significance. The negligible impact ratings after the application of mitigation measures imply that no significant adverse residual environmental effects are likely to occur. However, the minor impact rating applies primarily to occupational health and safety during construction and operation. Preventative health and safety programs will be put in place throughout the life cycle of the Project. Also, an emergency response plan shall be developed and implemented for unplanned events, such as fires and explosions. Implementation of the mitigation measures will also be periodically monitored.

6.4 Mitigation measures and circular economy

Circular economy in agriculture centers on the production of agricultural commodities using a minimal amount of external inputs, closing nutrient loops, and reducing negative discharges to the environment (in the form of waste and emissions). The integration of the circular economy into mitigation measures will support greener industrial space design, increase revenues, and advance environmental sustainability.

Environmental sustainability will be achieved by the employment of a green concept of circular economic principles, in which no waste is discarded but is reintroduced into the system to reduce waste and recycle into more useful materials. The Circular Economy Principles (Figures 6.1 and 6.2) ensure that waste is reused, recycled, and reduced to the the bare minimum whenever possible into save the environment and public health. Environmental sustainability will be assured with a circular economy engendering a positive development cycle that conserves and enhances natural capital, maximizes resource returns, and eliminates system risks.

Figure 6.1: Principles of circular economy



6.5 Mitigation measures and climate change

Agriculture contributes significantly to climate change. It presently accounts for 19–29% of total greenhouse gas (GHG) emissions, primarily methane and nitrous oxide. Without mitigation efforts, this number could skyrocket. As a result, climate-smart agriculture will be used as a mitigation measure, addressing the risks that agricultural production faces in a changing climate, emphasizing agriculture's role in addressing climate change, and emphasizing the importance of agricultural intensification required to feed the state and Nigerian population. Climate-smart agriculture (CSA) promotes the long-term growth of agricultural systems by implementing techniques and approaches that improve food security, strengthen resilience, and promote low-emission development when practicable and appropriate in the face of climate change (FAO, 2010).

The Climate Change Adaptation Strategy (CSA) is an initiative to integrate climate change and agricultural development planning, specifically seeking opportunities to link adaptation and mitigation measures. The strategy strives to ensure that climate change and agriculture planning are comprehensive, achieving various goals while reducing trade-offs in food system management (Lipper et al., 2014).

Furthermore, OYSG will incorporate tree planting into SAPZ planning for every tree that falls during construction. The OYSG will create a variety of policies and actions to mitigate the effects of climate change on agriculture. The economic, social, and environmental benefits of

these measures will encourage farmers, communities, and investors to invest more in the SAPZ initiative.

The forest will be used in accordance with the "Do No Harm" environmental principles and accompanying pledges to nature-friendly Overseas Development Assistance (ODA). https://ukcop26.org/glasgow-leaders-declaration-on-forests-and-land-use/

This will protect the forest reserve because it is already declassified, and 10% of the mapped area will be allotted for industrial construction. This is done to highlight the critical and interdependent roles of all types of forests, biodiversity, and sustainable land use in in meeting sustainable development goals, to help achieve a balance between anthropogenic greenhouse gas emissions and removal by sinks, to adapt to climate change, and to maintain other ecosystem services.

6.6 Mitigation Measures for the Identified Project Risks and Hazards Due to Unplanned Events

The mitigation measures for the identified project risks and hazards (due to unplanned events) are highlighted below:

Fire and explosion

- Emergency response plans shall be developed and implemented.
- Fire management system, including relevant equipment (such as fire extinguishers, fire alarms, fire notices, warning signs, etc.) shall be put in place. Oyo State Fire Authority shall be incorporated into the facility's fire management system.
- Only machinery which complies with international and local standards for electrical performance and safety shall be used.
- Good housekeeping shall be maintained at the facility.

Security Threat and Attack

- No authorized person(s) shall be allowed into the facility without adequate check.
- A 24-hour site security shall be put in place.
- Oyo State Government shall maintain regular communication with the Nigerian Police and other relevant local security.

Occupational Health and Safety (OHS)

- The OHS plans that cover the scope of the Project shall be developed and implemented in line with the relevant local and international guidelines and standards. The implementation of the OHS plans and procedures shall be overseen by the Facility's EHS Manager.

6.7 Enhancement Measures for Identified Positive Impacts

6.7.1 Direct Employment and Training

The Project will create direct employment opportunities at all levels, from unskilled to highly skilled labor. Training for local people would also be provided. The following measures will be implemented to ensure that direct employment and training opportunities are maximized:

- A Labour and Employment Plan (LEMP) will be produced before construction, detailing percentages and numbers of the workforce to be sourced from the local area.
- The Contractor will initiate training and skills development programs before commencement of construction, as a means of ensuring that members of the local workforce are up-skilled and can be employed on the Project.

6.7.2 Procurement and Indirect Employment

The proposed AIH project will create opportunities for short-term employment for locals during the construction and operations phase. This in turn will create indirect employment in the supply chain for petty traders. Local and regional procurement targets shall be included in the Project's LEMP.

CHAPTER SEVEN

7.

Environmental Management and Social Plan (ESMP)

7.1 Introduction

This chapter presents the Environmental Management and Social Plan (ESMP) for the proposed AIH Project in Akinyele LGA, Oyo State.

An ESMP is a planned, integrated program aimed at ensuring that unforeseen and unidentified impacts of a proposed project are contained and brought to an acceptable minimum.

The associated and potential impacts of the proposed Project have been analyzed in Chapter 5 of this report. The results show that if the recommended mitigation measures are implemented, the Project's impacts are not severe and are thus acceptable. To ensure the environmental and social considerations and mitigation measures of the ESIA are implemented, an ESMP has been developed.

The purpose of the ESMP is to ensure that the recommended mitigation measures are translated into practical management actions, which can be adequately resourced and integrated into the Project phases.

The ESMP has been developed to meet international and national standards on environmental and social management performance. It covers the pre-construction, construction, operational phase of the Project (the aspects related to decommissioning are presented in Chapter 8 of this report), and details the mitigation measures for the identified impacts as well as the desired outcomes, performance indicators, monitoring, and timing for actions and responsibilities (refer to Tables 7.1 to 7.3 in Annex 1).

7.2 Objectives of the EMP

The ESMP is essential for successfully implementing the Project's environmental performance throughout its life cycle. Having this framework in place ensures a systematic approach to bringing environmental and social considerations into decision-making and day-to-day operations. It establishes a framework for tracking, evaluating, and communicating environmental and social performance and helps ensure that environmental risks and liabilities are identified, minimized, and managed.

The ESMP will be a living document that continues to develop during the design and construction phases to enable continuous improvement in the Project's environmental performance.

The specific objectives of the ESMP are to:

- Promote environmental and social management and communicate the aims and goals of the ESMP.
- Ensure that all workers, contractors, subcontractors and others involved in the Project meet legal and regulatory requirements with regard to environmental management.
- Incorporate environmental and social management into Project design and operating procedures.
- Address concerns and issues raised in the ESIA's stakeholder engagement process and those that will likely continue to arise during the Project lifetime.
- Provide a framework for implementing Project environmental and social commitments (i.e., mitigation measures identified in the ESIA);
- Prepare and maintain records of the Project's environmental and social performance (i.e., monitoring, audits and non-compliance tracking).

7.3 Environmental and Social Management Organization

Oyo State Government is committed to providing resources essential to the implementation and control of the ESMP. Resources include the appropriate human resources and specialized skills.

Oyo State Government has in place qualified and competent personnel with appropriate education, training, and experience to manage and oversee the Environment, Health and Safety (EHS) aspects of the Project.

The EHS personnel shall ensure that the Project is developed and implemented in accordance with the applicable regulatory HSE requirements and plans and also monitor the implementation of environmental and social protection measures. The Oyo State Government organizational structure for the EMP implementation is depicted in Figure 7.1.

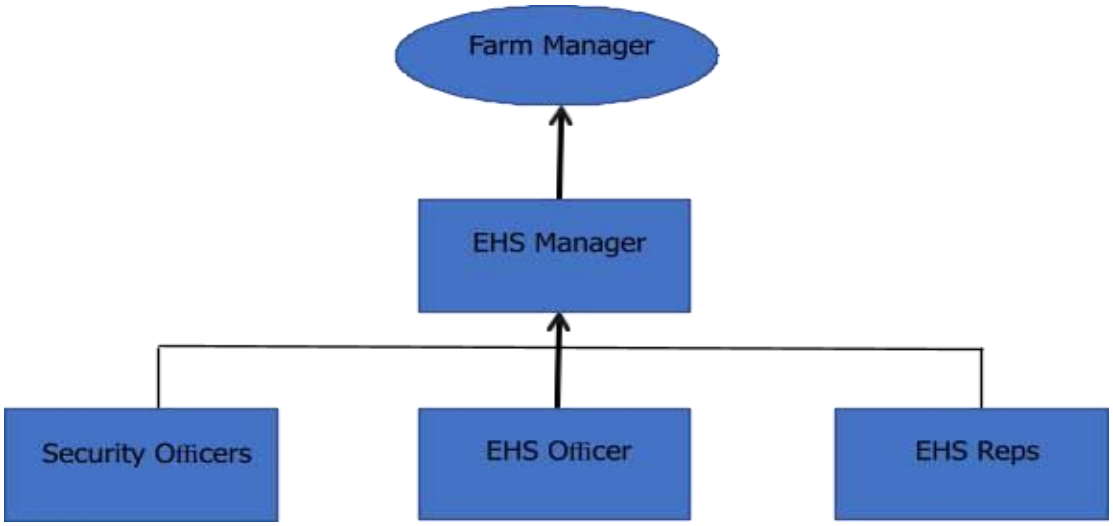


Figure 7.1: Oyo State Government organizational structure for ESMP Implementation

7.3.1 Training and Awareness

Oyo State Government shall identify, plan, monitor, and record training needs for personnel whose work may have a significant adverse impact on the environmental or social conditions. The Project recognizes that it is important that employees at each relevant function and level are aware of the company's environmental policy, potential impacts of their activities, and roles and responsibilities in achieving conformance with the policy and procedures.

This will be achieved through a formal training process. Employee training will include awareness and competence with respect to:

- Environmental and social impacts that could potentially arise from their activities (including dust, noise, soil contamination, etc.).
- Necessity of conforming to the requirements of the EIA and EMP, to avoid or reduce those impacts.
- Roles and responsibilities to achieve the required conformity, including those in respect of change management and emergency response.

Employees responsible for performing site inspections will receive training by drawing on external resources as necessary. Training will be organized as at when required and based on formally identified needs.

Similarly, the Project will require that contractors and subcontractors institute training programs for their personnel. The training program will be subject to approval by Oyo State Government, and it will be audited to ensure that: training programs are adequate; all personnel requiring training have been trained; and competency is being verified.

7.3.2 Communication

Oyo State Government will maintain a formal procedure for communication with the regulatory authorities and communities. Meetings will be held, as required, between Oyo State Government and the appropriate regulatory authorities and community representatives to review environmental performance, areas of concern and emerging issues. Dealings will be transparent and stakeholders will have access to personnel and information to address concerns raised.

The Project will also develop and implement a grievance mechanism whereby community members can raise any issues of concern. Grievances may be verbal or written and are usually either specific claims for damages/injury or complaints or suggestions about the way that the Project is being implemented. When grievance has been brought to the attention of the Project team, it will be logged and evaluated. The person or group with the grievance is required to present grounds for making a complaint or claiming loss so that a proper and informed evaluation can be made.

Where a complaint or claim is considered to be valid, then steps are required to be undertaken to rectify the issue or agree compensation for the loss. In all cases, the decision made and the

reason for the decision will be communicated to the relevant stakeholders and recorded. Where there remains disagreement on the outcome then an arbitration procedure may be required to be overseen by a third party (e.g. Government official). Local community stakeholders will be informed on how to implement the grievance procedures surveillance .

7.3.3 Documentation

Oyo State Government will control HSE documentation, including management plans; associated procedures; and checklists, forms and reports, through a formal procedure. All records will be kept on site and will be backed up at several offsite locations (including secure cloud storage facilities as may be required). Records will be kept in both hard copy and soft copy formats. And all records will be archived for future purposes.

In addition, the document control procedure will describe the processes that the Project will employ for official communication of both hardcopy and electronic document deliverables. Also, it will describe the requirement for electronic filing and posting and for assignment of document tracking and control numbers.

The subcontractors will be required to develop a system for maintaining and controlling its own HSE documentation and describe these systems in their respective HSE plans.

7.3.4 Operational Control Procedures

Each potentially significant impact identified in the EIA will have an operational control associated with it that specifies appropriate procedures, work instructions, best management practices, roles, responsibilities, authorities, monitoring, measurement and record keeping for avoiding or reducing impacts. Operational controls are monitored for compliance and effectiveness on a regular basis through a monitoring and auditing procedure described in the EMP.

Operational control procedures shall be reviewed and, where appropriate, amended to include instructions for planning and minimizing impacts, or to at least reference relevant documents that address impact avoidance and mitigation.

7.3.5 Facilities Surveillance

This is a salient system maintenance requirement for the environmental sustainability of the project. Oyo State Government shall carry out constant equipment and facilities surveillance to detect on time the malfunctioning or deterioration of equipment and/or facilities. Thesha ll aim at taking prompt corrective/repair measures on detected faults.

7.3.6 Managing Changes to Project Activities

Changes in the Project may occur due to unanticipated situations. Adaptive changes may also occur during the course of final design, commissioning or even operations. The Project will implement a formal procedure to manage changes in the project that will apply to all project activities.

The objective of the procedure is to ensure that the impact of changes on the health and safety of personnel, the environment, and equipment are identified and assessed prior to changes being implemented.

The management of change procedure will ensure that:

- Proposed changes have sound technical, safety, environmental, social and commercial justification.
- Changes are reviewed by competent personnel, and the impact of changes is reflected in documentation, including operating procedures and drawings.
- Hazards resulting from changes that alter the conditions assessed in the EIA have been identified and assessed and the impact(s) of changes do not adversely affect the management of health, safety or the environment.
- Changes are communicated to personnel who are provided with the necessary skills, via training, to effectively implement changes.
- The appropriate Oyo State Government person accepts responsibility for the change.

7.3.7 Additional Management Plans

This section provides a framework for the contents of additional management plans to be developed and implemented, in support of this EMP, for the proposed Project. As the Project progresses, the additional management plans will be expanded to include specific procedures to guide implementation by the relevant Project personnel including contractors and sub-contractors.

The documents will be prepared strictly in line with the requirements set out in the relevant international standards and guidelines such as the World Bank General EHS Guidelines as well as other applicable national and local regulations and guidelines.

7.3.7.1 Emergency Preparedness and Response Plan (EPRP)

The EPRP shall include procedures for addressing all reasonably foreseeable and possible emergencies such as: fire and explosion, spill or release of hazardous wastes, medical emergencies, and weather-related emergencies.

The EPRP will be reviewed by Oyo State Government on at least an annual basis and after the occurrence of any accidents or emergency situations to ensure that lessons learnt inform continuous improvement. The Plan will address the following aspects, amongst others:

- Identification of the emergency scenarios and the development of appropriate and specific emergency response procedures for each scenario.

- Training of emergency response teams in the appropriate procedures and the use of emergency response equipment.
- Identification of emergency contacts and support services and the development of effective communication systems/protocols);
- Emergency equipment and facilities to be provided (e.g., first aid stations, fire-fighting equipment, personal protective equipment);
- Development of decontamination/clean-up procedures and identify critical remedial measures to contain, limit and reduce pollution; and
- Identification of potential risk relating to the uncontrolled release of hazardous materials and the preparation of spill prevention, control, and response plans including:
  - Training of operators on spill prevention of chemicals.
  - Implementation of inspection programmes to confirm the integrity of secondary containment structures and equipment.
  - Development of standard operating procedures for filling containers or equipment and the transfer of hazardous materials.
  - Identification and availability of the appropriate personal protective equipment and equipment.

7.3.7.2 Traffic Management Plan (TMP)

The purpose of this plan is to adopt best transport safety practices across all the aspects of the Project (especially at the construction phase) with the goal of preventing traffic accidents and minimizing injuries suffered by Project personnel and the public. The measures to be included in the TMP will include the following, amongst others:

- Emphasizing safety aspects among drivers.
- Improving driving skills and requiring licensing of drivers.
- Adopting limits for trip duration and arranging driver rosters to avoid overtiredness.
- Avoiding dangerous routes and times of day to reduce the risk of accidents.
- Regular maintenance of vehicles and use of manufacturer approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure.
- Minimizing pedestrian interaction with construction vehicles.
- Collaboration with relevant government authorities to improve signage, visibility and overall safety of roads in the Project area.
- Collaborating with local community on education about traffic and pedestrian safety.
- Coordination with emergency responders to ensure that appropriate first aid is provided in the event of accidents.
- Employing safe traffic control measures, including road signs and flag persons (where required) to warn of dangerous conditions; and
- Using locally sourced materials, whenever possible, to minimize transport distances.

7.3.7.3 Waste Management Plan (WMP)

Waste will be generated in many aspects of the Oyo State Government operations. The associated waste shall be properly managed to ensure prudent and responsible collection, segregation, storage, transportation, treatment, recycling, and disposal.

Oyo State Government will ensure that government regulations concerning waste management are followed. Oyo State Government management shall make effort to apply the principles of the 3Rs of waste management (Reduce, Reuse and Recycle) in its waste management practice. Processes for waste handling are to be developed and documented in the Waste Management Procedure.

The elements of Waste Management Plan for the Project will include:

a. **Waste Segregation and Categorization Practice:** In disposing generated wastes, Oyo State Government shall practice waste segregation. Different kinds of wastes are classified and disposed accordingly.
b. **Waste Handling and Disposal:** The procedure required by regulations for proper waste disposal shall be strictly adhered to by Oyo State Government. Licensed waste disposal third party contractors shall be used for disposal of various categories of wastes. The requirements to be fulfilled by third party waste disposal contractors shall include the following:
   - Proof of proper licensing and authorization by relevant bodies.
   - Waste handling program of the contractor to be scrutinized by the HSE Unit.
   - Physical assessment of waste handling procedure and patterns.
   - Compliance with all environmental and regulatory requirement verified.

   The waste disposal contractors shall provide evidence of authorization and permits issued by the local authorities for the handling of waste. In addition, waste handling contractors are also subject to other OHS conditions for third party contractors engaged by Oyo State Government.
c. **Reducing Volume:** All employees and contractors of Oyo State Government shall be required to reduce the volume and toxicity of wastes generated. The following steps shall be adopted to ensure compliance:

   - Personnel and contractors will be encouraged to imbibe practices that encourage maximum utilization of materials with a view to avoiding being wasteful with products. The management will organize campaigns and programmes aimed at teaching employees and contractors to make efforts to extend the use of materials for as long as possible.
   - The management will encourage the use of non-hazardous products instead of hazardous products whenever possible.
   - Encourage Recycling and re-using, whenever possible.
d. **Record Keeping:** Oyo State Government will ensure that proper record of waste generated within its facility is maintained by the HSE Unit. The amount of waste, the type and the disposal methods are all documented. Records of waste disposal activities are also kept.
e. Environmental protection and waste control
   - All Oyo State Government activities will be assessed for their impact on the environment and all reasonably practicable measures taken to protect the environment in compliance with the Environmental Protection Act and all other relevant legislation and approved Codes of Practice, (including local authority regulations).

- In all its waste management and environmental protection practices and procedures, Oyo State Government shall ensure full conformity with the relevant World Bank Environmental Health and Safety (EHS) guidelines.

7.3.7.4 Occupational Health and Safety (OHS) Plan

The OHS plan will include the following elements, amongst others:

- Identification of potential hazards and development of responses to eliminate sources of risk or minimize workers' exposure to hazards.
- Provision of Personal Protective Equipment (PPE) to workers at no cost.
- Provision of training to all workers on all relevant aspects of occupational health and safety issues associated with their daily work, including emergency arrangements.
- Third parties (visitors and external service providers) must be briefed on the relevant aspects of health and safety and emergency response when accessing the site premises.
- Documentation and reporting of occupational injuries, illnesses and fatalities. It is recommended that a process for reporting near-missive and unsafe behaviour be developed as a proactive approach to occupational health and safety risk management.
- Adequate access to first aid and medical assistance in cases of work-related accidents or injuries must be provided.
- Designation of onsite Health and Safety officer with required experience; and
- The overall site management system must be designed with adequate capacity for oversight of occupational health and safety matters.

7.3.7.5 Local and Employment Management Plan (LEMP)

The LEMP should aim to promote employment opportunities and training for local people in the Project's area of influence and include, amongst others:

- Targets for employing local labor.
- Targets for work experience opportunities.
- Notification of all employment and training opportunities prior to them being advertised elsewhere.
- Measures to provide verifiable monitoring information regarding training and employment. The training status for all workers must be recorded.
- Measures to provide training opportunities in respect of any new jobs created.
- Commitment to up-skilling existing employees.
- Measures to promote local procurement of goods and services.
- Recruitment and selection process for local employment.
- Measures to ensure the contractors work directly with local employment and training agencies.
- Measures to enhance and grow diversity in the workplace.

7.3.7.6 Erosion Control Management Plan

This Plan should aim to control soil erosion and the transport of sediment in the Project area. The timing of work and the installation of control measures have a major influence on the management of stormwater. The Plan should include the following measures, amongst others:

- Clearing of only those areas necessary for construction works shall be ensured.
- Site clearing operations shall progress gradually to ensure there are no large increases in sediment discharge.
- Slopes of all cuts and fill areas shall be rigorously controlled and will at no time be allowed to be greater than the slope established in the final design.
- Piles of soil or other materials shall be allowed for short periods of time and will be located only in flat areas and away from any stormwater courses.
- Temporary protection of exposed soil surfaces with measures such as plastic film, bio-membranes, or other means will be implemented whenever necessary.
- Inlet structures used to collect storm run-off will be constructed of any suitable construction material. The structures will ensure efficient removal of design-storm runoff to avoid construction interruptions during or after storms and to prevent erosion from overtopping of the inlet.
- All flow of storm water over exposed soil surfaces will be along pre-established paths that will not interfere with vehicle and other activities and will contain breakers and other devices to control flow velocity.
- Careful considerations will be given to the drainage of all roads, facility areas, and surplus soil deposit areas; and
- All storm drainage will be discharged via surface drainage systems. Maximum use of natural drainage features will be used. Runoff from cleared areas will be collected in open channels or ditches for removal from the immediate area.

7.3.7.7 Community Engagement Plan and Grievances Mechanism

The purpose of the Community Engagement Plan is to, amongst others:

- Ensure community inclusion and involvement across the various phases of the project.
- Ensure clarity and understanding through an open, inclusive and transparent process of culturally appropriate engagement and communication undertaken to ensure that local community members are well informed about the proposed Project.
- Manage expectations to ensure that the proposed Project does not create or allow unrealistic expectations to develop amongst the local community. The engagement process will serve as a mechanism for understanding and managing community expectations, where the latter will be achieved by disseminating accurate information in an accessible way.

In addition, the Community Engagement Plan should include a detailed grievance mechanism that will contain the following elements, amongst others:

- Processes by which the affected local community can bring their concerns on the Project for consideration and redress
- Responsibility for receiving grievances
- Channels through which grievances will be communicated

- Process for investigating and resolving complaints

7.3.7.8 Water Management Plan

The Water Management Plan will address the appropriateness of water conservation, and efficient use of groundwater for the Project.

7.4 Checking and Corrective Action

Checking includes inspections and monitoring as well as audit activities to confirm proper implementation of checking systems as well as effectiveness of mitigations. Corrective actions include response to out-of-control situations, non-compliances, and non-conformances. Actions also include those intended to improve performance.

7.4.1 Inspection

Health, Safety and Environment inspections will be conducted weekly on a specific basis and formally at least once every three months. The results of the inspection activities will be reported to Oyo State Government to be addressed.

7.4.2 Monitoring

Environmental Monitoring Programme is the systematic schedule for collection of environmental data through a series of repetitive measurements. UNEP (1996) describes three known types of environmental monitoring within the conceptual ESIA framework as follows:

- Baseline Monitoring: Refers to the measurements of environmental parameters during the pre-project period.
- Effects Monitoring: Involves the measurements of environmental parameters during project construction and implementation so as to detect changes in these parameters which can be attributed to the project.
- Compliance Monitoring: Is the periodic or continuous measurement of environmental parameters of discharges to ensure that regulatory requirements and standards are met. Compliance monitoring can either be Mitigative Measures Monitoring which relates to the prescribed mitigation measures put in place by the pre-project ESIA to the existing operational structure of the project, or Regulatory Compliance Monitoring, which compares the regulatory monitoring requirements to the existing operational, occupational and environmental parameters.

Oyo State Government shall adopt a systematic monitoring schedule that will comprise both effects and compliance monitoring plans for the implementation of the Project. Baseline requirements are already embodied in Chapter 4 of this report and are not covered in this chapter. Monitoring shall be conducted to ensure compliance with regulatory requirements as well as to evaluate the effectiveness of operational controls and other measures intended to mitigate potential impacts. Specifically, the objectives of instituting a monitoring programme for this Project are to:

- Ensure that regulatory standards/limits for parameters of concerns are not exceeded.

- Monitor changes in existing physical, chemical and biological characteristics of the ancillary environment of the Project area. Early warning of environmental damage is thus provided so that urgent action may be taken if needed, to reduce in earnest the unwanted impact.
- Determine whether any detected changes in environmental components are caused by the Project or by other factors.
- Determine the effectiveness of the mitigation measures as well as check mitigation measures are correctly implemented.
- Highlight areas of concern undetected during the EIA study and provide a basis for recommending additional mitigation measures.

The environmental monitoring programme for the proposed Project is presented in Table 7.4 (see Annex 1).

7.4.3 Auditing (Internal and External)

Beyond the routine inspection and monitoring activities, audits will be carried out internally by Oyo State Government to ensure compliance with regulatory requirements as well as their own HSE standards and policies. Audits to be conducted will also cover the subcontractor's self-reported monitoring and inspection activities. The audit shall be performed by qualified staff, and the results shall be reported to Oyo State Government to be addressed.

The audit will include a review of compliance with the requirements of the ESIA and EMP and include, at a minimum, the following:

- Completeness of HSE documentation, including planning documents and inspection records.
- Conformance with monitoring requirements.
- Efficacy of activities to address any non-conformance with monitoring requirements.

There will be a cycle of audits into specific areas of the Project such as waste management. The frequency of audits will be risk based and will vary with the stage of the Project and will depend on the results of previous audits.

In addition, periodic auditing of the facility operations shall be embarked on every three years as required by the FMEnv, NESREA etc.

7.4.4 Corrective Action

Investigating a near miss or actual incident after it occurs can be used to obtain valuable lessons and information that can be used to prevent similar or more serious occurrences in the future. Oyo State Government will implement a formal non-compliance and corrective action tracking procedure for investigating the causes of, and identifying corrective actions to, accidents or environmental or social non-compliances. This will ensure coordinated action between Oyo State Government and its subcontractors.

7.4.5 Reporting

Oyo State Government shall keep the regulatory authorities informed of the Project performance with respect to HSE matters through reports that will be made available to the regulators when required. Oyo State Government will provide appropriate documentation of HSE related activities, including internal inspection records, training records, and reports to the relevant authorities. Subcontractors are also required to provide HSE performance reporting to Oyo State Government on a regular basis through weekly and monthly reports.

7.4.6 *Roles*, Responsibilities and Accountabilities

The main responsibility for overseeing the implementation of the ESMP lies with the OYSADA-PMU throughout the project life span. However, conformance with the specific environmental measures detailed in Chapter Six of this report will be ensured by the DBO contractor during the construction phase and Operations and Maintenance (O&M) Contractor at the operational phase of the Project.

7.4.7 Pre-construction Phase

The key personnel and institutions with major roles in the implementation of the ESMP during pre-construction phase are:

Akinyele Committee of Community Development

- Select the land for the proposed Project
- Appoint a Site Engineer
- Arrange and ensure adequate training is carried out for the Site Engineer
- Review the ESMP from the consultant
- Ensure the Community's commitment to the ESMP implementation

OYSADA - PMU

- Assist the Community in selecting sufficient and suitable land for construction of the Agro-industrial Processing Hub
- Appoint a DBO Contractor
- Supervise the activities of the DBO contractor
- Review the ESMP from the consultant
- Ensure Contractors's commitment to the ESMP implementation

Akinyele Site Engineer

- Attend adequate training on ESMP implementation
- Supervise the activities of the DBO contractor and ensure compliance with ESMP mitigation measures
- Report to Akinyele committee on ESMP compliance and non-compliance issues

DBO Contractor

- Familiarize with ESMP requirements
- Ensure that all personnel are made aware of the management measures/plans that are to be implemented
- Report to the OYSADA-PMU and AKINYELE Site Engineer on ESMP compliance and non-compliance issues

7.4.7 Construction Phase

The key personnel and institutions with major roles in the implementation of the ESMP during construction phase are:

Akinyele Committee of Community Development

- Supervise the activities of the Site Engineer by reviewing reports on ESMP issues
- Suggest ESMP improvements to OYSADA-PMU to address non-compliance and upcoming issues

OYSADA -PMU

- Supervise the activities of the DBO contractor by reviewing reports on ESMP issues
- Discuss ESMP improvements with AKINYELE development committee to address non-compliance and upcoming issues
- Monitors the implementation of the ESMP

Akinyele Site Engineer

- Supervise the activities of the DBO contractor and ensure compliance with ESMP mitigation measures
- Report to AKINYELE development committee on ESMP compliance and non-compliance issues
- Implement ESMP requirements relevant to work being undertaken.

DBO Contractor

- Implement ESMP requirements relevant to work being undertaken
- Hire a Gender/GBV officer
- Report to the OYSADA-PMU and AKINYELE Site Engineer on ESMP compliance and non-compliance issues

FMEnv Representatives

- Discuss ESMP improvements with AKINYELE Committee on Community Development OYSADA-PMU to address non-compliance and upcoming issues.

Monitor the implementation of ESMP requirements (impact mitigation monitoring) relevant to work being undertaken

Ministry of Women Affairs and Social Development and GBV/SEA service provider

- Monitor the implementation of Gender mitigation measures relevant to work being undertaken
- Discuss ESMP improvements with the Gender/GBV officer, AKINYELE Committee on Community Development, and OYSADA-PMU to address non-compliance and upcoming issues.

OYSADA- PMU

- Appoint a O&M Contractor
- Supervise the activities of the O&M Contractor by reviewing reports on ESMP issues
- Discuss ESMP improvements with AKINYELE Committee on Community Development to address non-compliance and upcoming issues

AKINYELE Site Engineer

- Supervise the activities of the O&M Contractor and ensure compliance with ESMP mitigation measures
- Report to AKINYELE Director of Physical Planning on ESMP compliance and non-compliance issues

OYSEPA Representatives

- Monitor the implementation of ESMP requirements (impact-mitigation monitoring) relevant to work being undertaken
- Discuss ESMP improvements with AKINYELE committee and OYSADA-PMU to address non-compliance and upcoming issues

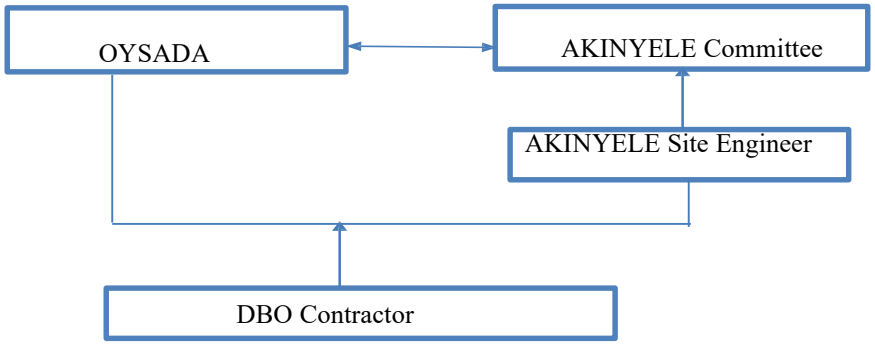


Figure 7.1: Roles and Responsibilities for the Pre-Construction & Construction Phase

7.4.8 Operational Phase

AKINYELE Committee of Community Development

- Supervise the activities of the Site Engineer by reviewing reports on ESMP issues
- Suggest ESMP improvements to O&M Contractor and PMU to address non-compliance and upcoming issues

O&M Contractor

- Implement ESMP requirements relevant to work being undertaken
- Hire a Gender/GBV officer
- Report to the OYSADA-PMU and AKINYELE Site Engineer on ESMP compliance and non-compliance issues

FMEnv Representatives

- Monitor the implementation of ESMP requirements (environmental compliance monitoring) relevant to work being undertaken
- Discuss ESMP improvements with O&M Contractor, AKINYELE Committee on Community Development and OYSADA-PMU to address non-compliance and upcoming issue

NESREA Representatives

- Monitor the implementation of ESMP requirements (environmental compliance monitoring) relevant to work being undertaken
- Discuss ESMP improvements with AKINYELE Director of Physical Planning and OYSADA-PMU to address non-compliance and upcoming issues.

Ministry of Women Affairs and Social Development and GBV/SEA service provider

- Monitor the implementation of Gender mitigation measures relevant to work being undertaken
- Discuss ESMP improvements with the Gender/GBV officer AKINYELE Committee on Community Development, and OYSADA-PMU to address non-compliance and upcoming issues

OYSEPA Representatives

- Monitor the implementation of ESMP requirements (environmental compliance monitoring) relevant to work being undertaken
- Discuss ESMP improvements with AKINYELE Director of Physical Planning and OYSADA-PMU to address non-compliance and upcoming issues.

7.5 ESMP Costing and Responsibility Framework[1]

The Environmental and Social Management Plan (ESMP) has been designed with a clear distinction between mitigation measures and monitoring activities, ensuring transparency in budgeting and accountability.

Mitigation costs are embedded within contractor Bills of Quantities (BoQs) and technical specifications, forming part of contractual obligations. In contrast, monitoring, auditing, and

[1] See Table 7.5, Annex 1

capacity-building costs are presented as separate budget lines to ensure independent verification and oversight.

The total ESMP budget is estimated at ₦108,000,000 Million, representing approximately 0.2% of the total project cost. This demonstrates a strong commitment to environmental and social sustainability.

Key cost components include:

- Environmental and social monitoring
- Capacity building
- Grievance Redress Mechanism
- Environmental audit
- Contingency

Responsibilities for ESMP implementation are clearly defined:

- Project Implementation Unit (PIU): Overall coordination, reporting, GRM oversight
- Contractors: Implementation of mitigation measures
- Supervision Consultants: Compliance monitoring and reporting
- Independent Auditors: Periodic environmental and social audits

This structure ensures clear accountability and effective implementation across all project phases

Institutional Arrangements in Line with AfDB Requirements

1. Role of the PIU (Project Implementation Unit)

The PIU functions as the primary safeguard coordination body and is responsible for:

- Ensuring compliance with AfDB ISS and national EIA regulations
- Supervising Contractor ESMP (C-ESMP) implementation
- Managing safeguard reporting to AfDB (quarterly/biannual as required)
- Overseeing GRM operations
- Coordinating independent environmental audits

The PIU will include designated Environmental and Social Safeguards Specialists in accordance with AfDB requirements.

2. Contractor Obligations (AfDB-Compliant)

Safeguard mitigation measures are fully integrated into the Contractor's contract through:

- Mandatory preparation and Bank approval of a Contractor's ESMP (C-ESMP**)** prior to mobilization
- Inclusion of E and S Key Performance Indicators (KPIs)
- Payment certification tied to verified safeguard compliance
- Enforcement of Occupational Health and Safety (OHS) standards consistent with OS2
- Penalty and corrective action mechanisms for non-compliance

No payment certificates will be approved without verified E and S compliance clearance from the Supervision Consultant and PIU.

3. Supervision Consultant Responsibilities

The Supervision Consultant ensures third-party compliance verification through:

- Routine site inspections
- Validation of environmental monitoring data
- Verification of OHS implementation
- Review of community engagement records
- Submission of safeguard monitoring reports to the PIU and AfDB
- Environmental and social compliance certification forms part of interim payment approvals.

4. Independent Environmental Audit
Consistent with AfDB ISS requirements:

- Periodic independent E&S audits will be conducted.
- Audit findings will be disclosed as required by AfDB disclosure policies.
- Corrective Action Plans (CAPs) will be prepared where necessary.

Financial Sustainability and Risk Assurance
The allocation demonstrates:

- Adequate financial provisioning for safeguard compliance
- Strong alignment with AfDB Integrated Safeguards System
- Reduced environmental, social, and reputational risk
- Institutional clarity and enforceability
- Long-term sustainability beyond construction

This structured financial integration ensures that environmental and social safeguards are fully mainstreamed into project governance, procurement, and financial management systems in accordance with AfDB standards.

Institutional Capacity and Strengthening

An assessment of institutional capacity indicates that the Project Implementation Unit (PIU), Oyo State Agribusiness Development Agency (OYSADA), and other implementing entities possess foundational experience in project coordination and stakeholder engagement.
However, gaps exist in:

- Advanced environmental monitoring and data analysis
- Occupational Health and Safety (OHS) management
- Safeguard reporting aligned with AfDB requirements
- Digital data management and reporting systems

To address these gaps, a structured capacity-building programme has been developed. The programme includes:

- Training on environmental monitoring techniques
- OHS risk assessment and management
- Stakeholder engagement and GRM implementation
- ESMP reporting and compliance tracking

This will enhance institutional readiness and ensure effective ESIA implementation.

Monitoring and Audit Framework

A comprehensive monitoring and audit system has been developed to track ESMP implementation and ensure compliance with applicable standards.
Monitoring will cover:

- Air quality, water quality, soil conditions, and noise levels
- Occupational health and safety performance
- Social indicators, including grievances and stakeholder satisfaction

Monitoring frequency ranges from monthly to quarterly, depending on the parameter.
The audit framework includes:

- Quarterly internal audits by the PIU
- Annual independent environmental and social audits
- Corrective action tracking and verification

This ensures continuous improvement and accountability throughout the project lifecycle

TABLE 7.1: ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN

Activities	Potential Impact	Mitigation Measures	Responsibility for Mitigation	Mitigation Cost (NGN)	Parameters to be measured	Method of measurement	Performance indicator	Sampling Location	Monitoring Frequency	Institutional Responsibility (Monitoring)	Costs (NGN)
PRE-CONSTRUCTION PHASE											
A. Environmental Impacts											
Mobilization of Personnel, Materials and Equipment to project site.	Deterioration of air Quality as a result of increase in amounts of fugitive dust, exhaust fumes and GHGs from movement of materials, heavy-duty vehicles and equipment into project areas.	Contractor shall ensure the sprinkling of water via spraying devices to limit dust at stipulated intervals. Materials such as sand, gravel etc. must be covered with tarpaulin during transportation. Train drivers/ workers on proper operation of vehicles & equipment to include fuel efficiency and anti- idling techniques Equipment and vehicles are to	Contractor	500,000.00	Fugitive dust and Air quality parameters (CO, NO2, SO2, CO2, SPM) Driver's training records Maintenance records	In-situ Measurement Visual Observation of records	FMEnv. permissible Limit Minimal dust within sites and environs	Within the Site	Daily	Supervising Consultant (SC) Contractor's Environmental Safeguard Specialist OYO- SPIU Environmental Safeguard Officer (SPIU-ESO)	Supervision Consultant costs are part of operational costs in the contract. Contractor costs are part of operational costs in the contract 150,000.00 (Monitoring activities during pre-construction phase. Part of routine SPIU monitoring)

Activities	Potential Impact	Mitigation Measures	Responsibility for Mitigation	Mitigation Cost (NGN)	Parameters to be measured	Method of measurement	Performance indicator	Sampling Location	Monitoring Frequency	Institutional Responsibility (Monitoring)	Costs (NGN)
		be serviced before mobilizing to site.									
	Loss of Flora and Fauna as a result of Land clearing activities for campsite areas, materials and equipment stacking areas leading to loss of vegetation cover and increase soil erosion.	Selective removal of vegetation to the area of need only. Undertake quick re-vegetation of exposed soils with indigenous plant species. Protect all vegetation not required to be removed against damage; Sensitization of workers on the need to conserve the flora and fauna. .	Contractor	250,000.00	Vegetation cover Number of workers aware and sensitized on the need to conserve the flora and fauna Number or percentage of terrestrial flora and fauna unaffected by the sub projects	Visual observation of Vegetation Quadrant count ratio to estimate the number of flora & fauna species	Minimal vegetation clearing Site clearing Inspection records	Within the site green areas.	At the commencement of the project works and decommissioning	Supervising Consultant (SC) Contractor's Environmental Safeguard Specialist Oyo-SPIU Environmental Safeguard Officer (SPIU-ESO)	
	Vegetal waste from clearance can	Implement site-specific waste management plan in	Contractor	200,000.00	Presence / amount of vegetal waste on-site	Site inspection	Compliance with the site waste	project sites	Monthly	Oyo State Environmenta	

Activities	Potential Impact	Mitigation Measures	Responsibility for Mitigation	Mitigation Cost (NGN)	Parameters to be measured	Method of measurement	Performance indicator	Sampling Location	Monitoring Frequency	Institutional Responsibility (Monitoring)	Costs (NGN)
	deface the environment	Appendix in conjunction with Oyo State Environmental Protection Agency for effective waste management and safe handling/disposal of waste.					management plan Good house keeping			l Protection Agency SPIU-ESO. Project Engineer	
	Distortion of soil due to movement of vehicles to site and mounting of building materials	Designate an area for parking and materials stacking	Contractor		Area of demarcated for vehicles and equipment limit/parking zone	Soil moisture Visual observation .	Satisfactory Soil Compaction test	Project camp sites and equipment packing zones	At the commencement of the project works and then Monthly	SC & SPIU-ESO	250,000.00
	Processing equipment installations Equipment Leakages and chemical substances into soil.	Install impermeable surface at the limit zone to contain potential leakages of chemicals from processing equipment	Contractor	190,000.00	Installed impermeable platform at limit zone. Level of pollution at vehicles and equipment limit/parking zone		Absence of spillages Satisfactory Soil quality test	Project camp sites and equipment packing zones	Monthly	SC & SPIU-ESO	
	Construction material vehicle. Noise level above permissible	Ensure transportation scheduling for construction materials,	Contractor	NA	Noise Level and number of complaints in project area /	In-situ measurement of noise level	Noise level test (Not to exceed 60dB(A) for 8 hours working period	Project host communities and environs	Weekly	SPIU-ESO	50,000.00 (Part of routine SPIU monitoring)

Activities	Potential Impact	Mitigation Measures	Responsibility for Mitigation	Mitigation Cost (NGN)	Parameters to be measured	Method of measurement	Performance indicator	Sampling Location	Monitoring Frequency	Institutional Responsibility (Monitoring)	Costs (NGN)
	noise level, (60dB and 50dB for day and night respectively) [2]during movement can disturb the community	equipment and vehicle. off peak hours/ weekends when it will cause least disturbance. Retrofit machines with sound proofing devices.			host communities						
	Accidents and injuries from the use of scaffolds, over-tank installations and carpentry works	The contractor shall ensure the provision of (Personal Protective equipment) PPE to workers; Worker Education Incident/accident reporting; Ensure provision of First Aid onsite Ensure that staging areas for contractor	Contractor	700,000.00	Contractors Compliance.	Routine inspection	Use of PPEs by Workers Training Records	Construction site	Daily	SC & SPIU-ESO	250,000.00

[2] The National Environment (Noise Standards and Control) Regulations, 2009 S.I No. 35. Maximum permissible noise levels for construction site as 60dB (A) and 50dB(A) for day and night respectively for Hospitals, schools, institutions of higher learning, homes for the disabled, etc. and maximum permissible noise levels for construction site as 75dB (A) and 65dB(A) for day and night respectively for Buildings other than those mentioned previously. Maximum Permissible Noise Levels for Accelerating Vehicles as stated in Table VIII

Activities	Potential Impact	Mitigation Measures	Responsibility for Mitigation	Mitigation Cost (NGN)	Parameters to be measured	Method of measurement	Performance indicator	Sampling Location	Monitoring Frequency	Institutional Responsibility (Monitoring)	Costs (NGN)
		equipment are adequately demarcated and cordoned off with reflective tapes and barriers									
	Vehicle accidents or pedestrians during mobilization of materials and equipment to the site.	Training of drivers on safe driving practices Install safety signage Enforce speed limits. (see Appendix 12)	Contractor	250,000.00	Community Affairs Safety Health, Environment & Security Plan (CASHES) Accident Report	Site Inspection Consultations	Training Report Accident/ Incident Report	Within the sites and environs	Every week	SC & SPIU-ESO/ SSO Traffic Control Team FRSC	(Part of routine SPIU monitoring)
	Management of laterite excavation sites	Limit the need to dig excessive Laterite from the excavation sites Ensure not to exceed approved max. depth of burrowing	Contractor	N/A	Contractors' Compliance	Inspections	Number of Laterite excavation sites incidents.	Borrow pit locations	Monthly	SC SPIU-ESO	(Part of routine SPIU monitoring)
Sub-Total				**2,090,000.00**							**700,000.00**
B. Social Impacts											

Activities	Potential Impact	Mitigation Measures	Responsibility for Mitigation	Mitigation Cost (NGN)	Parameters to be measured	Method of measurement	Performance indicator	Sampling Location	Monitoring Frequency	Institutional Responsibility (Monitoring)	Costs (NGN)
Mobilization of Personnel, Materials and Equipment to project site.	Traffic congestion along road as a result of mobilization of personnel, materials, heavy duty vehicles and equipment or breakdown of heavy-duty vehicles and equipment	Movement of equipment and machinery should be limited during non-peak period and non-market days. Prepare & implement a Traffic Management Plan (TMP) Equipment and vehicles are to be serviced before mobilizing to site	SPIU-SSO; SPIU Contractor Contractor	400,000.00	No of complaints received within the project area Traffic congestion	GRM Site visits and observation	GRM report and TMP report Traffic signs	Within the site Routes through community to the sites	Before commencement of civil works During mobilization	SPIU Social Safeguard Officer (SPIU-SSO) FRSC	(Part of routine SPIU monitoring)
	Obstructions to nearby residential areas, through noise and movement	Mobilization of equipment at weekends. Laterite excavation sites should not be located near residential areas.	Contractor	NA	Number and frequency of complaints in project area	In-situ measurement of noise level	Noise level test (Not to exceed 60dB(A) for 8 hours working period	Residential areas, around the project corridors	Weekly	SPIU-SSO, and SC	350,000.00

Activities	Potential Impact	Mitigation Measures	Responsibility for Mitigation	Mitigation Cost (NGN)	Parameters to be measured	Method of measurement	Performance indicator	Sampling Location	Monitoring Frequency	Institutional Responsibility (Monitoring)	Costs (NGN)
	Labor Influx which could lead to Increase in sexual activities and spread of STDs/STIs	Awareness campaign on sexual transmitted diseases, and implementation of labor influx plan	Contractor, SPIU-SSS, SPIU Communications Officer	350,000.00	Level of Awareness and Education	Rapid health survey/ Primary Healthcare centres' report	Level of awareness and knowledge of preventive measures. % of reported STI/ STD cases among workforce	Nearby communities Health care facilities	During pre-construction	SPIU-SSO SC, ESO, GBVO	250,000.00
	Potential risk of harassment, Sexual Exploitation and Abuse (SEA)/ Gender Based Violence (GBV), including verbal insults, physical abuse, rape, and women and child trafficking.	Sourcing of local workforce All contractors' workers to sign and strictly comply with Code of Conduct (CoC) and be sensitized on zero tolerance for sexual integration with students/ community Community leaders/ women group/youth group to sensitize the community on appropriate conduct with contractors	Supervision Consultant GBV Specialist Contractor Management, Resident engineers		Stakeholders concerns on risk of GBV	Consultations Third Party Monitor Report	Signed CoCs with the SPIU Conduct of sensitization campaigns and trainings Action plan for implementation of GBV activities internal "Reporting and Response Protocol"	Project host communities	During Pre-Construction/ Continuous	Project Coordinator SPIU-SSO, GBV Officer, ESO Supervising Consultant GBV Specialist GBV Focal Person at the project level Project Third Party monitor	120,000.00

Activities	Potential Impact	Mitigation Measures	Responsibility for Mitigation	Mitigation Cost (NGN)	Parameters to be measured	Method of measurement	Performance indicator	Sampling Location	Monitoring Frequency	Institutional Responsibility (Monitoring)	Costs (NGN)
		Engagement of intermediary service provider Provide Referral centers for survivors of GBV/SEA									
	Child labour	No employment of children either directly or indirectly on the project. Communication on hiring criteria, minimum age. Enforcement of legislation prohibiting child labour	Contractor Supervision Consultant Social Specialist SPIU-SSS	150,000.00	Visual observation of child labour	Routine inspection	No. of cases observed & recorded	Project site	Daily	SPIU-ESO & SSO, Project Engineer (Supervision Consultant), FPMU SSO	(Part of routine monitoring costs)
	Vulnerable groups (women, aged people, people living with disability) as identified will be at more disadvantage to social risks and	Implement SEA/SH/GBV prevention measures. Provide access slabs where required and should be considered in	Contractor Supervision Consultant Social Specialist	NA	Stakeholder/ vulnerable group Concerns	No of complaints via survey, GRM channels	Level of satisfaction of vulnerable groups	Project site and host communities	Daily	SPIU-ESO & SSO, GBVO Project Engineer SPC	Part of routine monitoring costs

Activities	Potential Impact	Mitigation Measures	Responsibility for Mitigation	Mitigation Cost (NGN)	Parameters to be measured	Method of measurement	Performance indicator	Sampling Location	Monitoring Frequency	Institutional Responsibility (Monitoring)	Costs (NGN)
	disturbance to their movement	the project designs. Also, consult with these groups regularly to address any concerns relating to the project and educate them on the GRM channels	GRC								
	Physical and Economic displacement including temporary restriction within the perimeter of the site asides construction workers, suppliers. Compensation for Economic trees on the Land	Implement standalone RAP prepared for the project. Ensure all issues relating to compensation are handled in a transparent, equitable manner	SPIU-SSO; SPIU	Refer to the RAP for all compensation and livelihood assistance costs	Implementation of the compensation and livelihood assistance	Number of PAPs compensated or provided with livelihood assistance	Level of satisfaction of the PAPs	Project area of influence	Before implementation of civil works	FPMU-SSO, SPIU-SSO	Provided in the RAP report
		Ensure grievances over loss of sources of livelihood are handled in a transparent, equitable manner	Grievance Redress Committee (GRC)	NA	No of complaints received	Review Grievance redress Log	No of cases resolved by the GRC	Project area of influence	Continuous	GRC SPIU-SSO	250,000.00
	Additional Population may introduce menace to the	Recommended that the contractor hire semi to	Contractor	Part of staff costs	Recruitment Process	Observation and Interview/ Records	Compliance with Mitigation	Camp Office Project Site	Monthly	SPIU-SSO	150,000.00

Activities	Potential Impact	Mitigation Measures	Responsibility for Mitigation	Mitigation Cost (NGN)	Parameters to be measured	Method of measurement	Performance indicator	Sampling Location	Monitoring Frequency	Institutional Responsibility (Monitoring)	Costs (NGN)
	community pressure on local resources.	unskilled labour locally. Contractor to provide amenities for workers	Supervising Consultant		No. of locals hired.					FPMU-SSO	
	Influx of workers could increase the risks of flus', common cold, tuberculosis, whooping cough, etc. and other infectious diseases in the proposed project area	Workers to adhere to airborne diseases prevention protocols (nose masks, frequent handwashing and regular health checks). See Appendix 12	Contractor	150,000.00	Increase in airborne diseases cases/ Outbreak	Health survey reports	Absence of airborne diseases outbreak related to project workers	Primary Health Care Centre Project Site	Weekly	SPC SC SPIU-SSO ESO GBV Health care workers	100,000.00
All project activities	Security Risks	The SPIU to liaise with the Oyo state Government and security forces to ensure adequate provision of security. Ensure compliance with the SPIU security focal person's security clearance	Contractor Security Supervising Consultant Security Oyo State Government SPIU (site monitoring)	Part of contract costs for contractor and SC State Budget See monitoring costs	Availability of security personnel No of Incidents	Visual Observation Security Incident Report	Absence of security incidents associated with project workers and contractors	Project Site	Daily	SPC SPIU-SSO ESO GBV Nigeria Police Force (NPF), NSCDS and Community Vigilante Group	1,500,000.00 (Supplementary budget for SPIU monitoring visits security cost throughout the project implementation in addition to the state security arrangements)

Activities	Potential Impact	Mitigation Measures	Responsibility for Mitigation	Mitigation Cost (NGN)	Parameters to be measured	Method of measurement	Performance indicator	Sampling Location	Monitoring Frequency	Institutional Responsibility (Monitoring)	Costs (NGN)
Sub Total				**1,050,000.00**							**2,720,000.00**
Total (Pre-construction Phase)				**3,140,000.00**							**3,420,000.00**

Activity	Potential Impact	Mitigation Measures	Responsibility for Mitigation	Mitigation Cost (NGN)	Parameters to be measured	Method of measurement	Performance indicator	Sampling Location	Monitoring Frequency	Institutional Responsibility (Monitoring)	Costs (NGN)
CONSTRUCTION PHASE											
Environmental Impacts											
Operation & movement of equipment , Waste management of debris and construction waste, Installation of borehole,	Air Quality concerns. Fugitive dust Release of exhaust fumes, hazardous gases (NOx, CO, SOx, SPM,), Oxides from machinery	Fuel switching from high- to low-carbon content fuels (where available) can be a relatively cost-effective means to mitigate GHG emissions during this phase. Use of Energy efficiency-Machines	Contractor	750,000.00	Fugitive dust Gaseous pollutants: SO2, NO2, CO2, CO, VOCs, H2S, TSP	Visual Observation In-situ Air Quality Measurement Vehicle emission testing (VET) and vehicle exhaust screening (VES Report	Minimal dust Permissible limit FMEnv air pollutants	On-site Project area	Monthly	SPIU-ESO Oyo State Ministry of Environment Supervision Consultant	300,000.00 (Part of routine monitoring cost)

Activity	Potential Impact	Mitigation Measures	Responsibility for Mitigation	Mitigation Cost (NGN)	Parameters to be measured	Method of measurement	Performance indicator	Sampling Location	Monitoring Frequency	Institutional Responsibility (Monitoring)	Costs (NGN)
parking lots, fencing and all the civil works.	GHG Emissions										
	Noise and vibration nuisance: noise level, (60dB) during construction activities can disturb communities	Adequate maintenance of equipment and machineries to reduce noise; Sound proof & Implement OHS Plan in Appendix 12 Use of adequate PPEs	Contractor	450,000.00	Number and frequency of complaints in project area	In-situ measurement of noise level	Noise level test (Not to exceed 60dB(A) for 8 hours working period	Host communities and projects sites	Weekly	Supervising Consultant SPIU-ESO & SSO	
	Surface soil excavation for foundation from Movement of heavy vehicles/Stationary vehicles and equipment	Creation of limit zones Rip compacted areas to reduce runoff and re-vegetate where necessary (every affected tree/shrub should be replaced by two (2)	Contractor	NA	Visible demarcation of vehicles and equipment limit zone	Visual observation Soil Compaction test	Visual observation Soil Compaction test	Project camp sites and equipment packing zones	Monthly	Supervising Consultant SPIU-ESO Project Engineer	Part of routine maintenance

Activity	Potential Impact	Mitigation Measures	Responsibility for Mitigation	Mitigation Cost (NGN)	Parameters to be measured	Method of measurement	Performance indicator	Sampling Location	Monitoring Frequency	Institutional Responsibility (Monitoring)	Costs (NGN)
	Pollution of soil and groundwater useful for the supply of portable water in the communities. Contamination by oil spills and lubricants.	Protection and avoidance of leak and chemicals for wood preservation for the roofing members The storage area should be far from all other water sources	Contractor	NA	Soil quality parameters (Especially hydrocarbon contaminants) Compliance with fuel storage procedures	In situ/ Laboratory Analysis Visual Observation	FMEnv. soil Pollutants Permissible limit	Project area	Twice during construction	SPIU-ESO	200,000.00
	Excessive vibrations from operations of construction trucks	Ensure construction trucks are well maintained to prevent excessive vibrations caused by worn-out or malfunctioning parts.	Contractor	Built into Contractor's cost	Presence of affected buildings	Visual inspection	Machinery fitted with acoustic shield	Project areas	Monthly	Supervising Consultant SPIU-ESO	60,000.00
Construction works for foundation laying and civil works, including damp	Presence of construction waste on-site which can pollute the environment	Implement site-specific waste management plan see Appendix 5 Liaise with Oyo state waste management authority for effective waste	Contractor	1,500,000.00	Presence/amount of construction waste on-site	Site inspection	Compliance with the site waste management plan	Project areas	Weekly	SPIU-ESO. Project Engineer	300,000.00

Activity	Potential Impact	Mitigation Measures	Responsibility for Mitigation	Mitigation Cost (NGN)	Parameters to be measured	Method of measurement	Performance indicator	Sampling Location	Monitoring Frequency	Institutional Responsibility (Monitoring)	Costs (NGN)
treatment		management and safe handling/disposal of waste.					Good house keeping				
	Silt from drainages can pollute and deface the environment	Limit clearing to required designed layout	Contractor		Vegetation cover within the area	Visual Observation	vegetation at the appropriate outside the coverage of project design	Project design areas	Monthly	Supervising Consultant SPIU-ESO	
Material sourcing and laterite excavation sites	Material sourcing from borrow-pits may trigger erosion	Limit the need to dig excessive Laterite excavation sites Drainages and storm water management structures should be included in the project design, and should be adequately managed. Created Laterite excavation sites should have appropriate signage and protection around them; Borrow pit management plan	Contractor	970,000.00	Contractors' Compliance Reclaimed Laterite excavation sites	Inspections	Number of Laterite excavation sites incidents.	Borrow pit locations	Monthly	SPIU-ESO Supervising Engineer	150,000.00

Activity	Potential Impact	Mitigation Measures	Responsibility for Mitigation	Mitigation Cost (NGN)	Parameters to be measured	Method of measurement	Performance indicator	Sampling Location	Monitoring Frequency	Institutional Responsibility (Monitoring)	Costs (NGN)
Campsite management	Pollution of the environment from open defecation by workers Waste generation and disposal	Contractor to provide gender friendly mobile toilets and on-camp sanitary facilities for workers Implement the detailed Waste Management Plan (WMP)	Contractor	1,500,000.00	Evidence of faecal waste within the project sites	Site inspection	Absence of faecal waste on-site	Camp sites and working zones	Weekly	Supervising Consultant SPIU-ESO	Part of Routine monitoring
Construction and final operational activities	Risk of occupational accidents (OHS), Injuries and diseases, life & fire safety Exposure to harmful chemicals	Implement project OHS Plan see Appendix 6. Provide additional PPEs and enforce usage of appropriate PPEs. Demarcate/cordon off construction areas and, lit up adequately at night. Develop and implement visitors' management protocol.	Contractor	1,200,000.00 (OHS Plan Implementation) 1,200,000.00 (PPEs) 450,000.00 (caution signs, tapes & barricades)	OHS Plan Developed Compliance with OHS Plan First aid box	Consultations/ visual observation Accident Report	Decrease in Lost Time Injuries (LTI) Zero incident /accident report Well stocked first aid box	Project area	Daily	Supervising Consultant SPIU-ESO	560,000.00

Activity	Potential Impact	Mitigation Measures	Responsibility for Mitigation	Mitigation Cost (NGN)	Parameters to be measured	Method of measurement	Performance indicator	Sampling Location	Monitoring Frequency	Institutional Responsibility (Monitoring)	Costs (NGN)
		Workers should get a daily induction/toolbox before going on the site Appropriate security measures Provide well-equipped first aid box Provide fire extinguisher at strategic locations Provide regular campsite fumigation		600,000.00 (first aid)							
Sub-Total:				**8,620,000.00**							**1,570,000.00**
Social Impacts											
Operation & movement of equipment	Temporary traffic build-up and delay in travel time along the	Prepare & Implement TMP (see framework see Appendix 8)	Contractor	40,000.00	No of complaints received within the project area	Site visits and observation	Traffic signs Contractors' compliance	Routes through community to the sites	Weekly	Supervising Consultant SPIU-SSO/ ESO	100,000.00

Activity	Potential Impact	Mitigation Measures	Responsibility for Mitigation	Mitigation Cost (NGN)	Parameters to be measured	Method of measurement	Performance indicator	Sampling Location	Monitoring Frequency	Institutional Responsibility (Monitoring)	Costs (NGN)
	proposed site	Movement of equipment and machinery should be limited during non-peak hours/days/period as identified such as non-market days	Traffic Control Team		Contractors Compliance		Presence of flagmen and Traffic Control Team			Traffic Control Team FRSC	
	Grievances and negative perception by community members	Conduct stakeholders' consultation with the host community/market management at every phase of the project	Contractor GRC	NA	No of complaints by community persons/market users	Consultations Review grievance log	Minimal number of reported cases	Host community/market	Quaterly	GRC members SPIU-SSO FPMU	100,000.00
	Increase in sexual activities leading to possible spread of STDs/STIs from influx of workers to project location	Continuous awareness and sensitization campaign on sexual diseases. .	Contractor SPIU Local Healthcare centre	300,000.00	Level of Awareness and Education Increase in number of new STI cases	Rapid health survey	Awareness and knowledge of preventive measures. STI/ STD Cases.	Nearby communities Health care facilities	During Construction/ Continuous	SPIU-SSO, ESO & GBV Officer Supervising Consultant,	100, 000.00
	Potential risk of Sexual Exploitation and	All contractors' workers to sign Code of Conduct (CoC) (See	SPIU GBV Specialist,	150,000.00 (contractor)	Stakeholders concerns on risk of GBV	Consultations	Signed CoCs with the SPIU	Market/Communities along the	During Construction / Continuous	SPIU-SSO, ESO & GBV Officer	100,000.00

Activity	Potential Impact	Mitigation Measures	Responsibility for Mitigation	Mitigation Cost (NGN)	Parameters to be measured	Method of measurement	Performance indicator	Sampling Location	Monitoring Frequency	Institutional Responsibility (Monitoring)	Costs (NGN)
	Abuse (SEA)/ Gender Based Violence (GBV) Influx of workers to project location	Appendix 9 for sample CoC). Mapping of Service providers and establishment of GBV-GRM	Contractor Supervision Consultant GBV Specialist GBV-GRC Focal person		GBV related grievances	GBV Prevention activities report	Conduct of sensitization campaigns Satisfactory GBV Prevention activities report	project corridors		FPMU-GBV Specialist GBV Officer	
	Conflicts between contractor and community members	Good work enforcement program. Grievance Redress Mechanism	Contractor GRC	150,000.00	No of complaints received	Consultation Review Grievance redress Log	No of cases handled by the GRC	Project area of influence	Continuous	GRC SPIU SSO	100,000.00
	Increase demand on existing community health and sanitation infrastructure due to influx of temporary workers	Provide basic amenities (water, sanitation, etc. to workers) See Appendix 4 General Environmental Conditions for Contract.	Contractor	Included in Contractor's cost	No of amenities in workers' camps	Visual observation	Availability of all essential amenities in workers' camps	Workers camp sites Host community	Monthly	SPIU-SSO SPIU ESO SPIU GBV Supervising Consultant	150,000.00

Activity	Potential Impact	Mitigation Measures	Responsibility for Mitigation	Mitigation Cost (NGN)	Parameters to be measured	Method of measurement	Performance indicator	Sampling Location	Monitoring Frequency	Institutional Responsibility (Monitoring)	Costs (NGN)
	Community and public health issues. (People within the project host communities may be exposed to vehicular or on-site accident)	Implement community health & safety plan: install caution signs, barricades, speed bumps, train drivers, avoid working at night and light up work areas.	Contractor	Same as in Env. Impacts	Accident /Incident Report	Reporting and feedback mechanism GRM	No of accidents reported	Project area of influence	Continuous	SPIU-ESO & SSO; Supervising Consultant	
	Child labour and school drop out	Ensure that children and minors are not employed directly or indirectly on the project.	Contractor, SPIU-SSS	NA	Visual observation	Routine inspection	No. of cases observed & recorded	Project site	Daily	SPIU-SSO Supervising Consultant	50,000.00
	Vulnerable groups as identified will be at more disadvantage to social risks and disturbance to their movement	Implement SEA/SH/GBV prevention measures. Provide access slabs where required and consult with these groups regularly to address any concerns relating to the project and	Contractor Supervision Consultant Social Specialist GRC	150,000.00	Stakeholder/ vulnerable group Concerns	No of complaints via survey, GRM channels	Level of satisfaction of vulnerable groups	Project corridor	Daily	SPIU-ESO & SSO, Project Engineer SPC	Part of routine monitoring costs

Activity	Potential Impact	Mitigation Measures	Responsibility for Mitigation	Mitigation Cost (NGN)	Parameters to be measured	Method of measurement	Performance indicator	Sampling Location	Monitoring Frequency	Institutional Responsibility (Monitoring)	Costs (NGN)
		educate them on the GRM channels									
	Influx of workers could increase the risks of airborne diseases thus causing ill-health and potential airborne diseases outbreak in the project area	Workers to adhere to airborne diseases (such as flus', common cold, tuberculosis, whooping cough etc.) prevention protocols including use of nose masks, frequent handwashing. Comply with all airborne diseases regulations	Contractor	150,000.00	Increase in COVID-19 cases/ Outbreak	Health survey reports	Absence of COVID-19 outbreak related to project workers	Workers' campsite Primary Health Care Centre Project Site	Weekly	SPC SC SPIU-SSO ESO, GBV Health care workers	100,000.00
Sub Total				**1,350,000.00**							**800,000.00**
Total (Construction Phase)				**9,750,000.00**							**2,370,000.00**
OPERATION PHASE											
Environmental Impacts											
Demobilization of equipment & construct	Potential remains of metal sheets, nails and	Cart away all remains and spoils through the relevant authorities	Contractor	150,000.00	Oil Spillages, Littered construction waste and spoilt	Site inspection	Good house keeping	Workers Camp site	Quarterly for one year	SPIU-ESO Project Engineer	100,000.00

Activity	Potential Impact	Mitigation Measures	Responsibility for Mitigation	Mitigation Cost (NGN)	Parameters to be measured	Method of measurement	Performance indicator	Sampling Location	Monitoring Frequency	Institutional Responsibility (Monitoring)	Costs (NGN)
ion materials	other construction materials and wastes such as off cuts and debris,	Clean out impacted areas			equipment / parts					Supervising Consultant	
	Improperly disposed wastes during a heavy rain, leading to drainage blockage. This may result in increased flood, erosion and groundwater contamination within the site.	Proper waste management system by introducing composting and prompt waste evacuation in order to reduce wastes coming out of the markets.	Contractor Oyo State Environmental Protection Agency	300,000.00	Adequate waste treatment in the markets	Visual observation	Implementation of proffered mitigation	Project site and community	Quarterly	SPIU-ESO Project Engineer	100,000.00
	Possibility of flooding, or erosion from post construction which may result	To follow proper design and best available practices to civil construction Strict adherence to terms of reference and specifications	Contractor Project Engineer	NA	Structural and performance integrity of hydraulic features	Structure integrity test	Efficient Durability of structures and hydraulic structures	Project Sites	Quarterly	SPIU-ESO,	100,000.00

Activity	Potential Impact	Mitigation Measures	Responsibility for Mitigation	Mitigation Cost (NGN)	Parameters to be measured	Method of measurement	Performance indicator	Sampling Location	Monitoring Frequency	Institutional Responsibility (Monitoring)	Costs (NGN)
	from poor designs, non-compliance to designs, sub-standard materials or poor maintenance	of engineering design Adequate and regular maintenance		100,000.00							
Sub-Total:				**550,000.00**							**300,000.00**
Social Impacts											
Demobilization of equipment & construction materials.	Rural communities will become more vulnerable to external influences as economic activities begins and improve	The communities shall constitute community vigilante groups, request for police posts for regular surveillance The design of local community alertness system shall be useful, to alert neighbours in case of invaders or criminals (see Appendix 14 for	Nigeria Police Force (NPF); NSCDC, Oyo State Vigilante groups, Community leaders	Part of budget of relevant agencies	Incidence of security breach	Routine interview	Absence of security threat	Communities within the project area	Quarterly for 2 years	NPF, NSCDC, Oyo State Vigilante, etc	Part of annual budget

Activity	Potential Impact	Mitigation Measures	Responsibility for Mitigation	Mitigation Cost (NGN)	Parameters to be measured	Method of measurement	Performance indicator	Sampling Location	Monitoring Frequency	Institutional Responsibility (Monitoring)	Costs (NGN)
		Security Risk Management Plan)									
	Discrimination against gender and vulnerable group for routine maintenance	Continues sensitization and awareness program and ensure that community level programs allow for gender inclusiveness	Community monitoring committee	400,000.00	Reports and awareness	Number of cases indicated	General compliance	communities	Quarterly	SPIU SSO/GBV/ESO	100,000.00
Sub Total				**400,000.00**							**100,000.00**
Total (Operation Phase)				**950,000**							**400,000.00**
Grand Total (Pre + Con. + Op.)				**13,840,000.00**							**7,760,000.00**

Implementation Budget and Financial Arrangements
Financial Commitment to Safeguards Implementation
In compliance with the AfDB Integrated Safeguards System (ISS 2023), the Project has allocated 9% of the total project cost (₦54 billion) to environmental and social safeguards implementation.
This allocation ensures full compliance with:

- OS1 – Assessment and Management of Environmental and Social Risk and Impact
- OS2 – Labour and Working Conditions
- OS3 – Resources Efficiency and Pollution Prevention and Mangement
- OS4 – Community Health, Safety and Security
- OS5 – Land Acquisition, Restrictions on Access to Land and Land Use, and Involuntary Resettlement
- OS6-Habitat and Biodiversity Conservation, and Sustainable Management of Living Natural Resources
- OS7- Vulnerable Groups
- OS8-Cultural Heritage
- OS10-Stateholder Engagement and Information Disclosure

The safeguard budget covers mitigation, monitoring, institutional strengthening, grievance redress, independent audits, and contingency provisions across pre-construction, construction, and operational phases.

Table 7.5: AfDB-ISS Compliant Environmental and Social Management Budget Summary

Component	% of Total Project Cost	Allocated Amount (₦)	AfDB Safeguard Linkage	Implementation Responsibility	Contractual Integration
Mitigation Measures	15%	16,200,000	OS1, OS3, OS4, OS5	Main Contractor	Embedded in BoQ and Technical Specifications; enforceable through E&S performance clauses
Implementation Cost	20%	21,600,000			
Environmental & Social Monitoring	10%	10,800,000	OS1 Compliance Monitoring	Supervision Consultant + PIU	Included in supervision contract; linked to certification and AfDB reporting
Capacity Building & Training	15%	16,200,000	Institutional Strengthening under	PIU + Contractor	Included in safeguard capacity plan and contractor obligations

			ISS		
Grievance Redress Mechanism (GRM)	20%	21,600,000	OS1 Stakeholder Engagement	PIU / Project Proponent	Operationalized under PIU; contractor supports community interface
Independent Environmental Audit & Reporting	12%	12,960,000	ISS Compliance Verification	Independent E&S Auditor	Separate oversight line item; periodic reporting to AfDB
Contingency for Safeguard Implementation	8%	8,640,000	Risk Management under ISS	Project Proponent	Reserved for unforeseen safeguard risks
Total ESMP Allocation		**108,000,000**	—	—	—

CHAPTER EIGHT

8.

Decommissioning and Remediation Plan

8.1 Introduction

This chapter discusses the activities associated with the decommissioning of the proposed Project, including the potential impacts associated with the decommissioning activities as well as the environmental and social measures to address the issues. In addition, an overview of the decommissioning plan for the Project at the end of its operating life is provided.

8.2 Decommissioning Activities

Decommissioning refers to the process of removing and managing all the operating assets of a project after completion of its operating life cycle. This process includes the dismantling and removal of equipment and structures; the removal of surface installations; and re-vegetation to restore the Project site to its original status as much as possible.

The proposed farm and processing plant is a pilot project for a period of five (5) years. At the end of the 5 years, the plant facilities may be decommissioned or further upgraded.

8.3 Management of Decommissioning Activities

In the event of decommissioning, the Oyo State Government shall ensure that the decommissioned site is left in a safe and environmentally acceptable condition. A standard decommissioning, abandonment, and closure programme shall be invoked. The tasks will include:

- Evacuation of the dismantled farming and milling equipment and associated facilities.
- Restoration of the Project site to baseline conditions (as much as practicable) in line with legislative and regulatory requirements.
- Assessing the residual impact, if any, the Project has on the environment.
- Monitoring the Project environment as necessary.

Oyo State Government will only commence decommissioning activities after due consultation with the relevant stakeholders, including the regulatory authorities. The decommissioning activities shall be carried out in line with the relevant provisions of the National Guidelines for Decommissioning of Facilities in Nigeria (2017) issued by the FMEnv.

Typically, the following actions shall be undertaken for the decommissioning:

Au updated decommissioning plan shall be developed taking into account the most cost-effective and best practicable methods, legal requirements and industry practices at that time. The decommissioning plan shall be submitted to the FMEnv., the Oyo State Ministry of Environment, the Oyo State Environmental Protection Agency, the Akinyele Local Government Authority and other relevant government institutions for approval, prior to

scheduled abandonment and decommissioning. The plan shall include, but not limited to the following:

- Description of the site and components to be decommissioned.
- Description of the decommissioning scope, objectives, end state and strategy.
- Activities to be performed during the decommissioning.
- Schedule of decommissioning activities.
- Estimate of the decommissioning cost.
- Estimated inventory of waste streams to be generated during the decommissioning and handling techniques.
- Decommissioning team (qualifications, roles, and responsibilities)
- To ensure that due consideration is given to all options, a detailed evaluation of facilities decommissioning options shall be carried out. The options will include facility mothballing, partial facility decommissioning, or complete site decommissioning. The evaluation will consider environmental issues alongside technical, safety, and cost implications to establish the best practicable environmentally friendly options for the Project's decommissioning.
- A risk assessment shall be conducted to ensure that nothing which could be constituted as a hazard for other users of the site or for the environment in general will be left at the site. The Project site shall be left in a safe and environmentally acceptable condition.
- Hazard identification and analysis shall be conducted to determine special safety concerns to be addressed.
- An appropriate Health, Safety, and Environment (HSE) plan shall be implemented to ensure that the decommissioning activities are carried out in an environmentally sound manner and in conformity with relevant laws and regulations guiding such operations.
- Third-party notifications shall be carried out before any demolition and shall be conducted in a phased sequence.
- Consultation shall be made with Akinyele Local Government and Oyo State Government to determine whether any of the Project components could be useful if left in place. In such instances, the transfer of responsibility for maintaining the facility shall be considered and documented to avoid any conflicts between interested parties.
- Socioeconomic considerations of facility decommissioning shall be carried out. These will include assessment of potential effects associated with termination of employment (at the end of the operational phase) and measures to minimize the effects by:
- Ensuring that employees are fully informed about the decommissioning and how it will affect them before the project finally closes.
- Building community capacity to manage opportunities and impacts arising from the decommissioning and post-decommissioning phase of the Project.
- Providing training to build local skills tailored to project decommissioning and post-decommissioning activities (e.g., equipment dismantling, rehabilitation activities, monitoring, etc.).

- Providing training to transfer project-learned skills to alternative and secondary industries tailored to respond to the market economy.
- An effective waste management plan shall be developed for the decommissioning activities. The decommissioning options for redundant structures and equipment will include: the complete dismantling of structures and equipment, and the return of components to the equipment manufacturer for recycling. A detailed record of all suitable recycling materials shall be maintained.

8.4 Abandonment Plan

Before site abandonment, the Oyo State Government shall establish a standard procedure for incorporating the following practices:

- Identification of the components of the Project that will be abandoned and/or removed.
- The proposed methods for abandonment or re-use of the equipment/material are applicable.
- Processes put in place to mitigate potential environmental impacts associated with the abandonment process; and
- Appropriate site rehabilitation programs (including re-vegetation of the site with native plant species) to return the Project environment to its original status (as much as possible).

8.4 Site Remedial Measures

- Dismantling of all equipment and associated facilities.
- Removal of all concrete structures.
- Removal of the drip irrigation system.
- Removal of the processing plant equipment.
- Remediation of any impacted soil.
- Backfilling with clean soil/sand where required; and
- Re-vegetation of the site with native plant species.

The decommissioning, abandonment and/or closure programme shall generally be managed by a team of competent personnel, including HSE personnel of the Oyo State Government, and shall be witnessed by relevant regulatory authorities such as the FMEnv., the Oyo State Ministry of Environment, and the Oyo State Environmental Protection Agency. A close-out report shall be prepared and archived for future reference.

Table 8.1: Environmental and Social Management Measures for Decommissioning Phase

Potential Impact	Source of Impacts	Desired Outcome	Description of Mitigation Measures	Performance Indicator	Monitoring	Timiny Frequency	Responsi bility	Estimated Cost for implementation (in Naira)
Air Quality								
Decrease in air quality due to emissions from decommissioning activities.	Sources of impacts for air quality include demolition of buildings and associated facilities, and vehicular movement.	• Minimize emission impacts on sensitive receptors	Oyo State Government shall ensure that: ▪ Dust control measures, such as the use of water for dust suppression, are implemented. ▪ Regular cleaning of equipment is maintained to avoid excessive buildup of dirt and mud. ▪ Strict adherence to the health and safety policy is observed during the demolition activities. Journey management plan is developed and implemented	National Ambient Air Quality Standards	Dust mitigation programme as part of Site Closure and Restoration Plan Air quality parameters	Monthly during decommissioning	Oyo State Governm ent HSE Unit	
Noise and Vibration								
Increased ambient noise level	Source of impacts for noise include demolition of buildings and associated facilities; vehicle movement.	• Reduce noise exposure to sensitive receptor.	Oyo State Government shall ensure that: ■ Site demolition equipment are run and maintained under optimum fuel efficient conditions; • Noise impacts are reduced by enclosing and insulating noise emitting processes or equipment where possible. ■ Engines and other noise making equipment are in good working order and well maintained, and that all have original noise suppression equipment intact and in working order.	Noise at sensitive receptors not to exceed FMEnv and WHO limits	Noise monitoring at sensitive receptors during decommission, Measurements of noise levels will be conducted using an integrated sound meter	Monthly during decommissioning	Oyo State Government HSE Unit	
Soil Quality								
Decrease in soil quality due to potential contamination from spills; soil percolation and erosion	Demolition activities	Minimize impact on soil environment	Oyo State Government shall ensure that: • Excavation during decommissioning is minimized to reduce erosion. • Waste management plan is developed and implemented. • Steel frames and supporting structures and other materials are removed from site and appropriately recycled • All impacted soil area are re-vegetated with native plant species.	Site Closure and Restoration Plan	Visual inspection and photographic record	Daily during decommissioning	Oyo State Government HSE Unit	
Ground and Surface Water Quality								
Decrease in Groundwater and Surface water quality	Decommissioning activities	Minimize groundwater and surface water contamination	Oyo State Government shall ensure that: An approved decommissioning plan by the regulatory bodies prior to demolition activities is implemented. All products and tank bottoms are removed and disposed in line with the regulatory requirements	Nigerian Water Quality Standard for Drinking Water. World Health Organization	Ground and surface water sampling and laboratory analysis. The water monitoring parameters will	Monthly /Post decommissioning	Oyo State Government HSE Unit	

Potential Impact	Source of Impacts	Desired Outcome	Description of Mitigation Measures	Performance Indicator	Monitoring	Timiny Frequency	Responsi bility	Estimated Cost for implementation (in Naira)
			Training of relevant staff in safe storage and handling practices, and rapid spill response and clean up techniques is implemented.	(WHO) limits for potable water. FMEnv surface Water quality standards	include heavy metals and hydrocarbon among others.			
Employment and Economy								
Employment and Economy issues during decommissioning include: • loss of direct and contracted employment; • loss of indirect business opportunities; • decline in economic productivity and household income	Decommissioning activities	Minimize impacts on employment issues associated with loss of Employment following decommiss ioning of project	Oyo State Government shall ensure that: Small and Medium scale enterprises are facilitated and supported. • Training opportunities for local workforce is identified and facilitated. • Training is provided to local and regional workforce on career development and management of personal finances. • Training is provided to local and regional contractors on effective business management.	Nigerian Labour Act of2004	Employment and Procurement Policies	Prior to decommissioning	Oyo State Government	200,000
Workplace Health and Safety								
As with the Construction and Operation phases The potential Workplace health and safety impact will include: accidents, safety related to dismantling of equipment and structures, fire, noise nuisance, traffic related accident etc.	Decommissioning activities	Minimize any potential accidents that may occur during decommissioning particularIy with demolition and removal activities	Oyo State Government shall ensure that: Routine safety checks in line with standard safety procedures is carried out. Firefighting suppression system is provided and regular communication with local fire services is maintained. Demolition works are limited to the day time, wherever practical. Warning signs are provided at the site gates notifying people of the activity and timings. Health and Safety communication and training programme to prepare workers to recognize and respond to workplace hazards is provided. Daily toolbox talks prior to commencement of demolition activities is implemented and regular drills conducted involving the neighbors. Adequate personal protective equipment (PPE) are provided to workers. All employees shall be required to wear the appropriate PPE whilst performing their duties.	Nigerian H&S law (Nigerian Institute of Safety Professionals, Factories Act 2004),the adherence to Occupational Health and Safety Guideline, and incide nts record	Health & Safety Management Policy	Daily during decommissioning	Oyo State Government HSE Unit	

CHAPTER NINE

9.

CHAPTER NINE

STAKEHOLDER ENGAGEMENT AND GRIEVANCE REDRESS MECHANISM

This section describes the Stakeholder engagement activities as well as the grievance mechanism to be implemented for the proposed AIH at Akinyele Local Government, Oyo state under the Special Agroprocessing Zones Project.

9.1 Stakeholder Engagement

Stakeholder engagement is an ongoing process of sharing Project information, understanding stakeholder concerns, and building relationships based on collaboration. Stakeholder consultation is a key element of engagement and essential for effective Project delivery. Disclosure of information is equally as vital and must focus on informed consultation and participation with the local community and relevant stakeholders. If there are risks or adverse impacts from a Project, consultation must be inclusive and culturally appropriate and provide stakeholders with opportunities to express their views. In line with current guidance from the African Development Bank, consultation should ensure "*that appropriate project information on environmental and social risks and impacts is disclosed to stakeholders in a timely, understandable, accessible and appropriate manner and format*" In other words, effective consultation requires the prior disclosure of relevant and adequate Project information to enable stakeholders to understand the risks, impacts, and opportunities. The Project's consultation program was intended to ensure that stakeholder concerns are considered, addressed and incorporated in the development process, especially during the ESIA.

9.2 Legal and Administrative Framework Guiding Stakeholder Engagement

The stakeholder engagement was carried out to ensure compliance with both Nigerian legislative requirements, as well as international standards (as defined in the African Development Bank's Safeguard Policy – Operational Policy 4.01, Environmental Assessment). This section presents the relevant standards and legislation that relate directly to the public participation and stakeholder engagement requirements for the proposed Project.

9.2.1 Nigerian Legislative Requirements

1.2.1.1 EIA Act No. 86 of 1992 (as amended by the EIA Cap E12 LFN 2004)

The EIA Act is the primary Act governing the environmental and social assessment of developmental projects or activities in Nigeria. Section 2(2) of the Act requires that where the extent, nature or location of a proposed project or activity is such that it is likely to significantly affect the environment, an EIA must be undertaken in accordance with the provisions of the Act.

Section 55 of the EIA Act provides for the maintenance of a Public Registry to facilitate public access to records relating to environmental assessments. Public hearings to which interested members of the public are invited are a key part of the approval process for ESIA reports by the Federal Ministry of Environment (FMEnv). However, this project shall not be subject to a public hearing but rather an in-house review to be conducted by the FMEnv. This arrangement was adopted based on the abridged EIA process for the Special Agro-processing Zones Projects (SAPZ), which has been approved by the FMEnv.

9.2.2 International Requirements

African Development Bank requirements for Stakeholder Engagement and Information Disclosure. The project will endeavor to meet standards and requirements set out by the African Development Bank's Operational Safeguard policies as defined below:

- *African Development Bank OS1 - Environmental Assessment*

If there are risks or adverse impacts from the Project, engagement must be inclusive and culturally appropriate and provide stakeholders with opportunities to express their views. Engagement should ensure 'free, prior and

informed engagement of the affected communities (1). The African Development Bank Operational Safeguards (OS1 & OS 10) provide opportunity for stakeholder engagement and consultation in the process of assessing and manageing the environmental and social risks ands impacts. It requires at least one round of engagement early in the Environmental and Social Impact Assessment (ESIA) process, and again one on the final ESIA report before decision- making. In other words, effective engagement requires the prior disclosure of relevant and adequate project information to enable stakeholders to understand the risks, impacts, and opportunities.

9.3 Objectives of Stakeholder Engagement

The stakeholder engagement process was designed to conform to the Nigerian EIA Act and international standards. For this Project, the key objectives for stakeholder engagement are:

- Inform and educate stakeholders about the proposed Project;
- gather local knowledge to improve the understanding of the environmental and social context;
- better understand the locally-important issues;
- provide a means for stakeholders to have input into the Project planning process;
- take into account the views of stakeholders in the development of effective mitigation measures and management plans; and
- lay the foundation for future stakeholder engagement

9.3.1 Stakeholder Identification and Analysis

Stakeholders are persons or groups who are directly or indirectly affected by a project, as well as those who may have interests in a project and/or the ability to influence its outcome, either positively or negatively (IFC, 2007). Stakeholders may include locally affected communities or individuals and their formal and informal representatives, national or local government authorities, politicians, religious leaders, civil society organizations and groups with special interests, the academic community, or other businesses.

Proper stakeholder identification forms the basis on which the stakeholder engagement was conducted for the Project as well as the development of the stakeholder engagement plan. It is necessary to determine who the stakeholders of a project are and understand their priorities and objectives. In addition, it is also essential that stakeholders are classified based on their position, influence, capacity and interests in order to develop a functional Stakeholder Engagement Plan (SEP) that is tailored to meet the individual and group needs of the identified stakeholders.

The DBO Contractor shall develop and implement an effective SEP which shall be maintained throughout the lifecycle of the project. A sample format for the SEP is outlined in the Environmental and Social Management framework (ESMF) for SAPZ. A list of identified stakeholders for the Project is shown in Table 2.1. This consists of individuals, groups, and organizations that may be affected by or may influence project development positively or negatively. The list was developed using international guidance and considered the following groups: national and local governments; Local community leaders; community members including potentially vulnerable sub-groups such as women, youth and elderly; international, national and local environmental and social Non-Government Organizations (NGOs); Potential contractors and service suppliers; and local businesses/cooperatives and associations.

Table 9.1: Identified Stakeholders Associated with the Proposed Project

Stakeholder Group / Interest in the Proposed Project	Stakeholder Name	International	National	State	Local	Connection to the Proposed Project
Project Sponsor	African Development Bank	✓				Provides financial and technical support for project development and operation.
Regulatory Authorities	Federal Ministry of Environment (FMEnv)		✓			Responsible for overseeing the Environmental Impact Assessment (EIA) process and ensuring compliance with relevant environmental laws and regulations.
	National Environmental Standards and Regulations Enforcement Agency (NESREA)		✓			Responsible for monitoring the project during the operational phase and ensuring compliance with national environmental laws and regulations.
	Federal Ministry of Power, Works and Housing (Department of Renewable Energy)		✓			Coordinates renewable energy and energy efficiency initiatives in Nigeria.
	Nigerian Electricity Regulatory Commission (NERC)		✓			Responsible for granting operational licenses for solar power projects.
	Oyo State Environmental Protection Agency (OYSEPA)			✓		Responsible for waste management and enforcement of state

						environmental laws in Oyo state.
Social and Institutional Stakeholders	Federal Ministry of Women Affairs and Social Development		✓	✓		Promotes gender equality, women empowerment, and gender inclusion in development programmes.
	Federal Ministry of Youth and Sports Development		✓	✓		Responsible for youth development and inclusion in national development programmes and recOYSADAtional activities.
Local Government Authorities	Akinyele Local Governmen (LGA)				✓	Local government authority within which the project area is located.
Host Community	Atan and Ijaye Community				✓	Households, community members, and groups that may be directly or indirectly affected by the proposed project and its activities.
Community (Project Beneficiaries)	Atan and Ijaye community Management				✓	Direct beneficiaries of the project through improved energy access and infrastructure.

9.3.2 Stakeholder Register

The project shall maintain a stakeholder engagement register for recording stakeholder information such as contact details, dates of engagement with comments and follow up requirements. A sample stakeholder engagement register is provided in Table 9.2.

9.2: Sample Stakeholder Engagement Register

Stakeholder category (choose from the list)	Individual or group (choose from list)	Stakeholder name	Organization	Position in their organization	Location	Contact address	Contact phone	Contact email	Stakeholder interest	Stakeholder priority	Engagement objectives	Method of engagement	Date of engagement	Issues raised	Follow-up action

9.3.3. Stakeholder Engagement Process

OYSADA shall adopt a proactive approach towards building and maintaining mutually beneficial relationships with all relevant stakeholders, throughout its operations. The engagement program shall be implemented to comply with national and international standards. The stakeholder engagement will be free of manipulation, interference, coercion, and intimidation. It shall be conducted on the basis of timely, relevant, understandable and accessible information. Effective stakeholder engagement depends on mutual trust, respect and transparent communication between the Project and its stakeholders. It thereby improves OYSADA's decision-making and performance by:

- **Managing costs:** Effective engagement can help project OYSADA avoid costs, in terms of money and reputation;
- **Managing risk:** Engagement helps project OYSADA and communities to identify, prevent, and mitigate environmental and social impacts that can thOYSADAten project viability;
- **Enhancing reputation:** By publicly recognizing human rights and committing to environmental protection, OYSADA and financial institutions (African Development Bank) involved in financing the project can boost their credibility and minimise risks;
- **Avoiding conflict:** Understanding current and potential issues such as land rights and proposed project activities;
- **Improving corporate policy:** Obtaining perceptions about a project, which can act as a catalyst for changes and improvements in OYSADA corporate practices and policies;
- **Identifying, monitoring and reporting on impacts:** Understanding a project's impact on stakeholders, evaluating and reporting back on mechanisms to address these impacts; and

- **Managing stakeholder expectations:** Consultation also provides the opportunity for OYSADA to become aware of and manage stakeholder attitudes and expectations.

Table 9.3: Stakeholder Engagement Process

Stakeholder Engagement Activity	Approach
Stakeholder Identification and Analysis	An initial stakeholder identification and analysis has been conducted as part of this ESIA. OYSADA shall maintain a register of identified stakeholders and undertake periodic review on a need basis.
Information Disclosure	OYSADA shall ensure that information is provided to relevant stakeholders on an on-going basis over the course of the Project lifecycle. OYSADA shall maintain regular communication with its stakeholders throughout the project lifecycle.
Stakeholder	OYSADA shall consult with its various stakeholders on mutual concerns to fulfil its compliance obligations in line with industry best practice. OYSADA shall maintain records of its consultation with its various stakeholders.
Negotiation Partnership	OYSADA shall adopt a stakeholder management process that fosters the mutual interest of all parties and adds value to its operation.
Grievance Management	OYSADA shall provide appropriate channels for stakeholders to raise their concerns and grievances about its operations
Stakeholders Involvement	This entails procedures that allow the direct involvement of stakeholders in project related functions in order to foster
Reporting stakeholders	OYSADA shall establish reporting procedure that allows information disclosure to stakeholders about the environmental social and economic performance of its operations.
Management Functions	OYSADA shall build and maintain management capacity within the company to manage the process of stakeholder engagement, track commitments and report on progress.

9.3.4 Stakeholder Engagement Tool and Communication

OYSADA recognizes the need to tailor its stakeholder engagement approach and information disclosure to suit the needs of each of its stakeholder. OYSADA shall adopt a variety of communication and engagement methods to ensure continuous engagement, dialogue and feedback is established during its engagement activities. Table 9.4 presents various tools and methods to be adopted by OYSADA during its stakeholder engagement process.

Table 9.4: Stakeholder Engagement Tools and Communication

Medium	Most Appropriate Application
Stakeholder meetings	
One-on-one consultations	• OYSADA shall on a need basis hold consultation meeting with its individual • stakeholders. These meetings will be held to: • Solicit views and opinions; • Discuss freely and confidently about stakeholder concerns and provide feedback etc.; • Build personal relations with stakeholders.
Focus group discussions	OYSADA shall on a need basis hold focus group discussions (FGDs) to pull together a small group of people with the same interest into a single meeting to engage them on common issues. FGDs would have specific objective and be aligned with the expectations and interest of the stakeholders present.

Workshops	OYSADA shall on a need basis hold workshops with its various stakeholders. Workshops are ad-hoc outcomes-based meetings that seek to find solutions for specific issues facing the environment and social aspects. When conducting a workshop, OYSADA shall use participatory exercises to facilitate group discussions, brainstorm issues, analyze information, and develop recommendations strategies.
Forum	OYSADA shall on a need basis use forum to engage with various stakeholders. Participatory tools and methodologies such as workshops, town hall meetings, and FGDs will continue to be utilized, as they are more likely to increase stakeholder involvement in the process and elicit alternative responses, especially if there is controversy or complexity, or a need to build a consensus around possible solutions.
Written / visual/electronic communication	• Newsletter • Emails • Meetings • Executive Summary of the ESIA • Mass Media and Newspaper Print etc. • Survey

Table 9.5 presents a stakeholder analysis with respect to appropriate levels of consultation for each of the major stakeholder groups. OYSADA shall determine the frequency of these interactions.

Table 9.5: Stakeholder Group Consultation Methods

STAKEHOLDER GROUP	CONSULTATION METHOD
Government and Regulators	Email exchanges and letters One-on-one consultations Formal meetings Print media
Project beneficiaries Management, Physical Planning,	Formal meetings One-on-one consultations Print media Strategic collaboration Information Centre
Employees	Phone / email / text messaging/ WhatsApp Print media Workshops Focus group meetings Surveys Management/departmental meetings
NGO's	Phone / email One-on-one interviews Town hall meetings Focus group meetings Information Centre

9.3.5 Principles for Effective Stakeholder Engagement

Stakeholder engagement is usually informed by a set of principles defining core values underpinning interactions with stakeholders. Common principles based on International Best Practice include the following:

- **Commitment** is demonstrated when the need to understand, engage and identify the key stakeholders is recognized and acted upon;
- **Integrity** occurs when engagement is conducted in a manner that fosters mutual respect and trust
- **Respect** is created when the rights, values and interests of stakeholders and neighbors are recognized;
- **Transparency** is demonstrated when stakeholder concerns are responded to in a timely, open and effective manner;
- **Inclusiveness** is achieved when broad participation is encouraged and supported by appropriate participation opportunities; and
- **Trust** is achieved through open and meaningful dialogue that respects stakeholder's values and opinions.

9.4 Summary of Previous Stakeholder Engagement Activities

This section describes the initial Stakeholder engagement activities carried out during the ESIA. The initial consultations were carried out from March, 2021 with the following:

- Oyo state Environmental Protection Agency
- Federal Ministry of Women Affairs and Social Development
- Federal Ministry of Youth and Sports
- Federal Ministry of Environment
- Akinyele Committee on Community Development
- Akinyele Local Government AOYSADA
- Atan and Ijaye Community Leader
- Civil Society Organization.

The consultations served to provide stakeholders with information about the proposed Project and to gather information important to the ESIA. The objective was to identify any key concerns or high-level issues that the stakeholders had at this early stage.

Stakeholder Engagement Field Visitation Report: Ijaye Agro-Industrial Hub Project

Overview of Field Visitations

The engagement activities were conducted in multiple phases to ensure a comprehensive understanding of the project's socio-economic and environmental footprints.

- Initial Reconnaissance: March 10–14, 2021.
- Phase I Data Acquisition: April 16 – October 10, 2021.
- Phase II Verification & Scoping: October 8–13, 2025, and November 10, 2025.

Key Stakeholders Consulted

The visitation included a broad cross-section of institutional and community stakeholders:

- Institutional: Federal Ministry of Environment (Dr. Kemi Oteruku, Mr. Adefuke A.), State Ministry of Environment (Mrs. Azeez Opeoluwa), and OYSADA (Mr. Ajetunmobi).
- Community Leadership: Baale of Atan, Asoju Baale (Oludayo Olaifa), and Asipa Baale (Oloye Isa Lawal).

- Target Groups: Smallholder farmers (represented by Mr. Addo Davids), local palm oil processors (Mrs. Adijat Olasupo), and garri processing workers (Mrs. Deborah Folorunsho).

Summary of Engagement Activities & Findings

Activity Date	Engagement Type	Key Stakeholders	Primary Findings/Outcomes
March 2021	Reconnaissance	Consultants, OYSADA, Baale of Atan	Identified sampling points and established access routes for field teams.
Oct 2025	Scoping Session	FMEnv Officials, Atan Residents	Community inquired about specific project benefits and potential impacts on current livelihoods.
Oct/Nov 2025	Livelihood Assessment	Farmers, Artisans, Vulnerable Groups	High positive disposition but requested transparent grievance redress and local hiring priority.

Observed Field Evidence

During the visitation, specific social and physical infrastructures were documented to establish the baseline:

- Infrastructure: Documentation of abandoned boreholes, electric cables without transformers, and fallen poles in the project area.
- Socio-Economic Life: Observed local palm oil production and garri processing as dominant livelihoods within the project's area of influence.
- Photographic Records: Plates 4.19a–k and 4.21a–e document the interactive sessions between consultants, government officials, and community members.

Community Concerns & Redress Preferences

- Priority Concerns: Residents expressed concerns regarding noise, dust during construction, and the potential for displacement of existing farms.
- GRM Preference: Stakeholders identified the Village Head (Baale) and direct PIU communication as the preferred pathways for resolving grievances.
- Livelihood Support: Vulnerable groups (aged women and farm workers) emphasized the need for training and direct employment in the hub.

Conclusion of Visitation

The field visitations successfully secured community buy-in and provided the necessary data to design a Grievance Redress Mechanism (GRM) with an allocated budget of ₦10.8 million to address ongoing community concerns throughout the project lifecycle. See Annex for copy of attendance during the field visitation

CHAPTER TEN

10.

Conclusion and Recommendations

10.1 Conclusion

The EIA of the proposed AIH to be sited at Akinyele Local Government Area of Oyo State has been conducted in accordance with the EIA Act CAP E12 LFN 2004 as well as the requirements of the relevant international standards such as the International Finance Corporation (IFC) Performance Standards on Environmental and Social Sustainability.

The EIA study involved a number of key steps, including desktop review, scoping, stakeholder engagement, field data gathering, laboratory analysis of field samples, potential impact identification and evaluation, development of mitigation measures and environmental management plans, and reporting.

The essence of the EIA process is aimed at ensuring informed decision-making and environmental accountability, and to assist in achieving environmentally sound operation throughout the life cycle of the proposed Project.

Consistent with the regulatory standards, the assessment of the environmental status and the socioeconomic aspects of the proposed Project's area of influence have been carefully carried out using universally accepted methodology. Evaluation of associated and potential impacts of the Project identified both positive and negative interactions with the receiving biophysical and socioeconomic environment.

The positive impacts associated with the proposed Project include, amongst others:

- Increase in farm produce and supply.
- Direct and indirect employment opportunities.
- Acquisition of new skills through technology transfer.
- Increased standard of living in the Project area.
- Opportunity for local farmers in the Project area to generate additional profit by selling their produce for processing at the proposed plant.
- Revenue generation to Government through taxes.
- Provision of support to the Government's Agricultural policies such as the achievement of self-sufficiency and modernization of all aspects of Agriculture.

There are no human uses of the Project site that will be permanently displaced, and no relocation of community residents is required. There are not culturally significant sites or heritage resources within the Project site that would be negatively impacted.

The potential negative effects identified were mostly of negligible to moderate significance. The significance levels of the majority of identified negative impacts can generally be reduced by implementing the recommended mitigation measures.

Based on the nature and extent of the proposed Project and the findings of the EIA, it is believed that the potential negative impacts associated with the proposed Project can be mitigated to as low as practicable. Also, an Environmental Management Plan (EMP) has been established to assess the efficiency and effectiveness of the recommended mitigation measures and ensure long- term monitoring of the Project.

However, given the bulging population of the State (and future projections of Nigerian population explosion by 2040), and the current need for critical infrastructure to support new cities and settlements, a positive case for development of the zone needs to be advanced to reflect that the area is already being inhabited by locals and the development of the zone in a climate friendly way enables rural community to benefit from the climate smart agriculture that will ensure the green credentials of the new community being developed, while preserving as many of the trees as possible. If done as envisaged, this could provide a model for the development of new cities and settlements in a climate-sensitive and friendly manner.

The forest will be used in accordance with the "Do No Harm" environmental principles and accompanying pledges to nature-friendly Overseas Development Assistance (ODA). https://ukcop26.org/glasgow-leaders-declaration-on-forests-and-land-use/ 10% of the entire mapped area will be allotted for industrial construction. This is done to highlight the critical and interdependent roles of all types of forests, biodiversity, and sustainable land use in enabling the world to meet its sustainable development goals; to help achieve a balance between anthropogenic greenhouse gas emissions and removal by sinks; to adapt to climate change; and to maintain other ecosystem services.

With regards to mitigation measures such as resizing the proposed site, the entire could be reduced to 2000 hectares (from 3000 hectares), with less than 10% used for industrial/built-up areas with as minimal impact on the existing trees as possible.

A study will be commissioned to establish how the industrial/built-up areas can be developed with minimal impact on trees, and a tree planting exercise initiated (on a 2 for 1 basis) to mitigate any tree felled in the process of building the zone The crop production areas of the zone (90%) to be designated for climate smart agriculture.

10.2 Recommendations

The management of the Oyo State Government is committed to ensuring that the proposed Project is developed and operated in an environmentally sustainable manner, in compliance with National and International Standards, by properly managing the processes and activities that may bring about disturbances to the environment through the implementation of the recommended mitigation measures and the EMP. Continuous monitoring of the environmental and social performance of the Project shall also be maintained, including periodic consultation with the relevant stakeholders.

It is expected that part of the revenue generated from the project and investment should be allocated to the environmental management of the industrial hub, this should include reforestation and afforestation for climate change mitigation. The project could further leverage on its international outlook to harness grants, other funding and resources available for sustainable agricultural management and climate change adaptation and mitigation.

The business model should adopt a climate smart agriculture and sustainable agricultural management.

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Annex 1: Tables

Table 1.1: AfDB OS and their applicability to the Project

S/N	African Development Bank (OS)	Operational Safeguards	Cross-cutting Requirements	Rationale for Applicability	EIA Reference
1	OS1	Environmental and Social Assessment	Requires that the environmental and social risks and impacts of the Project are identified, evaluated, and managed through an appropriate environmental and social management system	The proposed Project has potential environmental and social impacts that need to be appropriately managed. These include air and noise emissions, loss of terrestrial flora and fauna, occupational health and safety, community health and safety, and socio-economic impacts. Therefore, OS1 is applicable.	Chapter 3 – Project Description Chapter 4 – Description of the Environment Chapter 5 – Potential and Associated Impacts Chapter 6 – Mitigation Measures Chapter 7 – Environmental and Social Management Plan (ESMP)
	OS2	Involuntary Resettlement, Land Acquisition, and Compensation	Requires the Project to avoid involuntary resettlement or minimize it through exploring project design alternatives, avoid forced eviction, and mitigate unavoidable adverse social and economic impacts from land acquisition or restrictions on land use.	The proposed Project site is a farm settlement owned by Oyo State Government. No involuntary resettlement is associated with the Project. Therefore, OS2 on physical and economic displacement is not applicable.	Chapter 3 – Project Description
	OS3	Biodiversity and Ecosystem Services	Requires the Project to protect and conserve biodiversity, habitats, and ecosystem services and to avoid or mitigate potential impacts in the design and implementation of projects.	The Project site is classified as a modified habitat. Baseline assessments of flora and fauna at the Project site and surroundings indicate that biodiversity conservation measures are necessary. Therefore, OS3 is applicable.	Chapter 4 – Description of the Environment Chapter 5 – Potential and Associated Impacts Chapter 6 – Mitigation Measures Chapter 7 – ESMP
	OS4	Pollution Prevention, Resource Efficiency, and Safety of Hazardous Materials	Requires the Project to promote sustainable use of resources (energy, water, raw materials), prevent and minimize pollution, and manage hazardous materials throughout the project lifecycle.	The Project will involve the use of diesel for power generation and chemicals such as herbicides for farm operations. Potential impacts on air, water, soil, and human health make OS4 applicable.	Chapter 3 – Project Description Chapter 5 – Potential and Associated Impacts Chapter 6 – Mitigation Measures Chapter 7 – ESMP
	OS5	Labour Conditions, Health, Safety, and Community Protection	Requires the Project to protect workers' rights, ensure safe and healthy working conditions, safeguard community health and safety, and manage social risks such as SEA/SH.	The Project will engage direct and indirect workers during construction and operation, and there are communities within 2 km of the site. Potential risks include occupational hazards, community health and safety impacts, and social risks. Therefore, OS5 is applicable.	Chapter 3 – Project Description Chapter 5 – Potential and Associated Impacts Chapter 6 – Mitigation Measures Chapter 7 – ESMP

S/N	African Development Bank (OS)	Operational Safeguards	Cross-cutting Requirements		Rationale for Applicability	EIA Reference
2	Stakeholder Engagement	Stakeholder engagement and GRM are embedded within the socioeconomic baseline, with no structured presentation.	Chapter 4	Present Stakeholder Engagement as a standalone section and clearly reference the project's standalone SEP.	I believe this has been addressed by the authors.	Stakeholder engagement from the inception was addressed as a standalone section in Section 4.9 in the document and socio-economic baseline.4.10. This section has already been addressed.
3	Sampling Methodology Consistency	Discrepancies exist between narrative descriptions of sampling points and tabulated results.	Chapter 4	Correct inconsistencies and clearly state sampling locations, numbers, and rationale.	The authors need to verify using original data.	The correction is contained in Table 4.1 below. The information has been updated. Air quality, soil composition, and surface water sampling were conducted at Location SP3.

Table 4.13: Floristic composition and habitat description.

Sample Transect	Remarks	Species Encountered	Common Name	Yoruba Name
SP1	Farmland used for the cultivation of cassava, maize, cucumber and banana	*Musa paradisiaca*	Plantain /Banana	Ogede
		Azadirachta indica	Neem Tree	Dongoyaro
		Mangifera indica	Mango	Mangoro
		Manihot esculenta	Cassava	Gbaguda
		Talinum triangularea	Waterleaf	Gbure
		Psidium guajava	Guava	Gúàfà
		Basella alba	Malabar Spinach	Amunututu
		Capsicum annum	Chilli Pepper	Atarodo / Ata
		Theobroma cacao	Cocoa	Koko
		Anacardium occidentale	Cashew	Kaju
		Chrysophyllum albidum	White Star Apple	Agbalumo
SP2	Farmland used for the cultivation of cassava, maize, cucumber and banana	*Zea mays*	Maize / Corn	Àgbàdo
		Carica papaya	Papaya	Ìbẹ̀pẹ
		Brassica oleracea	Cabbage	Kábàjì
		Manihot esculenta	Cassava	Gbaguda
		Terminalia catappa	Tropical Almond	Eemi
		Anacardium occidentale	Cashew	Kaju
		Elaeis guineensis	Oil Palm	Ọ̀pẹ̀
		Gmelina arborea	Gmelina / White Teak	Araba funfun
		Azadirachta indica	Neem Tree	Dongoyaro
		Musa paradisiaca	Plantain / Banana	Ogede
		Theobroma cacao	Cocoa	Koko
SP3	Swampy area and surface water	*Zea mays*	Maize / Corn	Àgbàdo
		Talinum triangularea	Waterleaf	Ewé Gbure
		Elaeis guineensis	Oil Palm	Ọ̀pẹ̀
		Azadirachta indica	Neem Tree	Dongoyaro
		Pennisetum purpureum	Elephant Grass	Eeran
		Oryza sativa	Rice	Iresi
SP4	Oil palm dominated farms and teak trees	*Manihot esculenta*	Cassava	Gbaguda
		Oli palm		
		Oryza sativa	Rice	Ìrẹ̀si
		Pennisetum purpureum	Elephant Grass	Eeran
		Tectona grandis	Teak trees	Kukumba
SP5		*Zea mays*	Maize / Corn	Àgbàdo
		Carica papaya	Papaya	Ìbẹ̀pẹ
		Brassica oleracea	Cabbage	Kábàjì
		Manihot esculenta	Cassava	Gbaguda
		Terminalia catappa	Tropical Almond	Eemi
		Cucumis sativus	Cucumber	Kukumba
		Elaeis guineensis	Oil Palm	Ọ̀pẹ̀
		Gmelina arborea	Gmelina / White Teak	Araba funfun

Sample Transect	Remarks	Species Encountered	Common Name	Yoruba Name
		Azadirachta indica	Neem Tree	Dongoyaro
		Musa paradisiaca	Plantain / Banana	Ogede
		Theobroma cacao	Cocoa	Koko
SP6	Farmland used for the cultivation of cassava, maize, cucumber, and banana	*Zea mays*	Maize / Corn	Àgbàdo
		Carica papaya	Papaya	Ìbẹ̀pẹ
		Brassica oleracea	Cabbage	Kábàjì
		Manihot esculenta	Cassava	Gbaguda
		Terminalia catappa	Tropical Almond	Eemi
		Chrysophyllum albidum	White Star Apple	Agbalumo
		Elaeis guineensis	Oil Palm	Ọ̀pẹ̀
		Gmelina arborea	Gmelina / White Teak	Araba funfun
		Azadirachta indica	Neem Tree	Dongoyaro
		Musa paradisiaca	Plantain / Banana	Ogede
		Theobroma cacao	Cocoa	Koko
		Colocasia esculenta	Cocoyam	Kooko
SP7	Housing, Health Centre, and Commercial activities	*Azadirachta indica*	Neem Tree	Dongoyaro
		Pennisetum purpureum	Elephant Grass	Eeran
		Terminalia catappa	Tropical Almond	Eemi
		Gmelina arborea	Gmelina / White Teak	Araba funfun

Table 4.25: Summary of stakeholder engagement activities in communities within the Project's Aol.

SN	Name	Gender	Phone No.	Activites
1	Baale Okunlekan Kayode	Male	09061682202	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
2	Hon. Ayanbola Murtala Oluode	Male	070625636327	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
3	Opeleiye maobiri Chief Asipa	Male	09154459000	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
4	Chief Ramon Akekunde, Osi Baale	Male	08064478069	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
5	Chief Lawal Yissan, Asipa	Male	091694235481	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
6	Abdul Ramon Aruluga, Imam	Male	09033377706	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
7	Phillip Olabiyi, Farmer	Male	07033914697	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
8	Hameed Rasheed, Omo Baale	Male	09066104896	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
9	Rasheed B. Kazeem, Omo Baale	Male	09041904048	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
11	Mr KHALID, S/manager	Male	07074723242	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaiye comprising cultivation and processing of farm produce
12	Mr Jacob, S/manager	Male	08103565268	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
13	JERRY AYUBA, S/surveyor	Male	0813913555	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
14	Alami Fashola	Male	08035660291	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
15	OJO O. Sunday	Male	08133166987	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
16	ODE GENESIS	Male	09131645219	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
17	ADIKPE O. JERRY	Male	09036252621	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
18	ADEWUYI ADEMOLA	Male	08063846594	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
19	BIMBOLA ADEYAMO	Male	07035347806	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
20	OGUNOLA SUNDAY OLUWOLE, HND (Public administration)	Male	08101123358	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye cultivation and processing of farm produce
21	RAHEEM FARUQ OLAMIDE, SSCE	Male	07073423299	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce

SN	Name	Gender	Phone No.	Activites
22	OMONIJE IBRAHIM, HND (Animal production)	Male	08102121310	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye) comprising cultivation and processing of farm produce
23	OLATEJU OLALEKAN, SSCE	Male	09069606917	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
24	OLASUPO HAMMED OLAWALE, SSCE	Male	08167380318	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
25	PETER EMMANUEL, farming	Male	09033369759	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
26	SABI TU AZEEZ	Male	—	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
27	Kareem A. Wasiu, farming and trading	Male	08069435379	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
28	OJO Adedayo K, farming and trading	Male	09036749818	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
29	OSHIGBELU SEGUN M, farming and trading	Male	08142194378	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
30	Anifowose Monrufat, farming	Female	—	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
31	Omotoso Oluwaseyi	Male	08140317887	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
32	Ajibade oluwanifemi	Female	07069669691	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
33	Olateju Olalekan	Male	09069606917	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
34	Akinade Oluwaseyi, farming	Male	08165666280	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
35	David Ademola, farming	Male	08054658551	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
36	Olalekan Ogunola, farming	Male	07033828663	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
37	Ogunola Sunday, farming	Male	08101123358	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
38	Ogunola Oluwatoke, farming	Female	—	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
39	Olusola Soji, commercial	Male	08064403058	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
40	Elder Ogunlade Kehinde	Male	080805440	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
41	Akinosun Semiu	Male	08032148341	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
42	Adebisi Kabiru	Male	08105492857	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce

SN	Name	Gender	Phone No.	Activites
43	Abimbola Ademola	Male	07036769825	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
44	Adebayo Wasiu	Male	08130051132	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
45	Oloyede Wasiu	Male	08034360146	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
46	Suboola Segun	Male	07047082216	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
47	Ogah Alex	Male	09136144315	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
48	Olayiwola Kunle	Male	09162264753	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
49	**Olaoye Olufemi G**	Male	07052990722	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
50	Oludokun Gbenga	Male	08027630641	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
51	Muritala Rukayat	Female	08134355068	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
52	Adebisi Afusat	Female	08105820973	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
53	Rabiu Akangbe	Male	-	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
54	Sola Adediran	Male	—	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
55	Sunday I	Male	—	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
56	Sadiku Azeez	Male	—	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
57	Adewale Felicia	Female	09048969035	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
58	Adegoke Ogunniyo	Male	08162300448	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
59	Fatimo Oloyede	Female	09163220792	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
60	Saudat Shittu	Female	-	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
61	Subuola Funke	Female	-	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
62	Muibat Amidu	Female	08107236308	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
63	Bosede Olteju	Female	08109492759	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
64	Abibat Ajenikoko	Female	08136401708	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce

SN	Name	Gender	Phone No.	Activites
65	Oriyeba Ojogbede	Female		Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
66	Morufat Anifowose	Female	07041371510	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
68	Adeyanju Florence	Female	08139760784	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
69	Moromoke Afees	Female	09169351879	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
70	Azeez Kamorudeen	Male	08032438956	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
71	Chief Isa Lawal	Male	08106749551	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
72	Mr Remi Ogunlade	Male	09035539264	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
73	Mrs Adijat Olasupo (palm oil processor)	Female	08071923883	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
74	Mr. Addo Davids	—	08022965100	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
75	Mrs Deborah Folorunsho and Mrs Asiata Ogunlowo (garri processors)	Female	07086074512	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
76	Oloye Oludayo Olaifa - Asoju Baale	—	08156871948	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
77	Mr Busari R. A.	—	08082028783	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
78	Jackson Iko	Male	0906860855	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
79	Elisabeth	Female	09067071837	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
80	Adeleke Rukayat	Female	07079447920	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
81	Abayomi Opeyemi	Female	08060794433	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
82	Onimije Abideen	Female	08061658619	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
83	Modinat Basiru	Female		Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
84	Comm Olusola Siji	Male	08064403058	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce
85	Rasheed Kazeem	Male	08033640636	Developmental discussion on the intention of Oyo State Government to build AIH at Ijaye comprising cultivation and processing of farm produce

Field Survey, 2021 and 2025

Table 6.1: Summary of the project activities, the potential impacts, mitigation measures and the residual impacts.

Project Phase	Project Activities	Receptors	Summary of Potential Impacts	Impact Rating (before mitigation)	Mitigation Measures	Residual Impact Rating
Pre-construction	Mobilization of personnel, materials and equipment to Project site	Air quality	Decrease in ambient air quality due to vehicular emissions and dust generation; increase in ambient noise level	Minor	Oyo State Government shall ensure that: • Only Project vehicles with efficient engine performance and with minimal emissions (through regular serv1cmg and maintenance) are selected and used. • Journey Management Plan is developed and implemented. • All construction materials (e.g. sand) with potential to result in dust emissions are covered during transport. • The size of vehicles to be used for mobilization of materials, equipment and personnel to site is optimized to reduce the number of journeys required.	Negligible
		Social infra structure and community health and safety	Increase in traffic volume including potential for road accident	Minor	Oyo State Government shall ensure that: • Journey Management Plan is developed and implemented. • Off-road driving is prohibited. • Project vehicles with efficient engine performance (through regular servicing and maintenance) are selected and used. • Speed limit of less than 30 km/h is adhered to within the Project's Aol. • Driver's competency is assessed and where required; additional training provided. • A grievance procedure that tracks grievances (for any road accident) and responds in a timely manner with corrective actions identified as appropriate is developed and implemented.	Negligible
	Site clearing and land preparation	Soil	Soil compaction as a result of movement of heavy vehicles during site preparation; soil erosion because of loss vegetation	Minor	Oyo State Government shall ensure that: • The removal of vegetation and soil cover is restricted to only those areas necessary for the development. In particular, the unnecessary removal of groundcover vegetation from slopes shall be prevented, especially on steep slopes. • Disturbed areas are rehabilitated as soon as possible to prevent erosion. • Work areas are clearly defined and where necessary demarcated to avoid unnecessary disturbance of areas outside the development footprint. • Suitable storm water drainage channels are provided.	Negligible

Project Phase	Project Activities	Receptors	Summary of Potential Impacts	Impact Rating (before mitigation)	Mitigation Measures	Residual Impact Rating
		Terrestrial flora and fauna (including avifauna)	Vegetation loss; direct impacts on vegetation and soil dwelling organisms; indirect impacts on other animals	Minor	Oyo State Government shall ensure that: • Clearing of vegetation is limited to the Project site. • Work areas are clearly marked to prevent clearing or disturbance outside areas designated for project development. • The use of herbicides for vegetation clearing is avoided. • Hunting or deliberate killing of animals in the project area by project personnel is prohibited. • Awareness on environmental • Protection regarding terrestrial fauna and flora species is provided to workers.	Negligible
		Atmosphere (Air quality) and Noise	Decrease in air quality; increase in ambient noise levels	Minor	Oyo State Government shall ensure that: • Site clearing equipment are run and maintained under optimum fuel efficient conditions. • Noise impacts are reduced by enclosing and insulating noise emitting processes or equipment as much as practicable. • Site clearing equipment are turned off when not in use. • Site clearing equipment/machinery with lower sound power levels are selected and used. • Project personnel (especially those handling the site clearing machines) use appropriate PPE (e.g. ear muffs) to reduce exposure to noise impact.	Negligible
Construction	Construction of processing plant and other associated facilities	Air Quality	Emissions from construction vehicles and machinery; particulate emissions due to soil disturbance	Minor	Oyo State Government shall ensure that: • Construction equipment are turned off when not in use • Measures to reduce dust generation, such as spraying water on soil before excavation are adopted, where required. • Regular maintenance and serv1cmg of construction equipment that contribute to air emission are implemented. • Only modern and well maintained equipment and machinery for construction activities are selected and used.	Negligible
	Construction of processing plant and other associated facilities	Noise emission/ vibration to sensitive receptors	Increase in ambient noise level; discomfort to sensitive receptors; hearing loss	Minor	Oyo State Government shall ensure that: • Construction equipment are maintained as per manufacturer's recommendations and operated as per original specifications. • Activities associated with high levels of noise are limited to daylight hours. • Construction equipment with lower sound power levels are selected and used. • Acoustic enclosures are installed on equipment casing radiating noise.	Negligible

Project Phase	Project Activities	Receptors	Summary of Potential Impacts	Impact Rating (before mitigation)	Mitigation Measures	Residual Impact Rating
					• Engines and other noise making equipment are in good working order and well maintained, and that all have original noise suppression equipment (e.g. mufflers) intact and in working order. • Project personnel use appropriate PPE (e.g. ear muffs) to reduce exposure to noise impact. • Contractors implement best driving practices when approaching and leaving the project site to minimize noise emission.	
	Construction of processing plant and other associated facilities	Soil and geology	Removal of top soil and soil compaction; reduction in structural stability and percolative ability of soil resulting from compaction during excavation activities, laying foundations, erection of other buildings.	Moderate	Oyo State Government shall ensure that: • Excavation works are not executed under hostile weather conditions. • Stockpiles are appropriately covered to reduce soil loss as a result of wind or water erosion. • Excavated soil is reused for backfilling. • Disturbed areas are rehabilitated as soon as possible to prevent erosion. • Spill containment and clean up kits are provided onsite. • Waste management plan is developed and implemented by the contractors.	Negligible
	Construction of processing plant and other associated facilities	Surface water and groundwater resources	0 Increased sediment load in the drainage channels as a result of erosion 0 Decrease in the quality of ground and surface water resources.	Minor	Oyo State Government shall ensure that: • Appropriate drainage system is constructed. • Training is provided for workers on safe storage, use and handling of hazardous materials (e.g. fuel, lubricating oil) on site. • Hazardous substances and materials (e.g. fuel, lubricating oil, etc.) are stored in appropriate locations with impervious hard standing and adequate secondary containment • Waste receptacles are provided within a secured area for collection of solid waste. • Construction vehicles and equipment are serviced regularly. Servicing shall be carried out off site.	Negligible

Project Phase	Project Activities	Receptors	Summary of Potential Impacts	Impact Rating (before mitigation)	Mitigation Measures	Residual Impact Rating
	Construction of processing plant and other associated facilities	Socio-economic (local communities)	o Disruption of family structure and social networks due to influx of migrant workers; increase in incidence of sex workers and casual sexual relations, which may result in HIV/AIDS infections and unwanted pregnancies	Minor	Oyo State Government shall ensure that: • Construction workers (e.g. semi-skilled and unskilled craftsmen) are drawn from the local communities as much as possible. • The local communities are informed of the Project activities prior to commencement of work. • Contractor develops an induction programme, including a Code of Conduct, for all workers (including sub contractors and their workers). • A copy of the Code of Conduct are presented to all workers and acknowledged by each person. The Code of Conduct shall address the following aspects, amongst others: zero tolerance of illegal activities by construction personnel including: illegal sale or purchase of alcohol; sale, purchase or consumption of drugs; illegal gambling or fighting; respect for local residents; compliance with all road regulations; and description of disciplinary measures for infringement of the Code of Conduct. • Grievance procedure that is easily accessible to local community is developed, through which complaints related to contractor or employee behaviour can be lodged and responded to. Key steps of the grievance mechanism include: • Circulation of contact details of 'grievance officer' or other key developer contacts. • Establishment of a grievance register to be regularly updated. This will include all responses and response times. • Contractor develops a means of monitoring access to the site, prohibiting unauthorized access to the site and ensuring that all visitors report to the site office. • Contractor initiates training and skills development programs prior to commencement of construction, as a means of ensuring that members of the local workforce are up-skilled and can be employed on the project. • Awareness education about HIV/ AIDS and other sexually transmitted diseases is created among the workforce.	Negligible

Project Phase	Project Activities	Receptors	Summary of Potential Impacts	Impact Rating (before mitigation)	Mitigation Measures	Residual Impact Rating
	Construction of processing plant and other associated facilities	Socio-economic (local community)	Potential incident or accident as a result of increased vehicular movement	Minor	Oyo State Government shall ensure that: • Traffic management is developed and implemented. • Speed limits (of less than 30 km/h) within the Project area are adhered to. • All vehicles used for the project are regularly serviced and maintained. • Driver's competency are assessed and where required training is provided. • Public access is restricted to construction area via security fencing and appropriate signage. • A grievance procedure that will track grievances (for any road accident) and respond in a. timely manner with corrective actions identified as appropriate is developed and implemented.	Negligible
	Construction of processing plant and other associated facilities	Health, safety, and welfare of construction workers	Risk of injury and health related issues.	Moderate	Oyo State Government shall ensure that: • Appropriate personal protective equipment (such as helmets, coveralls, safety boots, eye goggles, nose masks, ear muffs, etc.) are provided to workers and use as required. • Firefighting equipment are provided and regularly maintained. Workers shall also be trained on the use of the firefighting equipment. • Safety training focused on operational procedures, emergency procedures and safe working practices, information on specific hazards, first aid and fire fighting is incorporated in the induction program for workers, prior to commencement of construction activities. • A procedure for receiving and addressing the concerns of workers is put in place and implemented. • The Project site is secured with perimeter fencing and/ or security. • Sanitary amenities and potable water are provided • o Trained first aiders and first aid equipment are provided onsite during construction.	Minor
Operational Phase	Cultivation of maize, cassava and Soya beans farm and processing plant operations including routine maintenance	Air Quality	o Decrease in air quality due emissions from movement of vehicles and equipment during operation and maintenance; and also from diesel powered generator.	Minor	Oyo State Government shall ensure that: • Onsite diesel-fuelled generators are regularly serviced and maintained. • Speed-control of trucks along the access road to the facility is implemented. • Project vehicles including tractors and trucks are well maintained through regular • servicing.	Negligible

Project Phase	Project Activities	Receptors	Summary of Potential Impacts	Impact Rating (before mitigation)	Mitigation Measures	Residual Impact Rating
		Noise and vibration	0 Increased in ambient noise levels from vehicles (tractors, trucks, and farm machinery) and the diesel powered generators and processing plant equipment	Minor	Oyo State Government shall ensure that: • Trucks and forklifts are turned off when not in use. • Engines and other noise making equipment are in good working order and well maintained, and that all have original noise suppression equipment (e.g. mufflers) intact and in working order. • The use of damper on the generator to reduce vibrations is ensured. • Use of sound proof (attenuated) generator is ensured. • Employees who work around the noise prone areas use appropriate PPE including ear muffs	Negligible
		Surface water and Groundwater resources	o Reduction in groundwater and surface water quality	Minor	Oyo State Government shall ensure that: • Appropriate drainage system is constructed for proper channeling of storm water. • The use of pesticides and other agrochemicals is limited to when they are absolutely necessary. • Only agrochemicals approved • by the relevant government regulatory authorities such as NAFDAC and SON are used. • All water pipes of the drip irrigation system are periodically checked for leakages. • Relevant operational staff receive training on the correct use and handling of agro chemicals. • Wastewater generated from • the processing plant is treated before discharge	Negligible
	Maize, cassava and Soya beans farm and processing plant operations including routine maintenance	Workers (health and safety of employees)	o Exposure to injuries, exposure to noise nuisance, electrical hazards, etc.	Moderate	Oyo State Government shall ensure that: • Occupational health and safety policy and procedures are developed and implemented. • Routine safety checks in line with standard safety procedures are carried out. • Provision of firefighting suppression system and regular communication with local fire services is implemented. • Staff are trained on emergency • preparedness and responses • Appropriate personal protective equipment i.e. safety boots, helmet etc. are provided for workers and used. • Trained first aiders and first aid equipment are available onsite during operations.	Minor

Table 7.1: Environmental management and social plan: pre-construction phase.

Project Activity	Potential Impact	Desired Outcome	Description of Mitigation Measures	Performance Indicator	Monitoring	Timing/ Frequency	Responsibility for implementation	Cost (Naira N)
Mobilization of personnel, materials and equipment to Project site	Decrease in Ambient air quality due to vehicular emissions and dust generation; increasein ambient noise level	■ Minimize deterioration of current ambient air quality • Minimize noise emission	Oyo State Government shall ensure that: 0Only Project vehicles with efficient engine performance and with minimal em1ss10ns (through regular servicing and maintenance) are selected and used. 0 Journey Management Plan is developed and implemented. 0 All construction materials (e.g. sand) with potential to result in dust emissions are covered during transport. 0 The size of vehicles to be used for mobilization of materials, equipment and personnel to site is optimized to reduce the number of journeys required.	Adherence to measures. Benchmarks stated in the Journey Management Plan	Records of Journey management plan implementation	Weekly during mobilization activities	Construction Contractor *Oyo* State Government EHS Manager	1,200,000
Mobilization of personnel, materials and equipment to Project site	Increase in traffic volume including potential for road accident	• Minimize any increase in road traffic ■ Avoid traffic accident	Oyo State Government shall ensure that: 0 Journey Management Plan is developed and implemented. 0 Off-road driving is prohibited. 0 Project vehicles with efficient engine performance (through regular servicing and maintenance) are selected and used.	Adherence to measures	Formal and informal feedback from locals Compilation of statistics o n numbers of accidents in conjunction with local	Weekly during mobilization activities	Construction Contractor Oyo State Government EHS Manager	400,000

Project Activity	Potential Impact	Desired Outcome	Description of Mitigation Measures	Performance Indicator	Monitoring	Timing/ Frequency	Responsibility for implementation	Cost (Naira N)
			o Speed limit of less than 30 km/h isadhered to within the Project's Aol. o Driver's competency is assessed and where required; additional training is provided. o A grievance procedure that tracks grievances (for any road accident) and responds in a timely manner with corrective actions identified as appropriate is developed and implemented.		authorities Grievance Log			
Site clearing and preparation	Loss of top soil; soil compaction and degradation; increased erosion potential; reduction in structural stability and percolative ability of soil	Minimize soil loss, reduce erosion.	Oyo State Government shall ensure that: o The removal of vegetation and soil cover is restricted to only those areas necessary for the development. In particular, the unnecessary removal of groundcover vegetation from slopes shall be prevented, especially on steep slopes. o Disturbed areas are rehabilitated as soon as possible to prevent erosion. o Work areas are clearly defined and where necessary demarcated to avoid unnecessary disturbance of areas outside the development footprint. o Suitable storm water drainage channels are provided.	Adherence to measures Re-vegetated land	Monitoring the quantity of Excavated soil generated and reused for backfilling. Areas of rehabilitated land	Weekly during site clearing and preparation	Construction Contractor Oyo State Government EHS Manager	4,800,000
Site clearing and preparation	Vegetation loss;	Minimize loss of flora and fauna	Oyo State Government shall ensure that:	• Requirements of IFC	■ Site surveys	Weekly during site	Construction Contractor	

Project Activity	Potential Impact	Desired Outcome	Description of Mitigation Measures	Performance Indicator	Monitoring	Timing/ Frequency	Responsibility for implementation	Cost (Naira N)
	dire ct impacts on vegetation and soil-dwelling organisms; indirect impacts o n other animals	species	o Clearing of vegetation is limited to the Project site. o Work areas are clearly marked to prevent clearing or disturbance outside areas designated for project development. o The use of herbicides for vegetation clearing avoided. o Hunting or deliberate killing of animals in **the** project area by project personnel is prohibited. o Awareness on environmental protection regarding terrestrial fat.ma and flora species is provided to workers.	Performance Standard 6 on Biodiversity and Sustainable Management of Living Natural Resources Re-vegetated land	And photographic records of the cleared site.	clearing and preparation	Oyo State Government EHS Manager	
Site clearing and preparation	Decrease in Ambient air quality Increase in Noise level with associated effects on the nearby sensitive receptors	Minimize deterioration of the ambient air quality Minimize noise emission	Oyo State Government shall ensure that: o Site clearing equipment are run and maintained under optimum fuel efficient conditions. o Noise impacts are reduced by enclosing and insulating noise emitting processes or equipment as much as practicable. o Site clearing equipment are turned off when not in use. o Site clearing equipment/ machinery with lower sound power levels are selected and used. Project personnel (especially those handling the site clearing machines) use appropriate PPE	Adherence to measures	Maintenance records Grievance log	Weekly During site clearing and preparation	Construction Contractor Oyo State Government EHS Manager	

Project Activity	Potential Impact	Desired Outcome	Description of Mitigation Measures	Performance Indicator	Monitoring	Timing/ Frequency	Responsibility for implementation	Cost (Naira N)
			(e.g. ear muffs) to reduce exposure to noise impact.					

Table 7.2: Environmental Management Plan: Construction Phase

Potential Impact	Activity/Impact source	Desired Outcome	Description of Mitigation Measures	Performance Indicator	Monitoring	Timing/ Frequency	Responsibility	EMP Implementation to be periodically monitored by	Cost (Naira N)
Air Quality									
Decrease in air quality	Source of impacts for air quality includes earthworks, exhaust emissions due to operation of construction equipment.	Minimize deterioration of current ambient air quality by minimizing dust and gaseous emissions • Ensure that adopted air pollution and noise control and management are effective.	Oyo State Government shall ensure that: o Construction equipment are turned off when not in use o Measures to reduce dust generation, such as spraying water on soil before excavation Are O Project personnel (especially those handling the site clearing machines) use appropriate PPE (e.g. ear muffs) to reduce exposure to noise impact. adopted, where required. 0 Regular maintenance and servicing of construction	National ambient air quality standards	Air quality insitu sampling and measurement methods. Air monitoring parameters will include TSP, NOx, CO, CO:z and 50:z,	Monthly throughout construction	Construction Contractor Oyo State Government EHS Manager	Federal Ministry of Environment Oyo State Ministry of Environment Protection Authority	

Potential Impact	Activity/Impact source	Desired Outcome	Description of Mitigation Measures	Performance Indicator	Monitoring	Timing/ Frequency	Responsibility	EMP Implementation to be periodically monitored by	Cost (Naira N)
			equipment that contribute to air emission are implemented. 0 Only modern and well maintained equipment and machinery for construction activities are selected and used.						
Noise and Vibration									
Noise impacts from general construction noise emission; annoyance and disturbance effects at noise sensitive receptors	Construction activities	• Minimize impact to sensitive receptors ■ Ensure that noise levels produced by operation of engines, machines do not exceed the applicable to Nigerian standards ■ Ensure that adopted noise controls and management are effective	Oyo State Government shall ensure that: 0 Construction equipment are maintained as per manufacturer's recommendations and operated as per original specifications. o Activities associated with high levels of noise are limited to daylight hours. o Construction equipment with lower sound power levels are selected and used. o Acoustic enclosures are installed on equipment casing radiating noise.	Noise level at sensitive receptors does not exceed FMEnv. limit (90dBA)	Noise monitoring/ measurement methods will follow Nigerian guidelines Measurements of noise levels will be conducted using an integrated sound meter. Grievance register	Monthly throughout construction	Construction Contractor Oyo State Government EHS Manager	Federal Ministry of Environment Oyo State Ministry of Environment Oyo State Environmental Protection Authority	

Potential Impact	Activity/Impact source	Desired Outcome	Description of Mitigation Measures	Performance Indicator	Monitoring	Timing/ Frequency	Responsibility	EMP Implementation to be periodically monitored by	Cost (Naira N)
			o Engines and other noise making equipment are in good working order and well maintained, and that all have original noise suppression equipment (e.g. mufflers) intact and in working order. o Project personnel use appropriate PPE (e.g. ear muffs) to reduce exposure to noise impact. o Contractors implement best driving practices when approaching and leaving the project site to minimize noise emission.						
Surface water and Groundwater Quality									
Reduction in ground and surface water quality	Civil works and other related construction activities	Minimize any impact on the water resources in the Project area	Oyo State Government shall ensure that: 0 Appropriate drainage system is constructed. 0 Training is provided for workers on safe storage, use and handling of	Nigerian Water Quality Standard for Drinking Water.	Periodic Groundwater and surface water monitoring	Monthly during construction	Construction Contractor Oyo State Government	Federal Ministry of Environment Oyo State Ministry of Environment	500,000

Potential Impact	Activity/Impact source	Desired Outcome	Description of Mitigation Measures	Performance Indicator	Monitoring	Timing/ Frequency	Responsibility	EMP Implementation to be periodically monitored by	Cost (Naira N)
			hazardous materials (e.g. fuel, lubricating oil) on site. 0 Hazardous substances and materials (e.g. fuel, lubricating oil, etc.) are stored in appropriate locations with impervious hardstanding and adequate secondary containment o Waste receptacles are provided within a secured area for collection of solid waste. o Construction vehicles and equipment are serviced regularly. Servicing shall **be** carried out off site.	World Health Organization (WHO) limits for potable water. FMEnv limit for surface water quality			EHS Manager	Oyo State Environmental Protection Authority	
Soli Quality									
• Removal of top soils ▪ Soil compaction and instability ▪ Potential contamina	Civil works and other related construction activities	Minimizes soil loss and reduce erosion.	Oyo State Government shall ensure that: o Excavation works are not executed under hostile weather conditions. o Stockpiles are appropriate!y covered to reduce soil loss as a	Adherence to measures	Monitoring the quantity of excavated soil generated and reused for backfilling	Weekly throughout construction	Construction Contractor Oyo State Government	Federal Ministry of Environment Oyo Stat	150,000

Potential Impact	Activity/Impact source	Desired Outcome	Description of Mitigation Measures	Performance Indicator	Monitoring	Timing/ Frequency	Responsibility	EMP Implementation to be periodically monitored by	Cost (Naira N)
tion from spills • Reduction in structural stability and percolative ability of soil resulting from compaction during excavation activities, laying foundation, erection of other buildings			result of wind or water erosion. o Excavated soil is reused for backfilling. o Disturbed areas are rehabilitated as soon as possible to prevent erosion. o Spill containment and clean up kits are provided onsite. Waste management plan is developed and implemented by the contractors.				EHS Manager	e Ministry of Environment Oyo State Environmental Protection Agency	
Community health and safety									
Disruption of family structure and social networks due to inf!ux of migrant workers; increase **in** incidence of sex workers and casual sexual relations, which may	Construction activities	Minimize community health and safety impacts	Oyo State Government shall ensure that: o Construction workers (e.g. semi skilled and unskilled craftsmen) are drawn from the local communities as much as possible. o The local communities are informed of the Project activities prior to commencement of work. o Contractor develop:; an induction programme, including	Adherence to measures	Formal and informal feedback from locals (grievance logs)	Monthly during construction	Construction Contractor Oyo State Government EHS Manager	Federal Ministry of Environment Oyo State Ministry of Environment Oyo State Environmental	500,000

Potential Impact	Activity/Impact source	Desired Outcome	Description of Mitigation Measures	Performance Indicator	Monitoring	Timing/ Frequency	Responsibility	EMP Implementation to be periodically monitored by	Cost (Naira N)
result in HIV /AIDS infections and unwanted pregnancies			a Code of Conduct, for all workers (including sub-contractors and their workers). o A copy of the Code of Conduct are presented to all workers and acknowledged by each person. The Code of Conduct shall address the following aspects, amongst others: zero tolerance of illegal activities by construction personnel including: illegal sale or purchase of alcohol; sale, purchase or consumption o.f drugs; illegal gambling or fighting; respect for local residents; compliance with all road regulations; and description of disciplinary					Protection Authority	

Potential Impact	Activity/Impact source	Desired Outcome	Description of Mitigation Measures	Performance Indicator	Monitoring	Timing/ Frequency	Responsibility	EMP Implementation to be periodically monitored by	Cost (Naira N)
			measures for infringement of the Code of Conduct. o Grievance procedure that is easily accessible to local community is developed, through which complaints related to contractor or employee behaviour can be lodged and responded to. Key steps of the grievance mechanism include: Circulation of contact details of 'grievance officer' or other key developer contacts o Establishment of a grievance register to be regular!y updated. This will include all responses and response times. o Contractor develops a means of monitoring access to the site, prohibiting unauthorized access to the site and ensuring that all visitors report to the site office. o Contractor initiates training and skills						

Potential Impact	Activity/Impact source	Desired Outcome	Description of Mitigation Measures	Performance Indicator	Monitoring	Timing/ Frequency	Responsibility	EMP Implementation to be periodically monitored by	Cost (Naira N)
			development programmes prior to commencement of construction, as a means of ensuring that members of the local workforce are up-skilled and can be employed on the project. Awareness education about HIV/ AIDS and other sexually transmitted diseases is created among the workforce						
Employment and Economy									
Positive impacts to Employment and economy include: generation of direct, indirect and induced Employment; increase in household income increase in economic activity among local and regional business; and development of skills	Construction activities	■ Maximize impacts on Employment and the local economy	0 Training programme to develop local workforce and supplier capacity; 0 Local employment and local procurement policies including requirements for local worker, engagement with local communities, and clear communication of procurement policies and criteria for Employment opportunities. 0 Disclosure of	Nigerian Labour Law	Employment and Procurement Policies	Monthly throughout construction	Construction Contractor Oyo State Government EHS Manager	Federal Ministry of Environment Oyo State Ministry of Environment Oyo State Environmental Protection Authority	250,000

Potential Impact	Activity/Impact source	Desired Outcome	Description of Mitigation Measures	Performance Indicator	Monitoring	Timing/ Frequency	Responsibility	EMP Implementation to be periodically monitored by	Cost (Naira N)
through job training and applied work experience.			employment and procurement information.						
Health and Safety of Construction Workers									
Accident, incident, exposure to air emissions, electrical hazards, fire outbreak, injury, fall, etc. during construction phase may impair the health and safety of construction workers	Civil works and other related activities	Minimize the likelihood of incidents or accidents occurring at site.	Oyo State Government shall ensure that: 0 A Construction Phase Health and Safety (H&S) Management Plan is developed and implemented by the Contractor. The H&S Plan will be developed following all relevant national and international standards. 0 Construction works are limited to the day time, wherever practical. 0 Speed limits along the project site access roads are limited to 30 km/hr. 0 Health and Safety communication and training programmes that prepare workers. to recognize and respond to workplace hazards is regularly carried out. Daily toolbox talks prior to commencement of construction	Institute of Safety Professionals, Factories Act 2004),	Health, Safety and Environment (HSE) Management Policy	Weekly throughout construction	Construction Contractor Oyo State Government EHS Manager	Federal Ministry of Environment Oyo State Ministry of Environment Oyo State Environmental Protection Authority	500,000

Potential Impact	Activity/Impact source	Desired Outcome	Description of Mitigation Measures	Performance Indicator	Monitoring	Timing/ Frequency	Responsibility	EMP Implementation to be periodically monitored by	Cost (Naira N)
			activities shall be undertaken. o Appropriate personal protective equipment (such as helmets, coveralls, safety boots, eye goggles, nose masks, ear muffs, etc.) are provided to workers and use as required. o Firefighting equipment are provided and regularly maintained Workers shall also be trained on the use of the firefighting equipment. o Safety training focused on operational procedures, emergency procedures and safe working practices, information on specific hazards, first aid and fire-fighting is incorporated in the induction program for workers, prior to commencement of construction activities. o A procedure for receiving and addressing the concerns of workers is						

Potential Impact	Activity/Impact source	Desired Outcome	Description of Mitigation Measures	Performance Indicator	Monitoring	Timing/ Frequency	Responsibility	EMP Implementation to be periodically monitored by	Cost (Naira N)
			put in place and implemented. o The Project site is secured with perimeter fencing and/or security. o Sanitary amenities and potable water are provided o Trained first aiders and first aid equipment are provided onsite during construction.						
Waste Management									
Improper handling of hazardous and non-hazardous waste during construction	Civil works and other related activities	Minimize likelihood of negative impact of hazardous and non-hazardous waste	Oyo State Government shall ensure that: o The construction contractor uses different storage facilities for different types of wastes to facilitate proper disposal. o Chemical wastes are stored in accordance with the provisions of Material Safety Data Sheets (MSDS). o Waste disposal is handled by a waste contractor accredited by the Oyo State Environmental Protection Agency.	National Environmental Protection (Management of Solid and Hazardous Wastes) Regulations of 1991.	Waste Management Plan	Weekly throughout construction	Construction Contractor Oyo State Government EHS Manager	Federal Ministry of Environment Oyo State Ministry of Environment Oyo State Environmental Protection Authority	250,000
Noise and Vibration									
Increased in	Source of	■ Reduce noise	Oyo State Government shall ensure that:	FMEnv limit (90dBA)	Measurements of noise levels	Monthly	Oyo State	Federal Ministry of Environment	50,000

Potential Impact	Activity/Impact source	Desired Outcome	Description of Mitigation Measures	Performance Indicator	Monitoring	Timing/ Frequency	Responsibility	EMP Implementation to be periodically monitored by	Cost (Naira N)
ambient noise levels from vehicles (tractors, trucks, and farm machinery) and the diesel powered generators and processing plant equipment	impacts during operations include vehicular movement, diesel-fuelled generators, processing equipment and machinery.	nuisance at receptor.	Trucks and forklifts are turned off when not **in** use. Engines and other noise making equipment are in good working order and well maintained, and that all have original noise suppression equipment (e.g. mufflers) intact and in working order. The use of damper on the generator to reduce vibrations is ensured. Use of sound proof (attenuated) generator is ensured. Employees who work around the noise prone areas use appropriate PPE including ear muffs.		will be conducted using an integrated sound meter.		Government EHS Manager	Oyo State Ministry of Environment Oyo State Environmental Protection Authority	

Table 7.3: Environmental management plan: operations and maintenance phase.

Potential Impact	Activity/ **Impact source**	**Desired Outcome**	**Description of Mitigation Measures**	**Performance Indicator**	**Monitoring**	**Timing/ Frequency**	**Responsibility**	**EMP implementation to be periodically monitored by**	**Cost (Naira N)**
Air Quality									
Decrease **in** air quality due emissions from movement of vehicles and equipment during operation and maintenance and also from diesel powered generator.	Source of impacts for air quality includes movement of trucks to and from the site , operation of diesel-fuelled generators, etc.	■ Minimize deteriora- tion of current ambient air quality by minimi- zing gaseous emissions	Oyo State Government shall ensure that: 0 Onsite diesel-fuelled generators are regularly serviced and maintained. 0 Speed-control of trucks along the access road to the facility is implemented. 0 Project vehicles including tractors and trucks are well maintained through regular servicing.	Federal Ministry of Environ ment (FMEnv.) permissible limit	Air quality in-situ samplin g and measurement methods. Air monitoring parameters will include SPM, NOx, CO, CO2 and 502,	Monthly	Oyo Stat e Government EHS Manager	Federal Ministry of Environment Oyo St ate Ministry of Environment Oyo St ate Environmental Protection Authority	250,000
Surface water and Groundwater Quality									
Reduction in ground and surface water quality	Operational activities such as refueling of diesel, servicing of diesel fuelled generators, application of fertilizer and pesticides, discharge of wastewater and from the processing plant	Minimize any impact on the aquifers Minimize pollution of surface water.	Oyo State Government shall ensure that: o Appropriate drainage system is constructed for proper channeling of storm water. o The use of pesticides and other agro chemicals is limited to when they are absolutely necessary. o Only agrochemicals approved by the relevant government regulatory authorities such as NAFDAC and SON are used.	Groundwater and surface water quality standards	Ground an d surface wate r sampling an d laboratory analysis. The monitoring parameters will include heav y	Quarterly	Oyo Stat e Government EHS Manager	Federal Ministry of Environment *Oya* St ate Ministry of Environment Oyo St ate Environmental Protection Authority	500,000

			o All water pipes of the drip irrigation system are periodically checked for leakages. o Relevant operational staff receive training on the correct use and handling of agro chemicals. o Wastewater generated from the processing plant is treated before discharge.		metals an d hydrocarbons among others.				
Employment and Economy									
Positive impacts to Employmen t and the economy are expected during operation including developmen t of skills and capacity; generation of induced Employmen t,·	Operational activities	• Maximize impacts on Employ- ment and the local and regional economy during operation • Increase livelihood opport- unities	■ Transparent communication on hiring policies amongst local communities ■ Identify training priorities • Communication about local Employment and contracting opportunities	Nigerian Labour Law	Local Employment and Procurement Policies	Annually	Oyo Stat e Government EHS Manager	Federal Ministry of Environment Oyo Sta te Ministry of Environment Oyo Sta te Environmental Protection Authority	250,000
Workplace Health and Safety									
Potential workplace health and safety impacts to Employees include: Accident, exposure to	Operational activities and routine maintenanc e	Minimize the likelihood of incidents occurring in the work place. In addition, protecting	Oyo State Government shall ensure that: o Occupational health and safety policy and procedures are developed and implemented. o Routine safety checks	Nigerian H&S (Nigerian Institute of Safety Professionals, Factories Act 2004), the Adherence to	Health & Safety Management Policy	Bi-annually	Oyo Stat e Government EHS Manager	Federal Ministry of Environment Oyo Sta te Ministry of Environment	250,000

noise nuisance, electrical hazards, accidents with tractors and farm machinery, fire outbreak, injury, fall, etc.		health of Employees from occupationa **1** hazards and related disease.	**in** line with standard safety procedures are carried out. 0 Provision of firefighting suppression system and regular communication with local fire services is implemented. 0 Staff are trained on emergency preparedness and responses o Appropriate personal protective equipment i.e. safety boots, helmet etc. are provided for workers and used. o Trained first aiders and first aid equipment are available onsite during operations.	Occupational Health an d Safety Guideline, and incidents record				Oyo Sta te Environmental Protection Authority	

Table 7.4: Environmental and Social Monitoring Programme for the proposed Project

Environmental Component!J' Matrix	Sampling Locations	Sampling Method	Environmental/ Social Paramete11, to be monitored	Compliance Requirement	Frequency of Monitoring	Responsible Party	Project Development Phase
Atmosphere (Air Quality& Noise)	Project Site surrounding environment and its	• Air Quality Monitoring Equipment • Sound level meter	TSP, CO, CO2, NOx, SOx, Noise Level (dBA)	FMEnv/NESREA/ Oyo State Min of Env *I* Oyo State Environmental Protection Authority	Monthly monitoring; quarterly reporting	Oyo State Government EI-IS Manager	• Construction Phase • Operation Phase
Groundwater Quality	Boreholes within and around the Project site	Direct sampling using w a t e r samplers	Temperature, pH, salinity, TDS, conductivity, DO, BOD, cations, COD, anions, Microbiology, Heavy metals, Tffi and Turbidity	FMEnv/NESREA/ Oyo State Min of Env *I* Oyo State Environmental Protection Authority	Quarterly Monitoring and reporting	Oyo State Government EI-IS Manager	• Construction Phase • Operations Phase
Surface water Quality water	Pond and nearby stream in the Project's area of influence	Direct samplimg Using water samplers	Temperature, pH, salinity, TDS, conductivity, DO, BOD, cations, COD, anions, Microbiology, Heavy metals, Tffi and Turbidity	FMEnv /NESREA/ Oyo State Min of Env *I* Oyo State Environmental Protection Authority	Quarterly and monitoring reporting	Oyo S tate Government EI-IS Manager	• Construction Phase • Operations Phase
Soil	Within the farm, Unpaved sections of the Plant	Soil sample s collection usi ng stainless stee auger	pH, Moisture, TOC, anions, cations, Microbiology, Heavy metals.	FMEnv/NESREA/ Oyo State Min of Env *I* Oyo State Environmental Protection Authority	Quarterly and monitoring reporting	Oyo St ate Government EI-IS Manager	• Construction Phase • Operations Phase
Solid Waste	Operational areas	Monitor th e handling a rrl disposal of solid wastes	Operational solid wastes including used packaging waste.	FMEnv/ NESREA/ Oyo State Min of Env *I* Oyo State Environmental Protection Authority	Monthly monitoring; Quarterly reporting	Oyo St ate Government EI-IS Manager	• Construction Phase Operations Phase
Health and Safety	Workers arrl Operational areas	Observe compliance to PPE usage and unsafe working conditions	Health and Safety Plan	FMEnv/NESREA/ Oyo State Min of Env *I* Oyo State Environmental Protection Authority	Daily	Oyo State Government EI-IS Manager	• Construction Phase • Operations Phase
Training	Workers	Observe compliance with existing training plan	Training plan and records	FMEnv/ NESREA/ Oyo State **Min** of Env *I* Oyo State Environmental Protection Authority	Quarterly monitoring and reporting	*Oya State* Government EI-£ Manager	• Construction Phase • Operations Phase

Environmental Component!J' Matrix	Sampling Locations	Sampling Method	Environmental/ Social Paramete11, to be monitored	Compliance Requirement	Frequency of Monitoring	Responsible Party	Project Development Phase
General Housekeeping	Construction sites **and** operational areas	Observe cleanliness **and** aesthetics of the facility	Cleanliness **and** aesthetics of facility	FMEnv/ NESREA/ Oyo State Min of Env *I* Oyo State Environmental Protection Authority	Daily	*Oya* State Government EI-£ Manager	• Construction Phase • Operations Phase
Stakeholder Engagement	Affected Communities and Regulatory agencies	Observe evidence of stakehol der consultations	Stakeholder Engagement Plan	FMEnv/ NESREA/ Oyo State Min of Env *I* Oyo State Environmental Protection Authority	Quarterly	Oyo State Government EI-£ Manager	• Construction Phase • Operations Phase

Implementation Budget and Financial Arrangements
Financial Commitment to Safeguards Implementation
In compliance with the AfDB Integrated Safeguards System (ISS 2023), the Project has allocated 9% of the total project cost (₦54 billion) to environmental and social safeguards implementation.
This allocation ensures full compliance with:

- OS1 – Assessment and Management of Environmental and Social Risk and Impact
- OS2 – Labour and Working Conditions
- OS3 – Resources Efficiency and Pollution Prevention and Mangement
- OS4 – Community Health, Safety and Security
- OS5 – Land Acquisition, Restrictions on Access to Land and Land Use, and Involuntary Resettlement
- OS6-Habitat and Biodiversity Conservation, and Sustainable Management of Living Natural Resources
- OS7- Vulnerable Groups
- OS8-Cultural Heritage
- OS10-Stateholder Engagement and Information Disclosure

The safeguard budget covers mitigation, monitoring, institutional strengthening, grievance redress, independent audits, and contingency provisions across pre-construction, construction, and operational phases.

Table 7.5: AfDB-ISS Compliant Environmental and Social Management Budget Summary

Component	% of Total Project Cost	Allocated Amount (₦)	AfDB Safeguard Linkage	Implementation Responsibility	Contractual Integration
Mitigation Measures	15%	16,200,000	OS1, OS2, OS3, OS4, OS10	Main Contractor	Embedded in BoQ and Technical Specifications; enforceable through E&S performance clauses
Implementation Cost	20%	21,600,000			
Environmental & Social Monitoring	10%	10,800,000	OS1 Compliance Monitoring	Supervision Consultant + PIU	Included in supervision contract; linked to certification and AfDB

					reporting
Capacity Building & Training	15%	16,200,000	Institutional Strengthening under ISS	PIU + Contractor	Included in safeguard capacity plan and contractor obligations
Grievance Redress Mechanism (GRM)	20%	21,600,000	OS1 Stakeholder Engagement	PIU / Project Proponent	Operationalized under PIU; contractor supports community interface
Independent Environmental Audit & Reporting	12%	12,960,000	ISS Compliance Verification	Independent E&S Auditor	Separate oversight line item; periodic reporting to AfDB
Contingency for Safeguard Implementation	8%	8,640,000	Risk Management under ISS	Project Proponent	Reserved for unforeseen safeguard risks
Total ESMP Allocation		**108,000,000**	—	—	—

Table 7.6: Construction Phase – Environmental Monitoring Indicators

Environmental Component	Parameter / KPI	Compliance Standard / Threshold	Monitoring Method	Frequency	Responsibility	Independent Oversight	Corrective Action Trigger
Air Quality	TSP, PM_{10}, NOx, SO_2, CO	FMEnv/NESREA ambient air quality limits	In-situ air monitoring using calibrated equipment	Monthly	Contractor (EHS Officer)	Oyo State Ministry of Environment / FMEnv	Exceedance of permissible limit → Immediate dust suppression + equipment servicing
Noise	dBA at site boundary & sensitive receptors	≤ 90 dBA (FMEnv limit)	Integrated sound level meter	Monthly	Contractor	Oyo State EPA / FMEnv	Exceedance → Restrict working hours + acoustic control
Surface Water	pH, BOD, COD, DO, TDS, Heavy Metals, Hydrocarbons	FMEnv surface water limits; WHO where applicable	Laboratory analysis of collected samples	Monthly	Contractor	State Ministry of Environment	Exceedance → Suspend discharge + implement containment

Groundwater	pH, TDS, Microbiology, Heavy metals	Nigerian Drinking Water Standards	Borehole sampling & lab analysis	Quarterly	Contractor	FMEnv	Exceedance → Investigate contamination source
Soil Quality	pH, TOC, Heavy metals	FMEnv soil guidelines	Soil sampling & laboratory analysis	Quarterly	Contractor	State EPA	Exceedance → Soil remediation plan
Waste Management	% waste segregated; disposal through licensed contractor	National Environmental (Solid & Hazardous Waste) Regulations	Site inspection & waste manifest review	Weekly	Contractor	State EPA	Non-compliance → Suspension of disposal activity
Occupational Health & Safety	Lost Time Injury Frequency Rate (LTIFR); PPE compliance rate	Factories Act 2004; HSE Policy	Incident logs; PPE inspection	Weekly	Contractor	PIU EHS Specialist	Injury trend increase → Safety stand-down & retraining
Community GRM	% grievances acknowledged within 48 hrs; % resolved within 14 days	Project GRM Framework	Grievance register review	Monthly	PIU		

Table 7.7: Operations Phase – Monitoring Indicators

Environmental Component	KPI	Standard / Limit	Frequency	Responsible Party	Regulatory Oversight	Trigger Action
Air Emissions	PM, NOx, CO, SO_2	FMEnv permissible limits	Monthly	Facility Manager	State Ministry of Environment	Equipment servicing
Noise	Generator & machinery noise (dBA)	≤ 90 dBA	Monthly	EHS Manager	State EPA	Install attenuation system
Effluent Quality	BOD, COD, pH, Oil & Grease	FMEnv effluent standards	Quarterly	Operations Team	FMEnv	Suspend discharge
Agrochemical Use	Approved chemicals only	NAFDAC/SON approval	Quarterly	Farm Manager	Regulatory agencies	Withdraw non-compliant chemicals

Workplace Safety	Incident rate	HSE Policy / Nigerian Labour Law	Bi-annually	Facility EHS Officer	State EPA	Safety audit

Table 7.8: Independent Environmental Audit Framework

Audit Type	Scope	Frequency	Conducted By	Reporting To	Deliverable
Internal ESMP Compliance Audit	Review of mitigation implementation and monitoring records	Quarterly	PIU EHS Specialist	Project Proponent	Internal Compliance Report
Regulatory Compliance Inspection	Verification of compliance with FMEnv approval conditions	As scheduled by regulator	FMEnv / State Ministry	FMEnv	Inspection Report
Independent Environmental Audit	Full ESMP compliance review (Air, Water, Soil, H&S, GRM)	Annually	Accredited External Auditor	FMEnv & Financier	Environmental Audit Report
Completion Audit	Pre-commissioning verification	Once before operations	Independent Auditor	FMEnv	Completion Compliance Certificate
Corrective Action Verification	Follow-up on non-conformities	Within 30 days of audit	PIU + Auditor	Proponent & Regulator	Corrective Action Closure Report

Table 7.9: Environmental Monitoring Programme

Environmental Component	Sampling Location	Parameter	Compliance Requirement	Sampling Method	Frequency	Responsible Party	Project Phase
Air Quality	Site boundary & nearest receptor	TSP, PM_{10}, NOx, SO_2, CO	FMEnv Ambient Standard	Air sampler	Monthly	Contractor / EHS	Construction & Operation
Noise	Boundary & sensitive receptors	dBA	≤ 90 dBA	Sound level meter	Monthly	EHS Manager	Construction & Operation
Groundwater	Boreholes within AoI	pH, TDS, Heavy metals, Microbiology	Nigerian Drinking Water Standard	Lab analysis	Quarterly	Contractor	Construction & Operation
Surface Water	Stream / pond within AoI	BOD, COD, pH, DO, Heavy metals	FMEnv Standard	Lab analysis	Quarterly	Contractor	Construction & Operation
Soil	Disturbed areas	pH, TOC, Heavy metals	FMEnv Soil Guideline	Lab analysis	Quarterly	Contractor	Construction & Operation
Waste	Operational areas	Waste segregation & disposal records	Waste Regulation 1991	Site inspection	Weekly	Contractor	Construction & Operation
GRM	Affected communities	Grievance resolution rate	Project GRM Framework	Log review	Monthly	PIU	All Phases
Occupational H&S	Work areas	Incident rate, PPE compliance	Factories Act 2004	Site inspection	Weekly	Contractor	All Phases

Annex 2: Plates

Plate 4.19a: Prof. Azeez (Agro4you Consultant) and OYSADA officials; Mr Ajetunmobi (in green) and Mr Popoola (in blue) discussing the project and scoping activities with Federal Ministry of Environment officials, Dr Kemi Oteruku (in red) and Mr Adefuke (in yellow), alongside Mrs Azeez Opeoluwa of the State Ministry of Environment.

Plate 4.19b and c: Consultant (Agro4you: Prof. Azeez) with members of SAPZ on visitation to the Ijaye

IDH. Plate 4.17b: Preliminary meeting between the Baale (Village Head; far left, Mr Ajetumobi (SPC), Dr Peter and Prof. Azeez

Plate 4.19d: Dr Kemi Oteruku (left) and Mr Adefuke (right) addressing residents of Atan during the scoping session for the proposed Ijaye Agro-Industrial Hub.

Plate 4.19e: Prof Azeez (Agro4you) and Mr Ajetunmobi (SPC, OYSADA) describing the size ofthe project with its benefits

Plate 4.19f: Mr Popoola of OYSADA (left) presenting project benefits and government implementation steps, while the Baale (right) inquires about specific benefits accruable to residents and farmers.

Plate 4.19g: Cross-section of respondents attentively listening to the benefits of the project

Plate 4.19h: Residents and farmers inquiring about the impact of the proposed industrial hub on their livelihoods.

Plate 4.19i: Stakeholders filling questionnaires

Plate 4.19j: Stakeholders responding to questions and filling questionnaires

Plate 4.19k: Mr Adefuke responding to inquiries from residents, followed by a group photograph with farmers and community members.

Plate 4.20a: Meeting with the Baale

Plate 4.20b: Interactions with vulnerable group (aged women) and artisans (Okada rider)

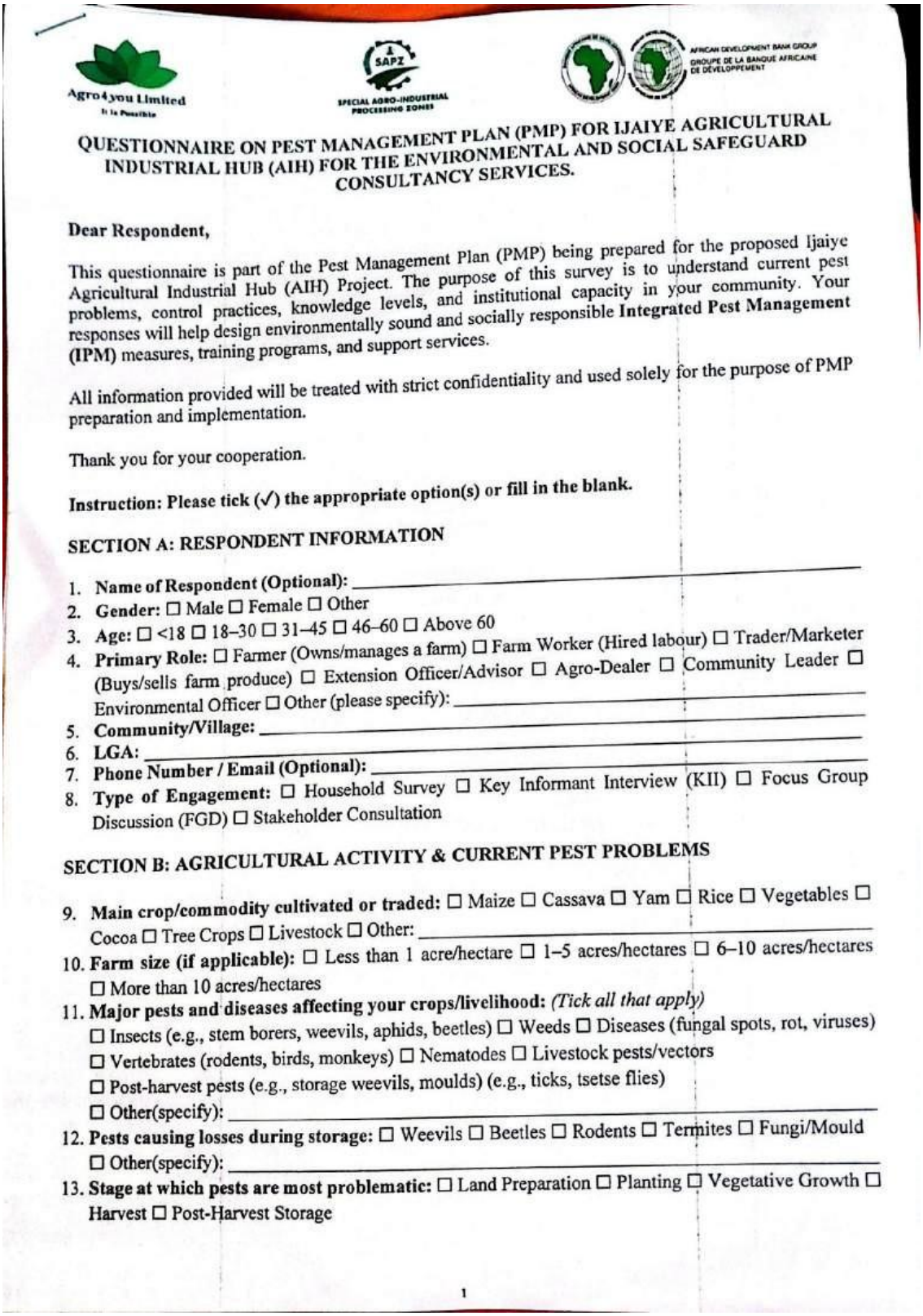

Plate 4.20c: Farm worker (left) and Head of hunter group and farmer (right)

Plate 4.21 a,b: The Team with members of Camp community A L: Mr Busari R.A., R: Mr Aremu Ashiru and Mrs Amdalat Ojebola. B Local palm oil processor (Mrs Adijat Olasupo). Field Survey, 2021

Plate 4.21 c and d: The team with stakeholders on the proposed AIH center. A Asoju Baale Mr Oludayo Olaifa (R) and Mrs Halimot Arunlogun (L). B Community Chief Mr Isa Lawal (Oloye Asipa Baale). Field Survey, 2021

Plate 4.19e: Consultation with Mrs Deborah Folorunsho, Mrs Ashiata Ogunlowo, and other garri processing factory workers. Field Survey, 2021

Annex 3: Sample of questionnaire distributed to residents of Atan and Camp at Ijaye Agro-Industrial Hub



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QUESTIONNAIRE ON PEST MANAGEMENT PLAN (PMP) FOR IJAIYE AGRICULTURAL INDUSTRIAL HUB (AIH) FOR THE ENVIRONMENTAL AND SOCIAL SAFEGUARD CONSULTANCY SERVICES.

Dear Respondent,

This questionnaire is part of the Pest Management Plan (PMP) being prepared for the proposed Ijaiye Agricultural Industrial Hub (AIH) Project. The purpose of this survey is to understand current pest problems, control practices, knowledge levels, and institutional capacity in your community. Your responses will help design environmentally sound and socially responsible **Integrated Pest Management (IPM)** measures, training programs, and support services.

All information provided will be treated with strict confidentiality and used solely for the purpose of PMP preparation and implementation.

Thank you for your cooperation.

Instruction: Please tick (✓) the appropriate option(s) or fill in the blank.

SECTION A: RESPONDENT INFORMATION

1. **Name of Respondent (Optional):** _____
2. **Gender:** ☐ Male ☐ Female ☐ Other
3. **Age:** ☐ <18 ☐ 18–30 ☐ 31–45 ☐ 46–60 ☐ Above 60
4. **Primary Role:** ☐ Farmer (Owns/manages a farm) ☐ Farm Worker (Hired labour) ☐ Trader/Marketer (Buys/sells farm produce) ☐ Extension Officer/Advisor ☐ Agro-Dealer ☐ Community Leader ☐ Environmental Officer ☐ Other (please specify): _____
5. **Community/Village:** _____
6. **LGA:** _____
7. **Phone Number / Email (Optional):** _____
8. **Type of Engagement:** ☐ Household Survey ☐ Key Informant Interview (KII) ☐ Focus Group Discussion (FGD) ☐ Stakeholder Consultation

SECTION B: AGRICULTURAL ACTIVITY & CURRENT PEST PROBLEMS

9. **Main crop/commodity cultivated or traded:** ☐ Maize ☐ Cassava ☐ Yam ☐ Rice ☐ Vegetables ☐ Cocoa ☐ Tree Crops ☐ Livestock ☐ Other: _____
10. **Farm size (if applicable):** ☐ Less than 1 acre/hectare ☐ 1–5 acres/hectares ☐ 6–10 acres/hectares ☐ More than 10 acres/hectares
11. **Major pests and diseases affecting your crops/livelihood:** *(Tick all that apply)*
    ☐ Insects (e.g., stem borers, weevils, aphids, beetles) ☐ Weeds ☐ Diseases (fungal spots, rot, viruses)
    ☐ Vertebrates (rodents, birds, monkeys) ☐ Nematodes ☐ Livestock pests/vectors
    ☐ Post-harvest pests (e.g., storage weevils, moulds) (e.g., ticks, tsetse flies)
    ☐ Other(specify): _____
12. **Pests causing losses during storage:** ☐ Weevils ☐ Beetles ☐ Rodents ☐ Termites ☐ Fungi/Mould
    ☐ Other(specify): _____
13. **Stage at which pests are most problematic:** ☐ Land Preparation ☐ Planting ☐ Vegetative Growth ☐ Harvest ☐ Post-Harvest Storage

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14. **Severity of pest infestation in your area:** ☐ Very Serious ☐ Serious ☐ Moderate ☐ Minor ☐ None
15. **Changes in pest problems over time:** ☐ Getting worse ☐ Getting better ☐ No change

SECTION C: PEST CONTROL PRACTICES

16. **Current pest control methods used (tick all that apply):**
    - ☐ Chemical Sprays (Pesticides, Insecticides, Herbicides)
    - ☐ Manual/Mechanical (e.g., handpicking, weeding)
    - ☐ Traditional/Local Remedies (e.g., plant extracts, ash)
    - ☐ Biological Control (natural predators, neem extracts)
    - ☐ Cultural Practices (e.g., crop rotation, early planting, clearing residues)
    - ☐ Resistant Seeds/Varieties
    - ☐ Traps/Barriers
    - ☐ None (I do not actively control pests)
17. **Specific chemical products used most often (e.g., Sniper, Gramoxone):** _____
18. **Where pesticides/pest control products are sourced:** ☐ Local Market ☐ Agro-dealer ☐ Cooperative ☐ Extension Office ☐ Other: _____
19. **Who applies pesticides on your farm:** ☐ Self ☐ Family Members ☐ Hired Labourers ☐ Extension Officer ☐ Commercial Applicator
20. **Use of protective clothing when applying chemicals:** ☐ Yes, always ☐ Yes, sometimes ☐ No, never
21. **Storage of pesticides before use:** ☐ Locked storage area ☐ Open/near food ☐ I do not use pesticides
22. **Disposal of empty pesticide containers:**
    - ☐ Safe disposal (buried/returned to seller)
    - ☐ Unsafe disposal (burning, throwing in trash, reusing for water/food)
    - ☐ I do not use chemicals
23. **Known cases of pesticide poisoning or misuse in your community:** ☐ Yes ☐ No ☐ Don't Know
    If yes, briefly describe: _____
24. **Use of natural or biological pest control methods (e.g., neem, predators, trap crops):** ☐ Yes ☐ No
    If yes, specify: _____

SECTION D: KNOWLEDGE, TRAINING & EXTENSION SUPPORT

25. **Have you received any training on pest management?** ☐ Yes ☐ No
26. **If yes, training provided by:**
    - ☐ Government (ADP/Extension)
    - ☐ NGO/Development Project
    - ☐ Cooperative/Farmer Group
    - ☐ Agro-dealer/Pesticide Seller
    - ☐ Other: _____
27. **Frequency of extension visits:** ☐ Regularly (monthly or more) ☐ Occasionally (a few times a year) ☐ Rarely ☐ Never
28. **Interest in receiving training on IPM and safe pesticide use:** ☐ Very Interested ☐ Somewhat Interested ☐ Not Interested

SECTION E: PERCEPTIONS & ENVIRONMENTAL CONCERNS

29. **Biggest challenges faced in controlling pests (select up to three):**
    - ☐ Cost – Chemicals/tools are too expensive
    - ☐ Knowledge – Unsure of best methods
    - ☐ Effectiveness – Pests seem resistant
    - ☐ Labour – Not enough workers or time
    - ☐ Availability – Hard to find good chemicals/alternatives
    - ☐ Health/Safety – Concern about chemical risks

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30. **Perceived health risks associated with pesticide use in your community:** ☐ Very Serious ☐ Serious ☐ Moderate ☐ Low ☐ Not Sure
31. **Environmental effects noticed after pesticide use (e.g., dead fish, fewer bees, contaminated water):** ☐ Yes ☐ No ☐ Not Sure If yes, describe: _____
32. **Priority services the Agro-centre should provide (select up to three):**
    - ☐ Training on Integrated Pest Management (IPM)
    - ☐ Subsidized or group purchase of chemical pesticides
    - ☐ Access to biopesticides (natural alternatives)
    - ☐ Access to improved/safer storage facilities
    - ☐ Better and more regular extension support
    - ☐ Safe disposal of empty pesticide containers

SECTION F: SUGGESTIONS & FOLLOW-UP

33. **Suggestions for better pest control in your community:** (e.g., cooperative spraying, training, local herb use, safer chemicals, etc.) _____

34. **Would you like to be contacted for follow-up or training?** ☐ Yes ☐ No
    If yes, provide contact: _____

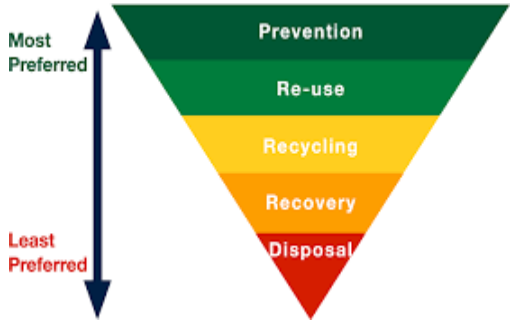
SECTION G: STAKEHOLDER CONSULTATION RECORD

Full Name	Gender	Role/Organization	Phone No. /Email Address	Signature/ Thumbprint	Photo (Yes/No)

Venue: _____
Date: ____ / ____ / _____
Type of Consultation: ☐ FGD ☐ Interview ☐ Meeting ☐ Workshop ☐ Others _____
Key Issues Raised: _____
Recommendations/Follow-Up Actions: _____

Thank you for your response.

1. GENERAL WASTE MANAGEMENT STRATEGY



An integrated approach to waste management is needed on this sub-project. Waste management is premised on certain principles, which include avoidance or prevention, minimization or reduction reuse, recycle, recover and proper disposal. For the current project, waste generation shall be limited to the lowest possible.

Reducing volumes of waste is a priority; if reduction is not feasible, the maximum amount of waste is to be recycled; and wastes that cannot be recycled is to be disposed of in the most environmentally responsible manner as possible. The Waste Management Hierarchy, from most desirable to least desirable, is presented below:

- **Reduce**: Avoid waste by reducing the quantity of waste being generated. This is the simplest and most cost-effective way to minimize waste. It is the most preferred option.
- **Reuse**: Reuse is when a product is used again for the same or similar use, without reprocessing. Reusing a product more than once in its original form reduces the waste generation and energy consumption associated with recycling.
- **Recycle**: Recycling involves processing waste into a similar non-waste product, which consumes less energy than production from raw materials. Recycling prevents further environmental degradation, and saves landfill space and resources
- **Dispose**: Removing waste from worksites, compounds and offices, and discarding the material in a licensed landfill site, or other appropriately licensed facility.

In order to minimize and appropriately manage the waste generated on site, the following good management practices will be used:

i. Reduction of waste generation (through management practices, avoiding or decreasing materials use, etc.) is the primary goal of this plan.
ii. Non-hazardous wastes will be segregated from hazardous wastes.
iii. Wastes to be sent to licensed recycling/dumpsites will be segregated by type.
iv. Effort will be made to minimize the quantity of hazardous materials used.
v. Personnel that handle hazardous materials and wastes, will be trained for proper handling and management.
vi. Spills of hazardous materials will be prevented through careful and sensible management of the materials.
vii. Regular inspections of storage areas will be conducted. If damaged or leaking containers are detected, they will be replaced.
viii. Preventive maintenance will be performed on equipment to avoid potential spills.
ix. Waste storage areas will have secondary containment or spill trays.
x. Under no circumstances will waste be disposed on site.

Classification of Wastes

The Project activities will lead to the generation of various non-hazardous and hazardous wastes.

Non-Hazardous Wastes

- Typical non-hazardous wastes are given below:

- Domestic waste,
- Recyclable wastes (e.g., paper, glass, metals, wooden waste, trees, tin cans, textile, etc.),
- Packaging waste,
- Waste tires, and
- Excavation waste / Concrete waste generated from civil works and foundations.

Hazardous Wastes

Different type of hazardous wastes, that may potentially be generated as a result of the project activities, are given below:

- Electrical wastes including waste and/or damaged batteries and accumulators,
- Waste oil (from maintenance of equipment and vehicles, transformers, etc.),
- Waste paint, and
- Other hazardous waste related to operation and maintenance (O&M) and decommissioning activities.

Potential Sources of Waste

Avoiding the generation of waste remains of highest importance to (project) when considering waste minimization and management measures. Waste management and reuse strategies will be considered and implemented where practical and cost-effective as outlined in Table 1. On-site reuse opportunities will be maximized, with efforts made to implement reuse and off-site recycling initiatives.

Table 1 lists the waste generating aspects and identifies the range of solid, hazardous wastes that are likely to be generated by construction. It also outlines the proposed reuse, recycling or disposal method.

Table 1: Potential Waste Streams and Management Method

Activity / Waste Aspect	**Types**	**Classification**	**Proposed Reuse / Recycling / Disposal Method**
Site clearing and preparation	Vegetation (logs, mulched timber, weeds)	General Solid (non- putrescible)	Native Vegetation – Reuse as biodiversity measures such as habitat enhancement, compost for topsoil or soil conditioner, or modify mulching equipment to create woodchip
	Concrete, brick asphalt and gravel	General Solid (non- putrescible)	Crushed and used as backfill or as road base
	Scrap metal	General Solid (non- putrescible)	Off-site recycling
	Excavated Materials	General Waste	Beneficial soil material - reuse onsite. Balance cut and fill earthworks, where possible, to optimise reuse on the Project
	Potentially	Hazardous waste	Off-site disposal at an approved facility

	contaminated soils		
Construction Waste	Steel reinforcing	General Solid (non- putrescible)	Off-site recycling
	Conduits and pipes	General Solid (non- putrescible)	Off-site recycling
	Concrete (solids and washouts) and asphalt	General Solid (non- putrescible)	Crushed and used as backfill or as road base
	Timber formwork	General Solid (non- putrescible)	Reuse onsite where possible or Off-site recycling
	Packaging materials, including wood, plastic, cardboard and metals	General Solid (non- putrescible)	Off-site disposal at an approved facility
	Empty oil and other drums	General Solid (non- putrescible)	Off-site recycling

Activity / Waste Aspect	**Types**	**Classification**	**Proposed Reuse / Recycling / Disposal Method**
	spill clean ups, paints and other chemicals	Hazardous waste	Off-site disposal at an approved facility
	Metals and bulk electrical cabling	General Solid (non- putrescible)	Off-site recycling
	Sediment basin discharge and solids (sediment)	General Solid (non- putrescible)	Beneficial reuse onsite
General Waste from compounds during construction and operation	Waste generated by the maintenance of equipment including air and oil filters, worn components and rags	General Solid (non- putrescible)	Off-site disposal at an approved facility
	Oil, grease, fuel, chemicals and other fluids	Liquid	Off-site disposal at an approved facility
	Damaged/ expired Batteries/ Inverters	Hazardous waste	Off-site Management according to the EPR with the producer or an approved FMEnv facility

	Domestic waste generated by workers including food packs, cans, bottles	General solid (putrescibles)	Off-site disposal at an approved facility
	Sanitary Waste/Sewage	General solid (putrescibles)	Off-site disposal at an approved facility
	Waste water / recycled water / stormwater	Liquid	Off-site disposal at an approved facility, or use of onsite sewer system
Office Waste	Paper, cardboard and plastic	General Solid (non- putrescible)	Off-site recycling
	Glass bottles and aluminium cans	General Solid (non- putrescible)	Off-site recycling
	Ink cartridges	General Solid (non- putrescible)	Off-site recycling
	Domestic waste including food waste generated by workers	General Solid (putrescible)	Off-site disposal at an approved facility

PROJECT PHASE - WASTE MANAGEMENT PLAN

Preconstruction and Construction Phase

A plan for the management of waste during preconstruction and construction is detailed below. As previously stated, preconstruction and construction practices must be measured and analyzed in order to determine the efficacy of the plan and whether further revision of the plan is required. A method statement detailing specific waste management practices during site clearing activities and construction shall be prepared by the Contractor prior to the commencement of works.

Waste Assessment / Inventory

- The Environmental Officer must develop, implement and maintain a waste inventory reflecting all waste generated during construction for both general and hazardous waste streams.
- Construction method and materials should be carefully considered in view of waste reduction, re-use, and recycling opportunities.
- Once a waste inventory has been established, targets for recovery of waste (minimisation, re-use, recycling) should be set.

Waste collection, handling and storage

- Each contractor/ subcontractor must implement their own waste recycling system, i.e. separate bins for food waste, plastics, paper, wood, glass cardboard, metals, etc.
- Portable toilets must be monitored and maintained daily.
- Below ground storage of septic tanks, if installed, must withstand the external forces of the surrounding environment. The area above the tank must be demarcated to prevent any vehicles or heavy machinery from driving around the area.

- Waste collection bins and hazardous waste containers must be provided by the principal contractor and placed at various areas around site for the storage of organic, recyclable and hazardous waste.
- A dedicated waste area must be established on site for the storage of all waste streams, before removal from site.
- Signage/ colour coding must be used to differentiate disposal bins for the various waste streams (i.e. paper, cardboard, metals, food waste, glass etc.).
- Hazardous waste must be stored within a bonded area constructed according to FMEnv requirements. The volume of waste stored in the bunds must not exceed 110% of the bund capacity.
- The location of all temporary waste storage areas must aim to minimise the potential for impact on the surrounding environment, including prevention of contaminated runoff, seepage, and vermin control.
- Waste storage shall be in accordance with all Regulations and best-practice guidelines and under no circumstances may waste be burnt on site.
- Vegetation removed from the site must be chipped, removed from the site and disposed of at an appropriate waste disposal facility or used as mulch on site.
- The Environmental Officer shall be responsible for ensuring the continuous sorting of waste and maintenance of the area. He/ She shall train other team members on waste handling and management.
- All waste removed from site must be done so by a registered/ licensed subcontractor, whom must supply information regarding how waste recycling/ disposal will be achieved. The registered subcontractor must provide waste manifests for all removals at least once a month.

Management of waste storage areas

- The position of all waste storage areas must be located away from water courses and ensure minimal degradation to the environment.
- Waste storage areas must be under roof or the waste storage bins/ containers must be covered with tarpaulins (or similar material) to prevent the ingress of water.
- Collection bins placed around site must be maintained and emptied on a regular basis.
- Waste must be stored in designated containers and not on the ground.
- Inspections and maintenance of bunds must be undertaken daily. Bunds must be inspected for leaks or cracks in the foundation and walls.
- It is assumed that any rainwater collected inside the bund is contaminated and must be removed and stored as hazardous waste, and not released into the environment. If any leaks occur in the bund, these must be removed immediately.

Disposal

- Waste generated on site must be removed on a regular basis, as determined by the Environmental Officer. This frequency may change during construction depending on waste volumes generated at different stages of the construction process.
- Waste must be removed by a suitably qualified contractor and disposed at an appropriately licensed landfill/ dumpsite site. Proof of appropriate disposal must be provided by the contractor.

Record keeping

The success of the waste management plan is determined by measuring criteria such as waste volumes, cost recovery from recycling, cost of disposal. Recorded data can indicate the effect of training and education, or the need for education. It will provide trends and benchmarks for setting goals and standards. It will provide clear evidence of the success or otherwise of the plan. Records will include:

- Documentation (waste manifest, certificate of issue or safe disposal) must be kept detailing the quantity, nature, and fate of any regulated waste for audit purposes.
- Waste management must form part of the monthly reporting requirements in terms of volumes generated, types, storage and final disposal.

Training

Training and awareness regarding waste management shall be provided to all employees and contractors as part of on-site awareness sessions.

Operational and Maintenance Phase

It is expected that the operational and maintenance phases will result in the production of limited general waste consisting mostly of cardboard, paper, plastic, tins, metals and vegetation materials especially from the training centres. Limited hazardous wastes (end-of-life EEE) may also be generated during maintenance activities. All waste generated will be required to be temporarily stored at the facility in appropriate containers prior to disposal at a permitted landfill site.

The following waste management principles apply during the operational phase:

- The O&M contractor and Site Manager must develop, implement and maintain a waste inventory reflecting all waste generated during operation for both general and hazardous waste streams.
- Adequate waste collection bins at site must be supplied. Separate bins should be provided for general and hazardous waste.
- Recyclable waste must be removed from the waste stream and stored separately.
- All waste must be stored in appropriate temporary storage containers (separated between different operational wastes, and contaminated or wet waste) at each operational area prior to being taken to the waste storage area for final sorting (if required). Waste storage shall be in accordance with all best-practice guidelines and under no circumstances may waste be burnt on site.
- Vegetation removed from the site must be chipped, removed from the site and disposed of at an appropriate waste disposal facility or used as mulch on site.
- Waste generated on site must be removed on a regular basis throughout the operational phase.
- Waste must be removed by a suitably qualified contractor and disposed at an appropriately licensed landfill site. Proof of appropriate disposal must be provided by the contractor.
- Waste EEE especially from damaged panels or end-of-life batteries shall be managed in line with the EPR plans set during purchase of all e-equipment associated with the project, and also in line with the FMEnv/NESREA regulations on e-wastes.

Decommissioning Phase

The project is expected to last for a minimum of 25 years, where with proper maintenance and management, it could last for up to 40years. Waste management principles applicable during this waste will include:

- Informing the appropriate ministries including FMEnv and NESREA about the decommissioning;
- Ensuring best practices in demolition and decommissioning to prevent pollution or contamination associated with improper waste handling.
- Use of the EPR as a standard for managing all associated e-wastes.
- Disposal of all other waste types using certified waste managers and at appropriate licensed landfills.

MONITORING OF WASTE MANAGEMENT ACTIVITIES

Records must be kept of the volumes/ mass of the different waste streams that are collected from the site throughout the life of the project. The appointed waste contractor is to provide monthly reports to the operator containing the following information:

- Monthly volumes/ mass of the different waste streams collected;
- Monthly volumes/ mass of the waste that is disposed of at a landfill site;
- Monthly volumes/ mass of the waste that is recycled; and
- Data illustrating progress compared to previous months.

This report will aid in monitoring the progress and relevance of the waste management procedures that are in place.

WASTE MANAGEMENT MITIGATION AND MONITORING COST

Finances must be allocated for proper waste management. The cost of mitigation and monitoring for waste management from pre-construction to operations and maintenance phase has been factored into each phase in the ESMP. This will cover trainings, PPE, receptables, containment areas and disposals. The cost for decommissioning will be however be required to be developed at the decommissioning phase with the realities at that period.

CONCLUSION

The waste management plan iterated above has been prepared with a view to ensuring that all wastes generated from the proposed project are effectively disposed. The effectiveness of the plan is premised on a number of factors, including, prompt and timely carting away of the wastes and using the right materials and equipment. To this end, waste disposal will be carried out only by contractors certified/approved by the Imo state Environmental and Protection Agency. In addition, adequate supervision shall be provided by the REA-PMU and the respective MDAs.

2. Labour Management and Influx Plan

A management procedure was developed for the SAPZ programme as a framework that identifies labour requirements and sets out the procedures for addressing labour conditions and risks associated with the proposed project in line with the AfDB Operational Safeguards (OS2) Policy: Labour and Working Conditions and National labour requirements.

This LMP covers contracted workers, community workers, and primary suppliers for the construction, operation, and maintainance works conditions. However, the LMP excludes government workers/civil servants working in connection with this project who will be governed by a set of public service rules, except if there is a legal transfer of their employment or engagement to this project, and technical consultants engaged for expertise contracts who will be governed by mutually agreed contracts with the Project Management Unit (PMU).

This plan identifies labour requirements and sets out the procedures for addressing labour conditions and risks associated with the proposed project, which is aimed at helping the client to determine the resources necessary to address project labour issues.

Table 1: Labour Management Plan

Potential Risks	Mitigation Measures	Monitoring Actions	Responsibility
LABOUR RISKS			
Discriminatory recruitment/ hiring, and gender imbalance in decision-making positions	Employment will be based on equal opportunity. This will be indicated in the advertisement for the recruitment/hiring of people into positions. Ensure gender balance in decision-making positions.	Job advert documents Record/List of individuals in the decision making positions	PMU
Exploitative wages due to a keen desire to get jobs	Program workers will be paid regularly as required by national law and labour management with a principle of "Equal pay for equal work/job performed"	Salary/Remuneration Pay-slip	PMU
Over-time and excessive working hours without compensation and break periods	Design and implement Human Resource policies and procedures which should include guidelines with respect to: Minimum Wage; Minimum age of workers; working hours, contracting terms, leave, equality and diversity, collective bargaining, hiring, working conditions; provision of PPEs; recruitment etc. Train the workforce on all HR policies and protocols, labour standards, and ensure the workforce understands their terms and conditions before engagement.	Presence of HR Policy Random Sampling of workers who understand the terms and conditions of engagement Record of Training on HR Policy and Protocols Number of trainings	PMU

Potential Risks	Mitigation Measures	Monitoring Actions	Responsibility
Labour risks			
Discriminatory recruitment/ hiring, and gender imbalance in decision-making positions	Employment will be based on equal opportunity. This will be indicated in the advertisement for the recruitment/hiring of people into positions. Ensure gender balance in decision-making positions.	Job advert documents Record/List of individuals in the decision making positions	PMU
Exploitative wages due to a keen desire to get jobs	Program workers will be paid regularly as required by national law and labour management, with a principle of "equal pay for equal work/job performed"	Salary/Remuneration Pay-slip	PMU

Over-time and excessive working hours without compensation and break periods	Design and implement Human Resource policies and procedures which should include guidelines with respect to: Minimum Wage; Minimum age of workers; working hours, contracting terms, leave, equality and diversity, collective bargaining, hiring, working conditions; provision of PPEs; recruitment etc. Train the workforce on all HR policies and protocols, labour standards, and ensure the workforce understands their terms and conditions before engagement.	Presence of HR Policy Random Sampling of workers who understand their terms and conditions of engagement Record of Training on HR Policy and Protocols Number of trainings	PMU

Potential Risks	Mitigation Measures	Monitoring Actions	Responsibility
Child Labour	The minimum age of Eighteen (18) years will be enforced at recruitment.	Absence of minors within the workforce	PMU Contractor
CONTRACTOR			
Community grievances and social threats	Develop, train, and implement Workers' Code of Conduct Develop and train the workforce on Grievance Redress Mechanism Monitor adherence to the Code of Conduct.	Number of workers that received induction on the code of conduct and GBV. Presence of Code of Conduct and GBV Number of GBV cases reported and resolved	PMU Contractor
Inadequate provision of Personal Protective Equipment (PPE)	Provide PPEs and train workers on usage as appropriate	Number of PPEs provided Number of incidents and accidents	PMU Contractor
Inequality during recruitment and discrimination against women, girls, and vulnerable people	The program should ensure non-discrimination in staff recruitment. The employment of program workers will be based on the principle of equal opportunity and fair treatment, and there will be no discrimination concerning any aspects of the employment relationship, such as recruitment, hiring, and compensation	Total number of staff employed Number of women employed	PMU Contractor

Unfair recruitment practices	Develop pre-qualification screening procedure for all consultants/contractors and suppliers The FPMUFPMU/SPIU should follow the in-country procurement procedures. Enlist the assistance of a professional procurement consultant Potential consultants/contractors should be verified by the concerned party from the World Bank Team. The Task team of the Bank should closely supervise the Contractor Recruitment Plan and ensure fairness of Employment Terms and Conditions against the applicable and prevailing National regulations	Number of contractors pre-qualified Number of Procurement Consultant engaged	PMU Task Team from the World Bank

Potential Risks	Mitigation Measures	Monitoring Actions	Responsibility
OCCUPATIONAL HEALTH & SAFETY RISKS			
Increase in incidents and accidents program implementation	Develop and implement a Hazard. Identification and Control Plan Update and train workers on OHS Management System	Hazard Identification and Control Plan prepared and implemented Number of incidents and accidents reported Several incidents and accidents addressed the Presence of the OHS system. Record and minutes of OHS Training	PMU Contractor
Poor working conditions, inadequate provision of Personal Protective Equipment (PPE)	Implement and ensure workers understand the program's health and safety plan. Provide and train the workforce on the usage of PPE	Number of PPEs provided and utilized Number of staff trained on the use of PPEs	PMU Contractor
Possibility of forced and child labour	Develop worker engagement procedure	Workers Engagement Procedure developed and implemented	PMU Contractor
COMMUNITY HEALTH & SAFETY RISK			
Occupational Health Risk affecting Nearby Communities (eg. Spread of respiratory issues/triggers)	Provide PPE to workers, dust control, health awareness program for workers and community	Health surveillance data; medical check up, community health reports No. of staff trained on preventive measures	PMU Contractor/ HSE Manager
Potential Risks	Mitigation Measures	Monitoring Actions	Responsibility
Fear due to other communicable diseases	Implement staff periodic medical/health surveillance and testing for communicable diseases.	Number of staff examined or submitted required medical certificate	PMU Contractor

Non-existence of compensation plan for accidents victims	Avail staff of the awareness of program compensation policy FPMUFPMU/SPIU must ensure they follow the Labour Act and Compensation Plan for accident victims	Number of awareness workshops conducted and participants	PMU Contractor
Grievances and social threats	Ensure the strict implementation of the Labour Management Plan to minimize social unrest. Contractors should be hired through a systematic process.	Number of complaints reported and addressed	PMU
SECURITY RISKS			
	The TA will assist the client in preparing a Security Management Plan (SMP); Before deploying security personnel, the program shall take measures to ensure that security personnel are: (i) screened to confirm that they have not engaged in past unlawful or abusive behavior, including excessive use of force; and (ii) adequately instructed and trained, regularly, on the use of force and appropriate behavior and conduct.	Security Management Plan (SMP) prepared and implemented	PMU

3. Code of Conduct for Contractor Workers

Individual Code of Conduct

Preventing Gender-Based Violence and Violence Against Children

Definitions:

Gender Based Violence (GBV) - is 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. It can be sexual, physical, psychological, and economic, and includes acts, attempted or threatened, committed with force, manipulation, or coercion and without the informed consent of the survivor. A SURVIVOR is a person who has experienced GBV.

Sexual Exploitation and Abuse (SEA) is the actual or attempted abuse of a position of vulnerability, power, or trust for sexual purposes including but not limited to profiting monetarily or socially from the sexual exploitation of another.

Sexual harassment (SH) is the unwanted behaviour of a sexual nature

Violence Against Children (VAC) is both physical and non-physical forms, including neglect, maltreatment, exploitation, and sexual abuse

I, _____, acknowledge that preventing gender-based violence (GBV) and violence against children (VAC) is important. The company considers that GBV or VAC activities constitute acts of gross misconduct and are therefore grounds for sanctions, penalties, or potential termination of employment. All forms of GBV or VAC are unacceptable, be it on the work site, the work site surroundings, or at the worker's camps. Prosecution of those who commit GBV or VAC may be pursued if appropriate.

I agree that while working on the project, I will:

a) Consent to a police background check.

b) Treat women, children (persons under the age of 18), and men with respect regardless of race, colour, language, religion, political or other opinion, national, ethnic or social origin, property, disability, birth or other status.
c) Do not use language or behaviour towards women, children, or men that is inappropriate, harassing, abusive, sexually provocative, demeaning, or culturally inappropriate.
d) Do not participate in sexual contact or activity with children, including grooming or contact through digital media. A mistaken belief regarding the age of a child is not a defense. Consent from the child is also not a defense or excuse.
e) Not engage in sexual favours—for instance, making promises or favourable treatment dependent on sexual acts, or other forms of humiliating, degrading, or exploitative behaviour.
f) Unless there is full consent by all parties involved, I will not have sexual interactions with members of the surrounding communities. This includes relationships involving the withholding or promise of actual provision of benefit (monetary or non-monetary) to community members in exchange for sex—such sexual activity is considered "non-consensual" within the scope of this Code.
g) Attend and actively partake in training courses related to HIV/AIDS, GBV, and VAC as requested by my employer.
h) Consider reporting through the GRM or to my manager any suspected or actual GBV or VAC by a fellow worker, whether employed by my company or not, or any breaches of this Code of Conduct.

About children under the age of 18:

i. Wherever possible, ensure that another adult is present when working in the proximity of children.
ii. Do not invite unaccompanied children unrelated to my family into my home unless they are at immediate risk of injury or in physical danger.
iii. Not sleep close to unsupervised children unless absolutely necessary, in which case I must obtain my supervisor's permission, and ensure that another adult is present if possible.
iv. Use any computers, mobile phones, or video and digital cameras appropriately, and never exploit or harass children or access child pornography through any medium (see also "Use of children's images for work-related purposes" below).
v. Refrain from physical punishment or discipline of children.
vi. Refrain from hiring children for domestic or other labour that is inappropriate given their age or developmental stage, which interferes with their time available for education and recreational activities, or which places them at significant risk of injury.
vii. Comply with all relevant local legislation, including labour laws about child labour.
viii. Use of children's images for work-related purposes
ix. When photographing or filming a child for work-related purposes, I must:
x. Before photographing or filming a child, assess and endeavor to comply with local traditions or restrictions for reproducing personal images.
xi. Before photographing or filming a child, obtain informed consent from the child and a parent or guardian of the child. As part of this, I must explain how the photograph or film will be used.
xii. Ensure photographs, films, videos, and DVDs present children in a dignified and respectful manner and not in a vulnerable or submissive manner. Children should be adequately clothed and not in poses that could be seen as sexually suggestive.
xiii. Ensure images are honest representations of the context and the facts.
xiv. Ensure file labels do not reveal identifying information about a child when sending images electronically.

Sanctions

I understand that if I breach this Individual Code of Conduct, my employer will take disciplinary action which could include:

- Informal warning.
- Formal warning.
- Additional Training.
- Loss of up to one week's salary.
- Suspension of employment (without payment of salary), for a minimum period of 1 month up to a maximum of 6 months.
- Termination of employment.
- Report to the police if warranted.

I understand that it is my responsibility to avoid actions or behaviours that could be construed as GBV or VAC or breach this Individual Code of Conduct. I do hereby acknowledge that I have read the foregoing Individual Code of Conduct, do agree to comply with the standards contained therein, and understand my roles and responsibilities

to prevent and respond to GBV and VAC. I understand that any action inconsistent with this Individual Code of Conduct or failure to take action mandated by this Individual Code of Conduct may result in disciplinary action and may affect my ongoing employment.

Signature: _____
Printed Name: _____
Title: _____
Date: _____

Contractor's Code of Conduct

Preventing Gender Based Violence (GBV) and Sexual Exploitation & Abuse (SEA)

Definitions:

Gender Based Violence (GBV) - is 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. It can be sexual, physical, psychological, and economic, and includes acts, attempted or threatened, committed with force, manipulation, or coercion and without the informed consent of the survivor. A SURVIVOR is a person who has experienced GBV.

Sexual Exploitation and Abuse (SEA) is the actual or attempted abuse of a position of vulnerability, power, or trust for sexual purposes including but not limited to profiting monetarily or socially from the sexual exploitation of another.

Sexual harassment (SH) is the unwanted behaviour of a sexual nature
Violence Against Children (VAC) is both physical and non-physical forms including neglect, maltreatment, exploitation, and sexual abuse.

The company is obliged to create and maintain an environment that prevents Gender Based Violence (GBV) and Sexual Exploitation & Abuse (SEA) issues. The company is also required to maintain an environment where the unacceptability of GBV and actions against children are communicated to all those involved in the project. To prevent GBV and SEA, the following core principles and minimum standards of behaviour will apply to all employees without exception:

GBV/SEA constitutes acts of gross misconduct and is therefore grounds for sanctions, penalties, and/or termination of employment. All forms of GBV/SEA including grooming are unacceptable, be it on the work site, the work site surroundings, project neighbourhoods, or at the worker's camps. Prosecution of those who commit GBV or SEA will be followed.

i. Treat women, children (persons under the age of 18), and men with respect regardless of race, color, language, religion, political or other opinion, national, ethnic or social origin, property, disability, birth or other status.
ii. Do not use inappropriate language or behavior towards women, children, and men. This includes harassing, abusive, sexually provocative, derogatory, demeaning, or culturally inappropriate words, gestures or actions.
iii. Sexual activity with children under 18—including through digital media—is prohibited. Mistaken belief regarding the age of a child and consent from the child is not a defense.
iv. Sexual favors or other forms of humiliating, degrading, or exploitative behavior are prohibited.
v. Sexual interactions between contractors and consultant employees at any level and members of the communities surrounding the workplace that are not agreed to with full consent by all parties involved in the sexual act are prohibited. This includes relationships involving the withholding/promise of actual provision of benefit (monetary or non-monetary) to community members in exchange for sex – such sexual activity is considered "non-consensual" within the scope of this Code.
vi. All employees are required to attend an induction training course before commencing work on-site to ensure they are familiar with the GBV/SEA Code of Conduct.
vii. All employees must attend a mandatory training course once a month for the duration of the contract, starting from the first induction training before the commencement of work, to reinforce the understanding of the institutional GBV and SEA Code of Conduct.
viii. All employees will be required to sign an individual Code of Conduct confirming their agreement to support GBV and SEA activities.

I do hereby acknowledge that I have read the foregoing Code of Conduct, do agree to comply with the standards contained therein, and understand my roles and responsibilities to prevent and respond to GBV and SEA. I understand that any action inconsistent with this Code of Conduct or failure to take action mandated by this Code of Conduct may result in disciplinary action.
FOR THE COMPANY
Signed by _____
Title: _____
Date: _____

Manager's Code of Conduct
Preventing Gender Based Violence (GBV) and Sexual Exploitation & Abuse (SEA)

Definitions:
Gender Based Violence (GBV) - is 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. It can be sexual, physical, psychological, and economic, and includes acts, attempted or threatened, committed with force, manipulation, or coercion and without the informed consent of the survivor. A SURVIVOR is a person who has experienced GBV.

Sexual Exploitation and Abuse (SEA) is the actual or attempted abuse of a position of vulnerability, power, or trust for sexual purposes including but not limited to profiting monetarily or socially from the sexual exploitation of another.

Sexual harassment (SH) is unwanted behaviour of a sexual nature
Violence Against Children (VAC) is both physical and non-physical forms, including neglect, maltreatment, exploitation, and sexual abuse

Managers at all levels have particular responsibilities to create and maintain an environment that prevents GBV and SEA. They need to support and promote the implementation of the Company Codes of Conduct. To that end, Project Managers are required to sign up to Codes of Conduct applicable to their managerial duties within the context and also sign the Individual Codes of Conduct. This commits them to support and develop systems that facilitate the implementation of this action plan and maintain a GBV-free, child-safe, and conflict-free work environment. These responsibilities include but are not limited to:

a) Mobilization
- Establish a GBV/SEA Compliance Team from the contractor's and consultant's staff to write an Action Plan that will implement the GBV and SEA Codes of Conduct.
- The Action Plan shall, as a minimum, include the: -
- Standard Reporting Procedure to report GBV and SEA issues through the project Grievance Redress Mechanism (GRM);
- Accountability Measures to protect the confidentiality of all involved; and,
- Response Protocol applicable to GBV survivors/survivors (including access to support coping and post-trauma management strategies) and perpetrators.
- Engagement of the services of social service providers (NGOs) with requisite skill in the prevention and management of GBV and SEA.
- Coordinate and monitor the development of the Action Plan and submit it for review to the RAMP-PIU safeguards teams, as well as the World Bank prior to mobilization.
- Update the Action Plan to reflect feedback and ensure the Action Plan is carried out in its entirety.
- Provide appropriate resources and training opportunities for capacity building so members of the compliance team will feel confident in performing their duties. Participation in the Compliance team will be recognized in the employee's scope of work and performance evaluations.
- Ensure that contractor, consultant, and client staff are familiar with the AGILEGRM and that they can use it to anonymously report concerns over GBV and SEA.
- Hold quarterly update meetings with the compliance team to discuss ways to strengthen resources and GBV/SEA support for employees and community members.
- In compliance with applicable laws and to the best of your abilities, prevent perpetrators of sexual exploitation and abuse from being hired, re-hired, or deployed. Use background and criminal reference checks for all employees.
- Ensure that when engaging in partnership, sub-grant, or sub-recipient agreements, these agreements.

- Incorporate this Code of Conduct as an attachment;
- Include the appropriate language requiring such contracting entities and individuals, and their employees and volunteers to comply with this Code of Conduct; and expressly state that the failure of those entities or individuals, as appropriate, to take preventive measures against GBV and SEA, to investigate allegations thereof, or to take corrective actions when GBV/SEA has occurred, shall constitute grounds for sanctions and penalties.

b) Training

- All managers are required to attend an induction manager training course before commencing work on-site to ensure that they are familiar with their roles and responsibilities in upholding the GBV/SEA Codes of Conduct.
- Provide time during work hours to ensure that direct recruits attend the mandatory induction training, which covers GBV/SEA training required of all employees before commencing work on site.
- Managers are required to attend and assist with the NGO-facilitated monthly training courses for all employees. Managers will be required to introduce the training and announce the results of consequential evaluations.

- Collect satisfaction surveys to evaluate training experiences and provide advice on improving the effectiveness of training.

c) Prevention

- All managers and employees shall receive a clear written statement of the company's requirements about preventing GBV/SEA in addition to the training.
- Managers must verbally and in writing explain the company and individual codes of conduct to all direct recruits.
- All managers and employees must sign the individual 'Code of Conduct for GBV and SEA, including an acknowledgment that they have read and agree with the code of conduct.
- To ensure maximum effectiveness of the Codes of Conduct, managers are required to prominently display the Company and Individual Codes of Conduct in clear view in public areas of the workspace. Examples of areas include waiting, rest, and lobby areas of sites, canteen areas, and health clinics.
- Managers will explain the GRM process to all employees and encourage them to report suspected or actual GBV/SEA.
- Managers should also promote internal sensitization initiatives (e.g., workshops, campaigns, on-site demonstrations, etc.) throughout the entire duration of their appointment in collaboration with the compliance team, service providers, and by the Action Plan.
- Managers must provide support and resources to the compliance team and service provider NGOs to create and disseminate the internal sensitization initiatives through the Awareness-raising strategy under the Action Plan.

d) Response

- Managers will be required to provide input, final decisions, and sign off on the Standard Reporting Procedures and Response Protocol developed by the compliance team as part of the Action Plan.
- Once signed off, managers will uphold the Accountability Measures outlined in the Action Plan to maintain the confidentiality of all employees who report or (allegedly) perpetrate incidents of GBV/SEA (unless a breach of confidentiality is required to protect persons or property from serious harm or where required by law).
- Once a sanction has been determined, the relevant manager(s) is/are expected to be personally responsible for ensuring that the measure is effectively enforced, within a maximum timeframe of 14 days from the date on which the decision was made.
- Managers failing to comply with such provisions can be, in turn, subject to disciplinary measures, to be determined and enacted by the company's CEO, Managing Director, or equivalent highest-ranking manager. Those measures may include:

- Informal warning
- Formal warning
- Additional Training
- Loss of up to one week's salary.
- Suspension of employment (without payment of salary), for a minimum period of 1 month up to a maximum of 6 months.
- Termination of employment.

I do hereby acknowledge that I have read the foregoing Code of Conduct, do agree to comply with the standards contained therein, and understand my roles and responsibilities to prevent and respond to GBV and SEA. I understand that any action inconsistent with this Code of Conduct or failure to take action mandated by this Code of Conduct may result in disciplinary action.

FOR THE EMPLOYER
Signed by _____
Title: _____
Date: _____

4. Occupational Health and Safety Plan (OHS)

Occupational Health and Safety Plan (OHS)

Every project poses its health, Safety and Environment (HSE) risks. This plan was necessitated to meet up with OHS standards and to achieve the objectives set for the proposed project. The project team shall undertake to ensure high-performance standards and conformity with contract requirements by managing the works systematically and thoroughly.

HSE Objectives

The Objectives for this plan are to:

- Adopt a positive Health & Safety Culture.
- Adopt the principles of prevention to avoid risk.
- Complete the project without incident (Zero fatalities, Zero Lost Time Injury (LTI), or occupational illness).

Policy Statement

In addition to the existing HSE policy, other policies shall be developed which include:

i. Substance Abuse Policy – Prohibiting the consumption or possession of narcotics, drugs, alcohol, and other banned substances
ii. Emergency Response Policy – Stating a commitment to ensure adequate resources and arrangements are in place in the case of an emergency.
iii. Community Affairs Policy – Stating a commitment to foster healthy relationships with communities through observance of the highest standard of conduct.
iv. Road Safety Policy–Stating commitment to complying with Road Traffic regulations and continuously improving its road safety performance by implementing a Road Safety Management Plan (RSMP)

KEY RESPONSIBILITIES

a) HSE Manager/Supervisor Responsibilities

i. Prepare relevant OHS documentation and procedures.
ii. Monitor the efficient implementation of OHS requirements.
iii. Participate and organize the OHS risk assessments.
iv. Advise management of compliance and conditions requiring attention.
v. Conduct regular HSE inspections.
vi. Make a thorough analysis of statistical data and inspections; delineate problem areas; and make recommendations for solutions.
vii. Take part in the review of all OHS incidents and assist in investigating incidents.
viii. Monitor the efficient implementation of the Project's OHS requirements.
ix. Organize the Project's OHS risk assessment exercises.
x. Check on the use of all types of personal protective equipment, specifies the use of appropriate PPE for the various work activities. Evaluate their effectiveness and suggest improvements where indicated.

b) All employees Responsibilities

- Take all reasonable and practical steps to care for their own health and safety and avoid affecting the health and safety of co-workers and the general public.
- Follow all instructions and use the equipment properly. Do not interfere with any safety arrangements.
- Report any circumstances that may not comply with the project's OHS management system.

c) Competency

- All personnel required to operate or work with any equipment or machine must be competent, and be tested for each equipment that he/she shall be operating. All personnel who, as part of their profession, require licensing or certification must obtain the necessary certification before he/she shall be allowed to work on the site.

d) Induction/Orientation

Every new or rehired employee and subcontractor employee must undergo mandatory OHS orientation/induction. The purpose of the Induction is to educate workers and make them aware of the major potential hazards he or she shall come into contact with while working on the site; also, it is one more opportunity to stress the importance of HSE being the first priority in the operations.
The content of the HSE orientation/induction shall cover the following subjects:

i. Site safety rules.

- Personnel protective equipment requirements (PPE).
- Environmental sensitivity and protection.
- Preparation and planning of the job (Daily Pre-task talk).
- Emergency plan and muster points.

ii. Project-Specific HSE Training

In addition to the HSE orientation /induction, there shall be specific site HSE training which shall cover the following topics:

- Manual handling.
- Electrical Safety
- Emergency Prevention, Preparedness and Response
- Work at height training
- First Aid training (for site First Aiders)
- Safe Driving Techniques (for drivers)

iii. Hazard identification & HSE risk assessment

The project HSE risk assessment shall be developed and recorded. The Project's HSE risk assessment shall be conducted by a team consisting of the HSE Manager/ Supervisor and technical managers/supervisors. It must be approved by the Project manager.

- EMERGENCY PREPAREDNESS AND RESPONSE

Emergency procedures and evacuation plans shall be developed by the HSE Department and displayed on the notice board. These procedures shall be communicated to all staff. Also, each section/department shall have at least a trained first aider at all times.

- HSE Reporting

All incidents and illnesses must be reported to the site supervisor, after which an investigation shall commence and be recorded so that appropriate corrective actions can be implemented to prevent any re-occurrence, and report findings shall be forwarded to management for review. Reporting requirements shall include notification of incidents, investigation reports, and monthly reports. A Notification of Incident form shall be developed, which shall be filled and submitted to the HSE department for investigation.

- HSE Inspection and Audits

For continual improvement of the HSE management system, HSE inspection and audit shall be conducted. An inspection checklist shall be developed. This is to ensure that the HSE management system is being adhered to. The inspection shall be conducted by the HSE department together with site management.

- Corrective and Preventive Actions and Non-Conformities

During inspections, concerns raised shall be addressed and closed out. It is expected that in two weeks, a close-out inspection shall take place to verify that the corrective actions have been closed.

- Project HSE Rules

The project HSE rules shall be developed and supervision shall develop specific rules and procedures when necessary. The following site rules shall be implemented at all times. The Site Manager shall draw these rules to the attention of their workmen or staff. The Principal Contractor may implement additional site rules during the contract program. Any such additional rules shall be notified to all personnel engaged in the project before their implementation. The HSE rules shall include but not be limited to:

a) Personal Protective Equipment must be worn at all times.
b) All instructions issued by the Site Manager regarding the storage, handling, or cleaning of materials, plant, and equipment must be followed.
c) All vehicles must be parked in the designated areas.

d) Any workman suffering from a medical condition that might affect his work and/or that could require specific medical treatment must inform the supervisor before commencing work.
e) All site tools shall either be battery-operated or 110 volts.
f) No one shall be permitted on site if it is believed that they are under the influence of alcohol or drugs.
g) Vehicles must not reverse without a banksman in attendance.
h) All visitors to the site must undergo a site-specific induction and an operative Identity badge must be worn at all times.
i) Smoking and eating shall only be permitted in the designated area. This area shall be identified during induction.
j) No hot works operations are permitted without a hot work permit in place.
k) There shall be no radios or other music-playing devices on site.
l) Good housekeeping practices are to be adopted.
m) Compliance with all Ethical Power Permit to Work systems.

SAFE WORK PRACTICES

Implementing safe work practices is one of the keys to achieving our HSE objectives and some of these safe work practices include:

Personal Protective Equipment (PPE)

- The basic PPE required for the project shall be Safety Glasses, Safety Boots, Hand Gloves, a Hard Hat, and a Coverall.
- Any other PPE shall be used as applicable.
- Management is responsible for the provision of PPE and usage shall be enforced at all times.
- PPE shall be provided in circumstances where exposure to hazards cannot be avoided by other means or to supplement existing control measures identified by a risk assessment. An assessment shall be made to ensure that the PPE is suitable for the purpose and is appropriate to the risk involved.
- Information, instruction & training shall be given to all employees on the safe use, maintenance, and storage of PPE.
- Employees shall, under instructions given, make full use of all PPE provided, maintain it in a serviceable condition, and report its loss or defect immediately to the maintenance department where it shall be replaced.
- PPE shall be replaced when it is no longer serviceable and returned on a new or old basis. Employees shall sign to state that they have received PPE when issued.