

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

FINAL DRAFT REPORT

FOR

**THE PROPOSED AGRICULTURAL TRANSFORMATION
CENTRE (ATC) LOCATED AT THE ERUWA FARM
SETTLEMENT, ERUWA, IBARAPA EAST LOCAL
GOVERNMENT AREA, OYO STATE**

SUBMITTED TO

**Oyo State Special Agro-Industrial Processing Zones
(OYS-SAPZ)**

Oyo State, Nigeria



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Acronyms and Abbreviations

°C	Degree Celsius
%	Percentage
ADS	Agricultural Development Scheme
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

Eruwa ATC	Eruwa Agricultural Transformation Centre
ESA	Environmentally Sensitive Areas
ESI	Environmental and Social Impacts
ESIA	Environmental and Social Impact Assessment
ESMS	Environmental and Social Management System
et. al	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 ₂ S	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
NO _x	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

ES1: Introduction

This Environmental and Social Impact Assessment (ESIA) has been prepared for the proposed Eruwa Agricultural Transformation Centre (ATC) under the African Development Bank (AfDB)-supported Special Agro-Industrial Processing Zones (SAPZ) Programme in Oyo State, Nigeria. The project is being implemented by the Oyo State Government through the Oyo State Agribusiness Development Agency (OYSADA) under a Public-Private Development Partnership (PPDP) arrangement.

The ESIA was undertaken to identify, predict and evaluate the potential environmental and social impacts associated with the planning, construction, operation and eventual decommissioning of the proposed Agricultural Transformation Centre. It also proposes practical mitigation and monitoring measures required to avoid, minimise, restore or compensate for adverse impacts while enhancing positive project outcomes.

The assessment has been conducted in accordance with the Environmental Impact Assessment Act of Nigeria, relevant environmental regulations, the African Development Bank's Integrated Safeguards System (ISS), the AfDB Operational Safeguards, the General Environmental, Health and Safety (EHS) Guidelines, and other applicable international environmental and social standards.

ES2: Project Description

The proposed Eruwa Agricultural Transformation Centre is located within the Eruwa Farm Settlement in Ibarapa East Local Government Area of Oyo State. The facility is designed to serve as a modern agricultural production, aggregation, processing and value-addition hub capable of supporting commercial agriculture, agro-processing industries and market access for farmers within the SAPZ catchment area.

Major project components include:

- Agricultural production zones;
- Industrial processing facilities;
- Storage and warehousing facilities including silos and cold storage;
- Internal road network and drainage infrastructure;
- Water supply and treatment systems;
- Power generation and distribution infrastructure;
- Administrative and support facilities;
- Waste management infrastructure;
- Security installations and utilities.

Priority commodities to be supported include cassava, maize, tomato, cocoa and soybean. The project is expected to improve agricultural productivity, reduce post-harvest losses, stimulate agro-industrial investments, create employment opportunities and strengthen food security within Oyo State and neighbouring regions.

ES3: Policy, Legal and Institutional Framework

The ESIA was undertaken within the framework of applicable Nigerian environmental legislation and international safeguard requirements. The principal legal instruments include the Environmental Impact Assessment Act, National Environmental Regulations enforced by NESREA, the National Environmental (Sanitation and Waste Control) Regulations, Labour Act, Factories Act, Land Use Act, National Policy on Environment and other sector-specific regulations.

The assessment also complies with the African Development Bank Integrated Safeguards System (ISS). The applicable Operational Safeguards include:

- **OS1:** Environmental and Social Assessment;
- **OS3:** Biodiversity and Ecosystem Services;
- **OS4:** Pollution Prevention, Resource Efficiency and Hazardous Materials Management;
- **OS5:** Labour, Working Conditions, Health, Safety and Security.

Operational Safeguard OS2 relating to involuntary resettlement was found not to be applicable since the project site is government-owned and no physical displacement is anticipated. However, social safeguards relating to labour management, stakeholder engagement, community health and safety, grievance management and biodiversity conservation remain integral components of project implementation.

ES4: ESIA Methodology

The ESIA adopted an integrated approach involving literature review, reconnaissance surveys, field investigations, environmental sampling, laboratory analysis and stakeholder consultations.

Baseline studies covered:

- Physical environment (climate, geology, soils, hydrology and air quality);
- Biological environment (flora, fauna and ecosystem characteristics);
- Socio-economic environment;
- Cultural heritage;
- Public health;
- Occupational health and safety considerations.

Environmental samples including air quality, ambient noise, soil and water quality were analysed using internationally accepted laboratory procedures and benchmarked against Nigerian standards, WHO guidelines and World Bank EHS standards.

Stakeholder consultations included community meetings, focus group discussions, key informant interviews and consultations with government institutions, traditional authorities, women, youths, farmers and vulnerable groups.

ES5: Existing Environmental and Social Conditions

The project site lies within the derived savannah ecological zone characterised by tropical climatic conditions with distinct wet and dry seasons. Existing land use consists predominantly of agricultural land, secondary vegetation and modified habitats.

Baseline environmental monitoring indicates that ambient air quality, surface water quality, groundwater quality and ambient noise levels are generally within applicable national and international standards. Soil characteristics indicate suitability for agricultural production with no evidence of significant contamination.

Vegetation within the project area largely comprises cultivated species and secondary regrowth with relatively low conservation significance. Wildlife diversity is limited due to long-term agricultural activities although several common fauna species remain present.

Socio-economic studies indicate that agriculture remains the dominant livelihood activity within surrounding communities. Farming, trading, artisanal activities and small-scale enterprises constitute the primary sources of household income. Communities expressed strong support for the project owing to anticipated employment generation, improved infrastructure, market access and economic development while emphasising the need for local employment, environmental protection, transparent communication and effective grievance resolution.

ES6: Stakeholder Engagement and Public Consultation

Stakeholder engagement formed an integral component of the ESIA process and was undertaken throughout project preparation.

Consultations were conducted with:

- Oyo State Government agencies;
- Local Government authorities;
- Traditional institutions;
- Farmers' associations;
- Community leaders;
- Women groups;
- Youth organisations;
- Vulnerable persons;

- Regulatory agencies;
- Civil society organisations;
- Local residents and project-affected communities.

Major issues raised included:

- Employment opportunities for local residents;
- Transparent recruitment procedures;
- Protection of community health and safety;
- Dust and noise management during construction;
- Road safety;
- Protection of water resources;
- Waste management;
- Security;
- Compensation for any unforeseen damages;
- Continuous stakeholder engagement;
- Accessible grievance redress mechanisms.

These concerns have been incorporated into project design and reflected within the Environmental and Social Management Plan (ESMP), Stakeholder Engagement Plan (SEP), Labour Management Procedures (LMP), Community Health and Safety measures and Grievance Redress Mechanism (GRM).

ES7: Analysis of Alternatives

The ESIA considered several project alternatives including the "No Project" option, alternative site considerations, engineering design alternatives and operational alternatives.

The "No Project" option was rejected because it would forgo opportunities for agricultural transformation, employment generation, industrial development, value-chain expansion and rural economic growth envisioned under the SAPZ Programme.

Alternative engineering and operational options were incorporated to minimise environmental impacts through improved drainage systems, efficient water use, integrated waste management, renewable energy opportunities where feasible, pollution prevention measures and integrated pest management practices.

ES8: Summary of Potential Environmental and Social Impacts

The project is expected to generate significant positive socio-economic impacts including:

- Increased agricultural productivity;

- Employment generation during construction and operation;
- Improved household incomes;
- Development of agro-processing industries;
- Increased investment within the agricultural sector;
- Enhanced food security;
- Improved market access;
- Technology transfer and capacity building;
- Increased internally generated revenue;
- Improved rural infrastructure.

Potential adverse impacts identified include:

Construction Phase

- Vegetation clearing and habitat disturbance;
- Soil erosion and compaction;
- Dust generation;
- Noise and vibration;
- Construction waste generation;
- Occupational accidents and injuries;
- Community health and safety risks;
- Increased traffic;
- Temporary disruption of local activities;
- Labour influx risks including GBV/SEA/SH;
- Water pollution from construction activities.

Operational Phase

- Air emissions from generators and machinery;
- Noise from industrial operations;
- Wastewater generation;
- Solid and hazardous waste generation;
- Increased water demand;
- Improper chemical and pesticide handling;

- Occupational health and safety risks;
- Community safety concerns;
- Increased traffic movements;
- Fire and emergency risks.

Most identified impacts are assessed as low to moderate significance after implementation of recommended mitigation measures, while several positive impacts are considered long-term and highly beneficial.

ES9: Mitigation Measures

Comprehensive mitigation measures have been incorporated into the ESMP to minimise adverse impacts throughout the project lifecycle.

Key mitigation measures include:

- Dust suppression through regular water sprinkling;
- Proper waste segregation, storage and disposal;
- Erosion and sediment control measures;
- Pollution prevention and spill response procedures;
- Integrated Pest Management (IPM);
- Biodiversity conservation measures;
- Occupational Health and Safety Management Plan;
- Provision and enforcement of Personal Protective Equipment (PPE);
- Emergency preparedness and response plans;
- Traffic Management Plan;
- Community Health and Safety Plan;
- Labour Management Procedures;
- GBV/SEA/SH Action Plan;
- Stakeholder Engagement Plan;
- Grievance Redress Mechanism;
- Continuous environmental monitoring and auditing.

Implementation of these measures will ensure that residual environmental and social impacts remain within acceptable limits.

ES10: Environmental and Social Management Plan (ESMP)

An Environmental and Social Management Plan has been developed to ensure effective implementation of all mitigation, monitoring and institutional measures identified during the ESIA.

The ESMP clearly defines:

- Mitigation actions;
- Monitoring indicators;
- Performance targets;
- Responsible implementing institutions;
- Reporting requirements;
- Capacity building programmes;
- Implementation schedule;
- Budget requirements.

Institutional responsibility for ESMP implementation will be shared among OYSADA, the State Project Implementation Unit (SPIU), contractors, supervising consultants, environmental regulators and community representatives.

Capacity building programmes covering environmental management, occupational health and safety, waste management, emergency preparedness, stakeholder engagement, grievance management and regulatory compliance have also been incorporated to strengthen implementation capacity.

The estimated cost for implementing the Environmental and Social Management Plan is **₦79,603,332.97** (Seventy-Nine Million, Six Hundred and Three Thousand, Three Hundred and Thirty-Two Naira, Ninety-Seven Kobo), equivalent to approximately **US\$57,475.33** using an exchange rate of **₦1,385 to US\$1**. This budget covers mitigation measures, environmental monitoring, institutional strengthening, training and capacity building, environmental management activities and a 10% contingency provision.

ES11: Environmental and Social Monitoring

A comprehensive monitoring programme has been established to evaluate compliance with environmental and social requirements throughout project implementation.

Monitoring activities will include:

- Air quality monitoring;
- Surface and groundwater quality monitoring;
- Noise monitoring;
- Soil quality monitoring;

- Biodiversity monitoring;
- Waste management audits;
- Occupational health and safety inspections;
- Community health and safety monitoring;
- Labour compliance monitoring;
- GBV/SEA/SH monitoring;
- Stakeholder engagement effectiveness;
- Grievance management performance;
- Environmental compliance audits.

Routine monitoring reports will be prepared and submitted to the relevant regulatory authorities and financing institutions to ensure continuous compliance with national legislation and AfDB safeguard requirements.

ES12: Conclusion

The Environmental and Social Impact Assessment concludes that the proposed Eruwa Agricultural Transformation Centre is environmentally and socially feasible. The project is expected to deliver substantial long-term economic, agricultural and social benefits to Oyo State through employment generation, industrial development, agricultural transformation and improved livelihoods.

Although the project will generate a number of environmental and social impacts during construction and operation, these impacts are generally site-specific, predictable and can be effectively avoided, minimised or managed through the implementation of the prescribed Environmental and Social Management Plan and associated safeguard instruments.

Provided that the recommended mitigation measures, monitoring requirements, stakeholder engagement commitments and institutional arrangements are fully implemented, the project is considered environmentally acceptable and socially sustainable. Consequently, approval of the project is recommended, subject to full compliance with applicable Nigerian environmental regulations, African Development Bank Integrated Safeguards System requirements and all commitments contained in the ESMP.

Environmental 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.

Nigeria's projected population of 329 million people (Abbani, 2021, Statista, 2026), with roughly 60 million living in poverty, demands immediate action. Food security and sustainability for the Nigerian population 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.

Agricultural development remains the central focus of the Oyo State Agribusiness Development Agency (OYSADA) policy under the Public–Private Development Partnership (PPDP) framework. Within this framework, the African Development Bank (AfDB) serves as a key private and development partner supporting the transformation of Oyo State's agricultural landscape. The initiative strategically positions private investors, in collaboration with AfDB and the State Government, to drive the shift from low-productivity, subsistence-based farming to a system characterized by high productivity, integrated value chains, and extensive value addition, thereby enhancing food security, employment generation, and rural economic growth across the state.

In this regard, the Oyo State Agribusiness Development Agency (OYSADA), under the framework of the Oyo State Commercial Agriculture Development Project, is spearheading the revitalization of two strategic farm settlements—Eruwa Farm Settlement in Ibarapa East Local Government Area and Akufo Farm Settlement in Ido Local Government Area. These projects are being implemented in collaboration with the African Development Bank (AfDB) under the Special Agro-Industrial Processing Zones (SAPZ) Programme.

The Eruwa ATC is designed as a flagship pilot project within this initiative. The groundbreaking ceremony, held on Thursday, 21 November 2024, formally signalled the redevelopment of the Eruwa Farm Settlement through a Public–Private Partnership (PPP) model between the Oyo State Government, AfDB, and selected private investors.

Originally established in the 1950s by the Western Nigeria Government, the Eruwa Farm Settlement was conceived as an agricultural training and production centre to promote food security and rural development. Its selection for transformation into an agribusiness hub was guided by a set of technical, socio-economic, and environmental criteria.

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 the potential environmental and social impacts associated with the proposed Eruwa ATC located within the Eruwa Farm Settlement in Ibarapa-East Local Government Area of Oyo State, Nigeria. The project area is characterized by a semi-rural farming population whose major occupations include crop farming, livestock rearing, petty trading, and other agricultural-related activities. Major crops cultivated within the area include cassava, maize, cocoa, cola, yam, and oil palm, while poultry and goat rearing are common livelihood sources.

The ESIA study was commissioned under the Oyo State Agribusiness Development Agency (OYSADA) as part of the Special Agro-Industrial Processing Zones (SAPZ) Programme jointly supported by the African Development Bank (AfDB), the International Fund for Agricultural Development (IFAD), and the Islamic Development Bank (IsDB), in collaboration with the Federal Ministry of Agriculture and Food Security (FMAFS). The SAPZ Programme was established to promote inclusive and sustainable agro-industrial development across participating states in Nigeria through the creation of agricultural growth clusters that integrate farmers, processors, and markets using modern infrastructure, value addition systems, and private-sector participation. The Eruwa ATC forms a strategic component of the Oyo State SAPZ Programme aimed at revitalizing the Eruwa Farm Settlement into a modern agro-industrial cluster capable of enhancing agricultural productivity, employment generation, food security, and rural industrialization.

The overall objective of the project is to restore, transform, and reposition agriculture as a major driver of Oyo State's economy through sustainable and inclusive agribusiness development. Specifically, the project seeks to improve agricultural infrastructure, encourage mechanized and climate-smart farming practices, enhance agro-processing and value addition, facilitate access to markets and finance, and stimulate private sector investment through Public-Private Partnerships (PPPs). These interventions are being implemented in line with OYSADA's environmental sustainability commitments and the AfDB Integrated Safeguards System (ISS), which requires Environmental and Social Impact Assessments for Category 2 projects.

Accordingly, this ESIA identifies and evaluates the likely impacts associated with land preparation, infrastructure development, construction activities, agro-industrial operations, resource utilization, waste generation, and associated socio-economic activities within the Eruwa ATC area. The assessment further proposes appropriate mitigation, monitoring, and enhancement measures to ensure compliance with national environmental regulations, Oyo State environmental requirements, and international safeguard standards.

In recognition of the anticipated environmental and social impacts associated with the project implementation and operational phases, OYSADA, under the SAPZ Programme, engaged independent Environmental and Social Consultants to undertake the ESIA study for the Eruwa ATC, including baseline environmental studies, stakeholder consultations, impact assessment, and the preparation of an Environmental and Social Management Plan (ESMP).

1.2 Project Proponent

This Environmental and Social Impact Assessment (ESIA) report presents the findings for the proposed Eruwa Agricultural Transformation Centre (ATC), located within the Eruwa Farm Settlement, Ibarapa-East 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 nationally by the Federal Ministry of Agriculture and Food Security (FMAFS). Financing support for the Project is provided primarily by the African Development Bank (AfDB), alongside co-financing support from the International Fund for Agricultural Development (IFAD) and the Islamic Development Bank (IsDB).

The SAPZ Programme was formally launched on October 24–25, 2022, by the Federal Government of Nigeria in partnership with the African Development Bank (AfDB), the International Fund for Agricultural Development (IFAD), and the Islamic Development Bank (IsDB). The Programme was conceived to promote inclusive and sustainable agro-industrial development, improve food and nutrition security, and generate employment opportunities, particularly for youth and women in rural communities.

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

Mandate and Role

The SAPZ Programme is designed to:

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

Relevance to the Eruwa Project

The Eruwa Agricultural Transformation Centre (ATC) represents a collaborative initiative between the Oyo State Government and the African Development Bank (AfDB) under the SAPZ framework. The Project is intended to revitalize the Eruwa Farm Settlement into a modern agricultural growth and agro-processing cluster capable of improving agricultural productivity, enhancing value addition, and strengthening market linkages across key agricultural value chains within the region.

Through the SAPZ initiative, the Eruwa ATC is expected to promote mechanized and climate-smart agriculture, stimulate agro-processing activities, generate employment opportunities, and support youth and women empowerment within the agricultural sector. The Project will also

contribute to improved food security, rural industrialization, and sustainable economic development in Oyo State while ensuring environmental and social sustainability through the implementation of appropriate safeguard measures.

Under the SAPZ Programme, the Federal and State Governments, in collaboration with AfDB and other financing partners, aim to establish competitive, inclusive, and resilient agribusiness ecosystems capable of driving economic diversification and rural transformation. Consequently, the Eruwa ATC forms an important component of Oyo State's agricultural transformation strategy and aligns with national agricultural development priorities and the AfDB "Feed Africa" Strategy.

The Special Agro-Industrial Processing Zones (SAPZ) Programme is financed through a multi-partner arrangement involving the African Development Bank (AfDB), International Fund for Agricultural Development (IFAD), and Islamic Development Bank (IsDB), which provide sovereign financing, fiduciary oversight, safeguards supervision, and implementation support. For the Oyo State SAPZ Programme, the African Development Bank (AfDB) serves as the lead financing institution, while the Oyo State Government provides counterpart funding and land-related support for project implementation.

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

The Oyo State Agribusiness Development Agency (OYSADA) serves as the Implementing Agency responsible for day-to-day project coordination, supervision of contractors and consultants, safeguards implementation, stakeholder engagement, monitoring activities, and reporting to both national authorities and financing institutions.

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.

It situates the EIA within the SAPZ Programme, which promotes agro-industrial development through the Agricultural Transformation Centres (ATCs) 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.

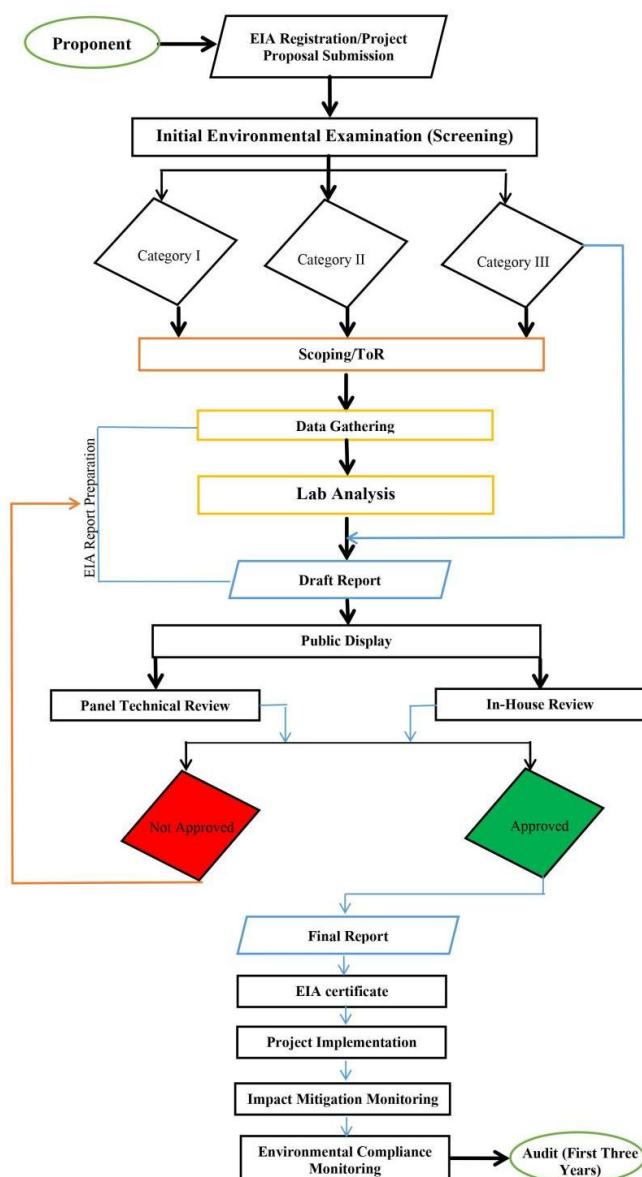


Figure 1.1: EIA Process Flowchart

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.I. 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 to 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 Eruwa ATC 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 Eruwa ATC 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 Eruwa ATC 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)
- Ibarapa-East Local Government Bye-laws

❖ **Eruwa Agricultural Transformation Centre 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.

❖ **Ibarapa-East Government by-laws on land development and waste management**

They serve as the local regulatory framework governing environmental sanitation, waste management, and land use within the project area. The Eruwa ATC 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 subsections 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).

1.7.11 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.

1.7.12 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 Eruwa ATC.
- 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 Bibliography**

Chapter Two

2.

Project Justification

2.1 Background Information

This chapter presents the rationale for the proposed Eruwa Agricultural Transformation Centre (ATC) located within the Eruwa Farm Settlement, Ibarapa-East Local Government Area, 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 Eruwa Agricultural Transformation Centre (ATC) is driven by the need to address existing agricultural productivity, processing, and market-access constraints within Eruwa Farm Settlement and the wider Ibarapa region of Oyo State. Eruwa possesses favourable agro-ecological conditions, including fertile agricultural land, suitable rainfall distribution, and an established farming population engaged in the cultivation of cassava, maize, cocoa, vegetables, yam, and oil palm, alongside poultry and livestock production. Despite these advantages, agricultural activities within the area remain largely smallholder-based, fragmented, and dependent on traditional farming methods, resulting in low productivity, limited commercialization, and high post-harvest losses.

A major challenge within the Eruwa agricultural system is the inadequate integration of production, processing, storage, and market infrastructure. Existing farming activities are predominantly focused on primary production with limited access to mechanization, irrigation systems, extension services, agro-processing facilities, structured financing, and modern supply chains. Consequently, farmers experience reduced incomes, weak market access, poor value addition opportunities, and significant losses during harvesting and distribution stages.

The Eruwa ATC is designed to address these constraints through an integrated agricultural transformation model that combines modern farming systems, agro-processing facilities, storage infrastructure, aggregation centres, and improved market linkages within a coordinated agribusiness platform. The Project is intended to promote economies of scale, improve productivity, reduce post-harvest losses, strengthen value-chain integration, and facilitate participation of smallholder farmers through out-grower arrangements and agricultural support services.

The selection of Eruwa Farm Settlement as the project location is strategic due to the availability of agricultural land, the area's long-standing farming history, proximity to agricultural communities within Ibarapa-East, and accessibility to regional markets within Oyo State and neighbouring southwestern states. The presence of an existing farming population and agricultural activities provides a suitable foundation for rapid project integration, community participation, and sustainable agribusiness development.

The scale and design of the Project are aligned with the objectives of the Special Agro-Industrial Processing Zones (SAPZ) Programme, which promotes integrated agricultural

value-chain development, agro-industrial clustering, private sector participation, and rural economic transformation. Through the introduction of mechanized farming, climate-smart agriculture, agro-processing infrastructure, and supporting utilities, the Project aims to transform Eruwa Farm Settlement from a predominantly subsistence-based farming area into a structured and market-oriented agricultural growth centre.

Conclusively, the need for the Project is justified by:

- The underutilized agricultural potential of Eruwa Farm Settlement and the wider Ibarapa region;
- The absence of integrated agro-processing, storage, and market infrastructure;
- The inefficiencies associated with existing smallholder and subsistence farming systems;
- The need to enhance agricultural productivity, value addition, and employment generation; and
- The strategic suitability of Eruwa as a scalable agricultural transformation and agro-industrial cluster.

The Eruwa ATC therefore represents a targeted intervention aimed at unlocking local agricultural potential, strengthening agricultural value chains, improving food security, promoting rural industrialization, and supporting sustainable agribusiness development within Oyo State

2.3 Value of the Project

The total estimated investment for the Oyo State Agricultural Transformation Centre (ATC) at Eruwa Farm Settlement, Ibarapa-East Local Government Area, Oyo State, is approximately ₦11.5 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 model leverages public-sector facilitation, enabling infrastructure, and policy support 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 under the Special Agro-Industrial Processing Zones (SAPZ) Programme, which provides technical and financial support for the development of agro-industrial clusters across Nigeria. The SAPZ initiative promotes inclusive and sustainable agricultural industrialization through the concentration of agro-processing, logistics, and support services 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 supply, and water infrastructure, while private-sector partners will invest in production, processing, packaging, and marketing components.

This model is expected to enhance agricultural productivity, reduce post-harvest losses, increase export potential, and strengthen rural livelihoods within the Eruwa 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 Eruwa ATC 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 ATC 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 ATC 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 ATC 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 ATC 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 Eruwa ATC 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 ESIA 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 Eruwa ATC.

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

- **Employment and Job Creation:** The ATC 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 Eruwa ATC 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 ESIA 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 ATC will be sited at Eruwa. 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 Eruwa Agricultural Transformation Centre (ATC) in Ibarapa-East Local Government Area (LGA) of Oyo State, Nigeria. The information presented covers, 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 Eruwa Agricultural Transformation Centre (ATC) is situated within the Eruwa Farm Settlement, located in Eruwa, the headquarters of Ibarapa-East Local Government Area of Oyo State, Nigeria. The settlement occupies a total land area of approximately 3,067 hectares, as delineated by the Oyo State Ministry of Agriculture, Natural Resources, and Rural Development.

Geographically, the site lies within Latitude 7°31'N and Longitude 3°22'E in the southwestern region of Nigeria and is accessible through the Abeokuta–Igboora–Iseyin road network. The settlement also accommodates existing infrastructure belonging to the Oyo State Water Corporation, including a dam used for water purification and public supply, which will serve as a key utility resource for the project.

The surrounding land cover consists mainly of secondary vegetation comprising shrubs, grasses, and scattered trees, indicating a regenerating fallow ecosystem with moderate anthropogenic disturbance. The terrain is gently undulating and well-drained, making it suitable for mixed agricultural production, agro-industrial development, and institutional land uses.

The proposed Eruwa ATC has been structured into functional land-use zones to ensure efficient spatial organization, environmental protection, and socio-economic integration. The breakdown of the land use plan is as follows:

Table 3.1: Land Allocation for Eruwa Agricultural Transformation Centre (ATC)

Zone	Description	Area (Ha)
A	Agricultural Production Zone (Core Farming Activities)	2,567
B	Administrative, Training and Support Facilities	350
C	Agro-Industrial / Processing Zone	50
D	Resettlement Area (Workers and Affected Persons)	50
E	Water Corporation / Utility Infrastructure	50

The Agricultural Production Zone constitutes the largest portion of the site and will accommodate field crop production, livestock activities, and mechanized farming systems. The Agro-Industrial Zone will host processing, packaging, and storage facilities to support value addition and post-harvest handling. The Administrative and Training Zone will serve as the institutional hub for research, extension services, farmer capacity building, and project coordination. The Resettlement Zone is designed to provide housing and basic social amenities

for workers and affected households, while the Water Corporation zone supports existing and planned water supply infrastructure essential for irrigation and operations.

This spatial configuration is intended to optimize land use efficiency, support integrated agro-industrial development, and ensure environmental sustainability through appropriate zoning, buffer allocation, and infrastructure planning.

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 Ibarapa-East Local Government Area respectively. The aerial imagery of the project area is shown in Figure 3.4, while site layouts of the proposed Eruwa ATC are presented in Figures 3.5 and 3.6. In addition, aerial photographs of the project area, including existing water bodies proposed for irrigation support, are provided in Plates 3.1 to 3.3.

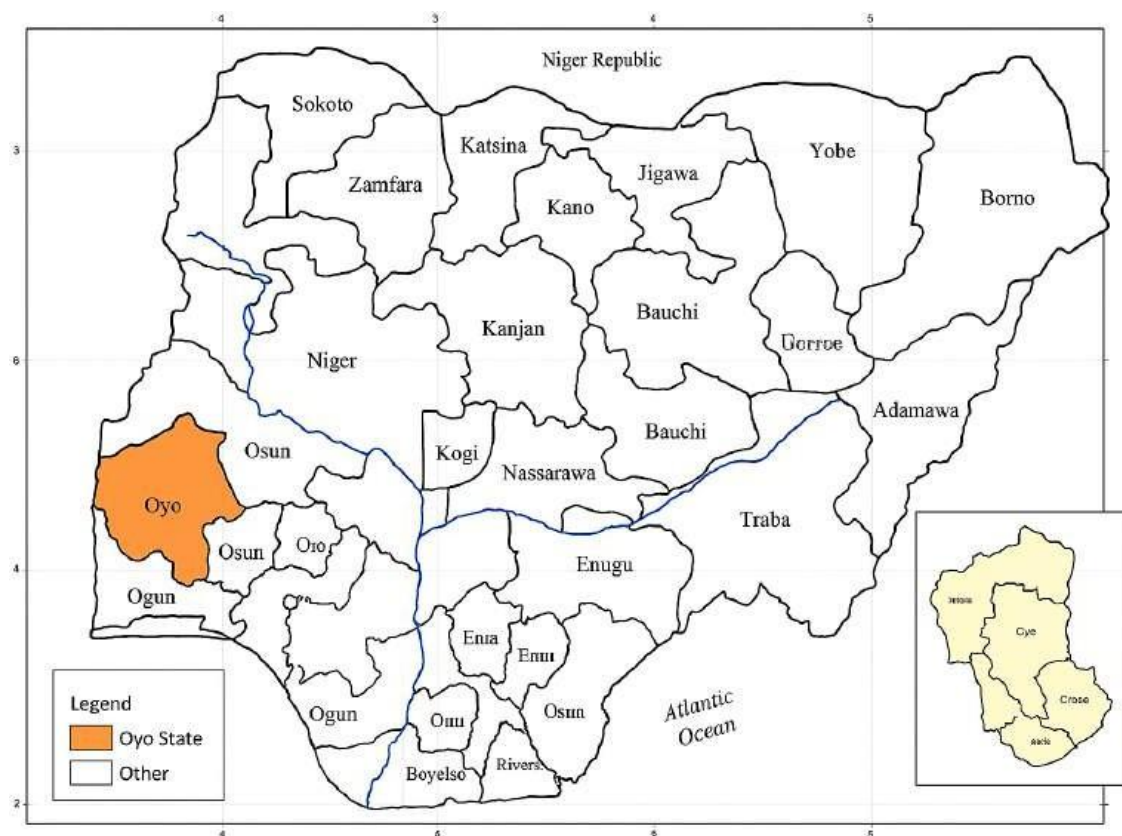


Figure 3.1: Administrative map of Nigeria highlighting Oyo State



Figure 3.2: Administrative map of Oyo State showing Ibarapa-East Local Government Area.

Source: Google



Figure 3.3a: Administrative map of Eruwa in Ibarapa-East Local Government Area

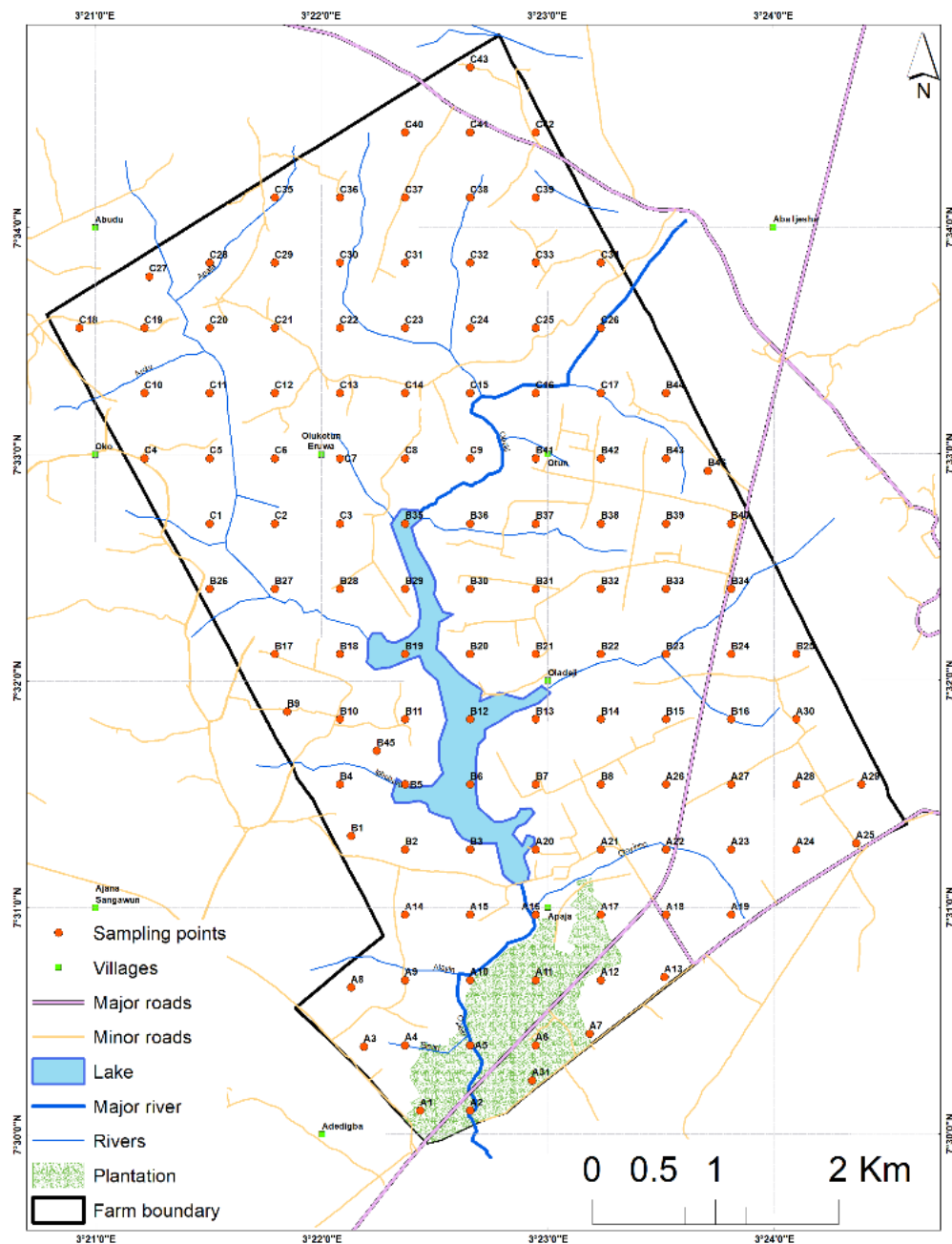


Figure 3.3b: Map of Eruwa farm settlement showing the boundary of the study area, roads and tracks, drainage networks and locations of the sampling points.

Source: Agri Serve, IITA



Figure 3.4: Aerial imagery of the proposed Farm Estate showing sampling locations.

Source: Google Earth



Figure 3.5a: Proposed Industrial hub (Zone A) within Eruwa ATC. Source - OYSADA



Figure 3.5b: Proposed Resort Centre (Zone B) within Eruwa ATC

Source - OYSADA



Figure 3.5c: Proposed Agricultural Zone (Zone C) within Eruwa ATC

Source - OYSADA



Figure 3.5d: Proposed Resettlement Centre (Zone D) within Eruwa ATC

Source - OYSADA



Figure 3.5e: State Water Corporation (Zone E) within Eruwa ATC

Source – OYSADA



Figure 3.6a: A photograph of the dam within the Farm Estate with its lush vegetation



Figure 3.6b: Another view of the dam from the Water Corporation side

3.3 Overview of the proposed Project

The proposed Eruwa Agricultural Transformation Centre (ATC) will involve the cultivation, processing, and marketing of major agricultural value chains, including cassava, maize, cocoa, soybean, vegetables (such as tomato and leafy greens), as well as livestock production (poultry and cattle). The project will also include an integrated agro-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 agro-ecological suitability, existing market demand, and the comparative advantage of Oyo State in their production and processing potential. The project site covers approximately 3,067 hectares and lies geospatially between Latitudes 7.5137°N–7.5200°N and Longitudes 3.3851°E–3.3925°E, occupying the northwestern section of Eruwa town within the Eruwa Farm Settlement.

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 Agricultural Transformation Centre

The Oyo State Government (OYSG) shall be actively involved in the cultivation of maize, cassava, cocoa, tomato, and soybean within the Eruwa ATC. The soil within the Eruwa Farm Settlement, as described in Chapter 4, is sufficiently fertile to support the cultivation of these crops. In addition, the OYSG shall ensure the adoption of climate-smart agricultural practices to promote inclusive and sustainable agricultural growth.

Cassava, maize, tomato, soybean, and other selected crops are well adapted to the prevailing soil and climatic conditions of the project area. They require optimal soil fertility management and adequate water supply to achieve high productivity and sustainable yields.

The cultivation of these crops will generate diverse primary and secondary products. Cassava and maize, for example, can be processed into garri, fufu, flour, starch, and animal feed, while cocoa will be processed into butter and liquor. Tomatoes and other vegetables will be processed into paste, puree, and other value-added products, enhancing shelf life, market value, and export potential.

Typical products derived from these value chains are illustrated in Figure 3.7.



Figure 3.7: Cassava, maize, tomato, and cocoa farm produce

Climate requirements

Cassava, tomato, cocoa and other agricultural items to be planted 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 Eruwa ATC project can favorably support the growth of cassava, maize, soyabeans, cocoa, cola 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, gravelly, 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 Eruwa ATC would support good yields of these items. The soil is sandy loam with a little bit of clay. The 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 Eruwa ATC

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).

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 ATC 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 Eruwa ATC crops.

Crop	Harvest Period	Mode of Storage After Harvest	Key Technology & Goal
Maize	August–November	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–February	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–February	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–April	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 Eruwa ATC, 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 Eruwa ATC'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 an expanse dam presently being used by Oyo State Water Corporation located approximately 120 km west of the farm. A centrifugal pump (20 HP, 8-inch discharge, 180 m³/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 m³/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 ATC'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: Eruwa ATC 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).

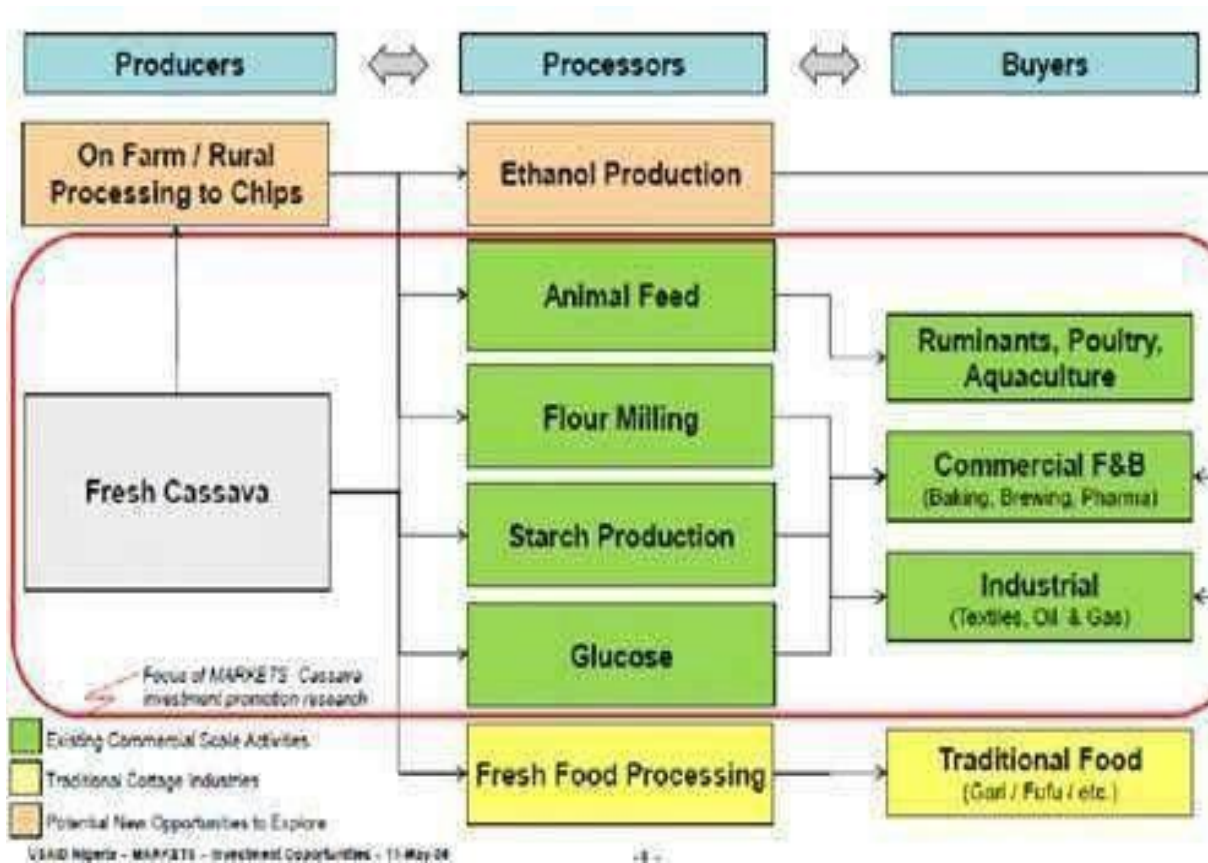


Figure 3.10: Typical cassava value chain



Figure 3.11: Typical maize value chain

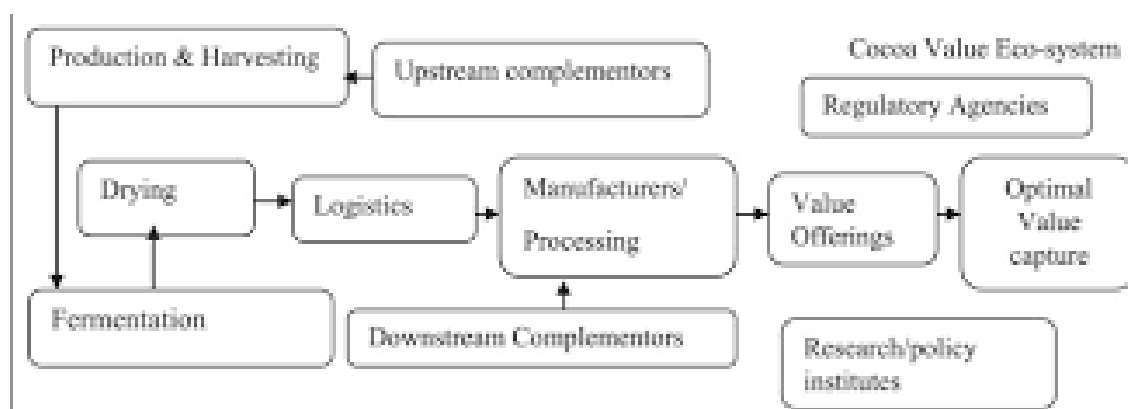


Figure 3.12: Typical cocoa value chain

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 ATC 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 3.17: Silos constructed within the facility for storing and preserving grains

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 March 24 to 26, 2020, 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

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 survey was conducted between March 24 to 26, 2020. Additional data were obtained between 8 and 13 October, 2025. 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 Eruwa ATC are presented in Plate 4.1

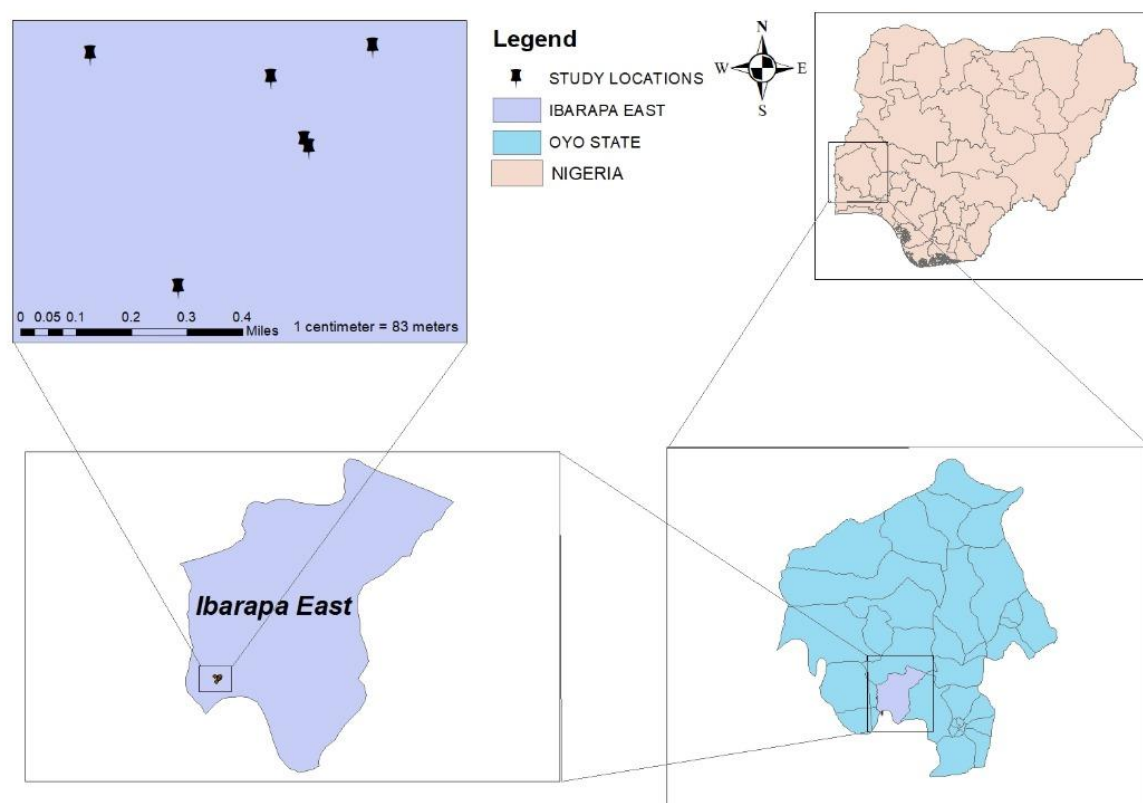


Figure 4.1: Maps showing exact locations of proposed project

Baseline environmental sampling was designed to ensure adequate spatial coverage and representativeness of conditions within the Project Area of Influence (AoI). A total of three (3) sampling locations were established for soil and ambient air quality assessment and two (2) for water sources, 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 Eruwa ATC site, including dam 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 Eruwa ATC'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 4.1a: Different views of Eruwa Farm Settlement



Plate 4.1b: Different views of Eruwa Farm Settlement



Plate 4.2: Air and soil sample collections

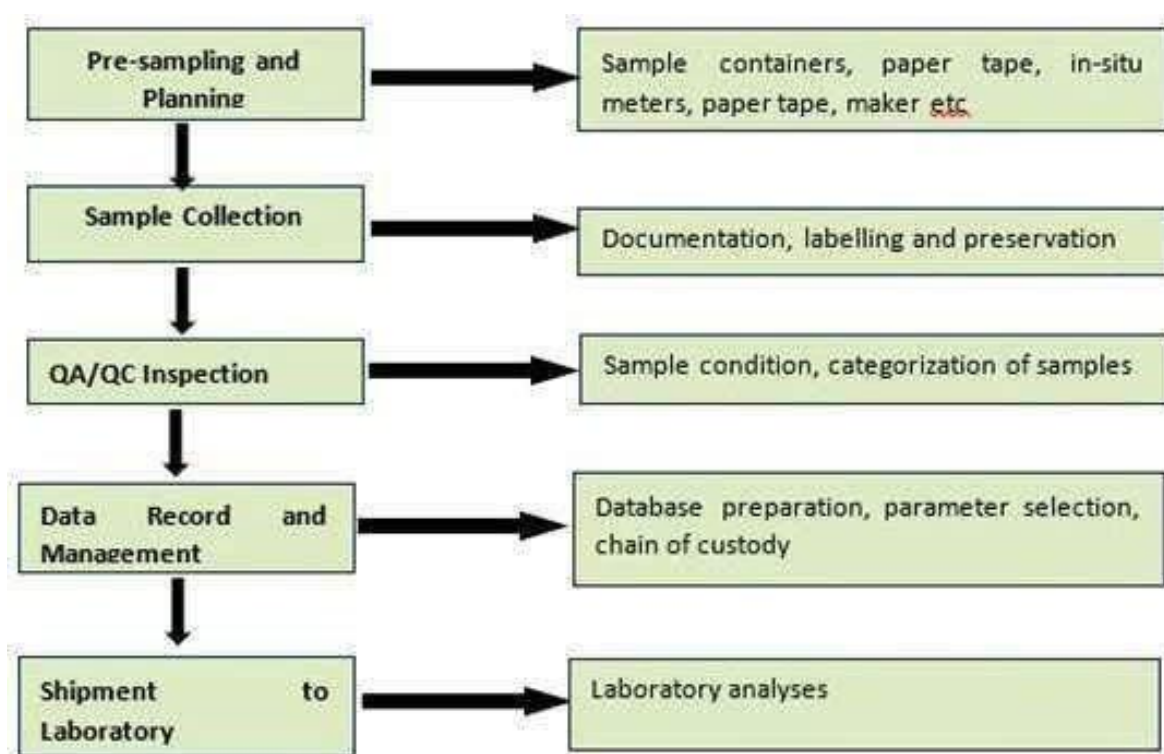


Figure 4.2: The summary of sample management program put in place to *safeguard the integrity of the field samples collected*

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 requirement

Sampling locations	GPS locations	Requirement
SP1	7°31'07''N, 3°23'23''E	Air quality, soil composition and vegetation
SP2	7°31'09''N, 3°23'11''E	Air quality, soil composition and vegetation
SP3	7°31'19''N, 3°23'13''E	Air quality, soil composition and vegetation
SP4	7°31'36''N, 3°22'39''E	Surface Water (Dam) and vegetation
SP5	7°31'28''N, 3°24'49''E	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; NO₂; and VOC.	0.01 ppm for CO, SO₂, CO₂, H₂S, NH₃ 0.001ppm for NO₂
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 AGENCY (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

CTX-ION Analytics Ltd | ctxionanalytics@gmail.com

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 (SO₂), Nitrogen (IV) Oxide (NO₂), Carbon Monoxide (CO), Carbon (IV) Oxides (CO₂), 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 *Oyo State Water Cooperation dam* located within the Project area, while groundwater (well water) samples were obtained from a hand-dug well approximately 1 km 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 Eruwa Community and environs. The socio-economic 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 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 Eruwa ATC.

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

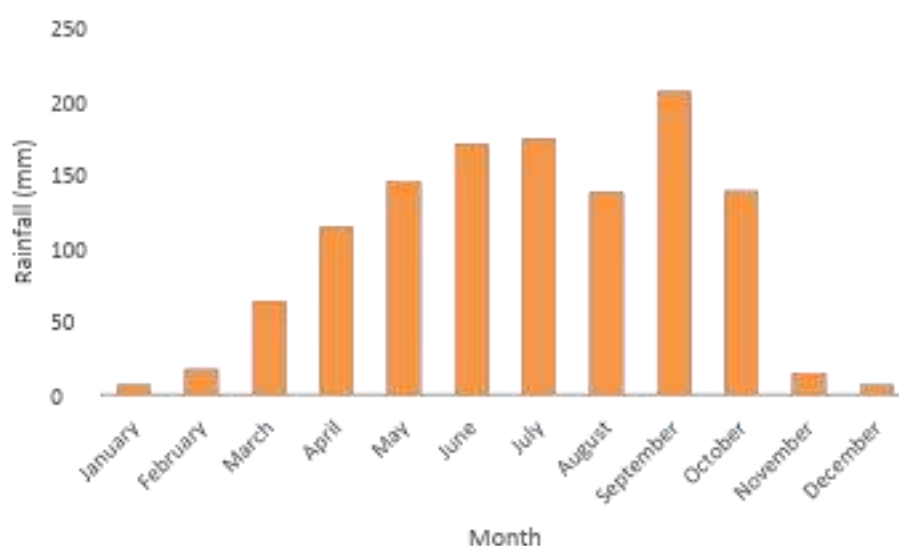


Figure 4.3: Average rainfall characteristics of the project area in Oyo State (1991–2023)

(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 Eruwa ATC (Figure 4.4).

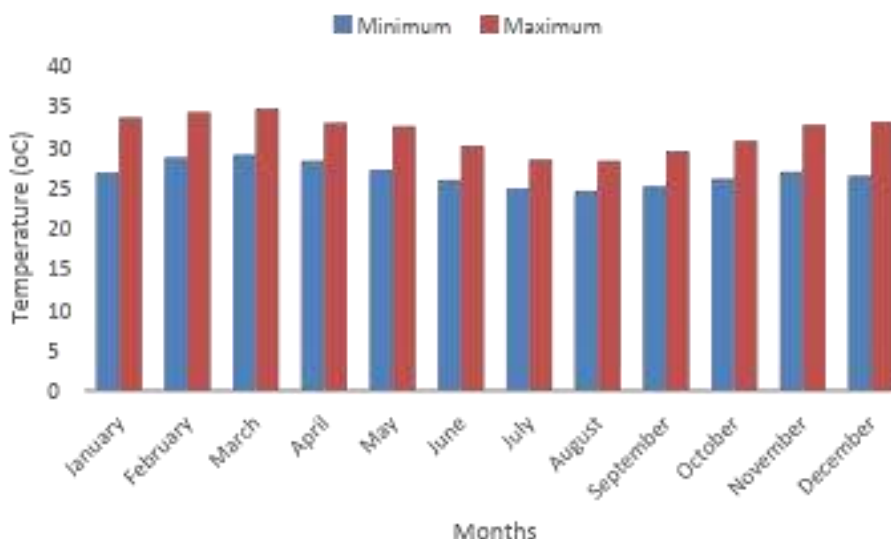


Figure 4.4: Monthly Mean Temperature Characteristics of the Project Area in Oyo State (1991–2023)

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.

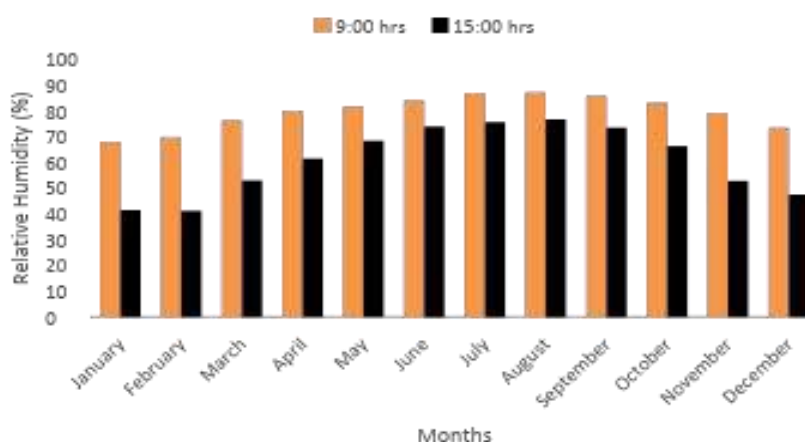


Figure 4.5: Monthly relative humidity characteristics of the project area in Oyo State (1991–2019)

4.2.13 Wind Direction and Speed

Wind speeds average between 3.06 and 4.98 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 odours. 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 Ibarapa-East LGA of Oyo State is mainly composed of undifferentiated schist and gneiss (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 Eruwa ATC is the Water Cooperation Dam within it.

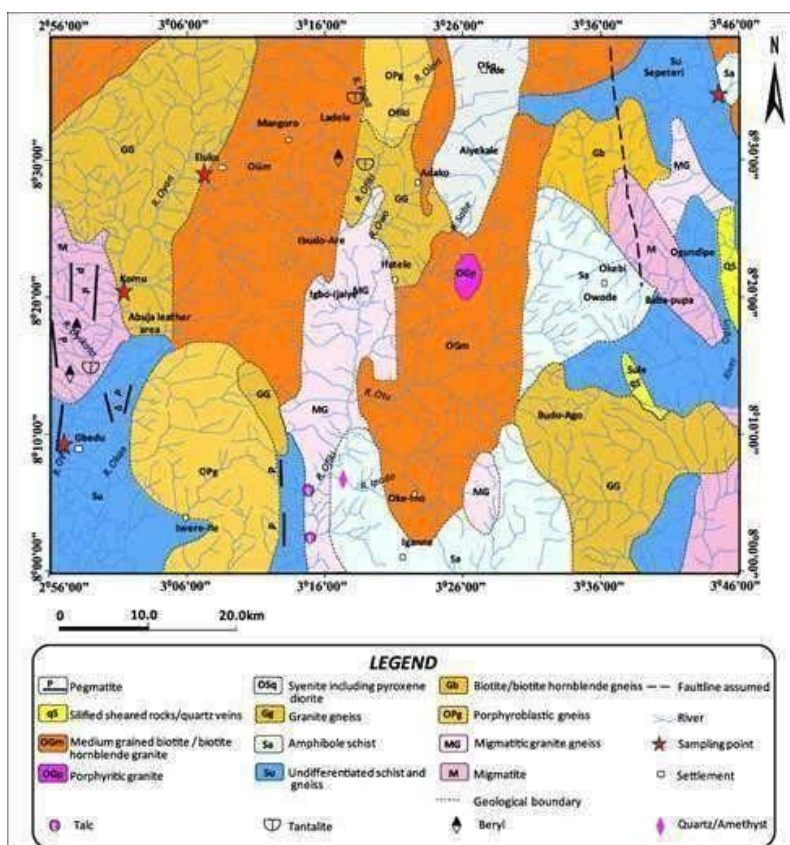


Figure 4.8: Map showing description of geology and hydrogeology of Oyo State

4.4 Ambient Air Quality characteristics

In line with ToR, three (3) 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

Parameters	SP1		SP2		SP3	
	Rainy	Dry	Rainy	Dry	Rainy	Dry
PM _{2.5} (µg/m ³)	17.2	36.3	16.4	21.4	16.2	28.2
PM ₁₀ (µg/m ³)	25.2	48.9	24.1	33.2	25.7	36.1
NO ₂ (mg/m ³)	nd	0.001	nd	nd	nd	nd
SO ₂ (mg/m ³)	nd	nd	nd	nd	nd	nd
VOC (ppm)	nd	nd	nd	nd	nd	nd
CO (ppm)	0.14	2.03	nd	1.19	nd	2.44
CO ₂ (ppm)	207	440	311	514	230	414
H ₂ S (mg/m ³)	nd	nd	nd	nd	nd	nd
Noise (dBA)	30.98	54.72	17.15	37.22	24.23	41.07

(Source: Field Survey, 2020)

Table 4.6: Concentration of ambient air quality in the Project area

Parameter	SP1		SP2		SP3	
	Rainy	Dry	Rainy	Dry	Rainy	Dry
PM _{2.5} (µg/m ³)	17.2	36.3	16.4	21.4	16.2	28.2
PM ₁₀ (µg/m ³)	25.2	48.9	24.1	33.2	25.7	36.1
NO ₂ (mg/m ³)	nd	0.001	nd	nd	nd	nd
SO ₂ (mg/m ³)	nd	nd	nd	nd	nd	nd
VOC (ppm)	nd	nd	nd	nd	nd	nd
CO (ppm)	0.14	2.03	nd	1.19	nd	2.44
CO ₂ (ppm)	207	440	311	514	230	414
H ₂ S (mg/m ³)	nd	nd	nd	nd	nd	nd
Noise (dBA)	33.98	54.72	37.15	42.22	34.23	41.07

Source: Field Survey, 2020 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 4.7 to 4.9.

Table 4.7: 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 4.8: 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 4.9: 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 remains a significant environmental and public health concern globally, affecting both developed and developing countries. To establish the baseline atmospheric condition of the Eruwa Project area, ambient air quality and noise measurements were conducted at three (3) representative sampling points (SP1–SP3) during both the rainy and dry seasons.

The dual-season monitoring approach provides a realistic representation of temporal atmospheric variations influenced by climatic conditions and human activities within the area. 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})

Particulate matter consists of microscopic solid and liquid particles suspended in the atmosphere. Common sources include vehicular emissions, biomass burning, construction activities, exposed soil surfaces, agricultural operations, and wind-blown dust. Elevated particulate concentrations may impair respiratory health, irritate mucous membranes, and contribute to cardiovascular and pulmonary diseases.

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

$PM_{2.5}$ concentrations across the study area ranged from $16.2 \mu\text{g}/\text{m}^3$ (SP3, rainy season) to $36.3 \mu\text{g}/\text{m}^3$ (SP1, dry season). Generally, concentrations were higher during the dry season at all sampling locations, reflecting increased dust resuspension, reduced atmospheric moisture, and enhanced influence of dry seasonal winds.

SP1 recorded the highest dry season concentration ($36.3 \mu\text{g}/\text{m}^3$), suggesting localized anthropogenic influences such as vehicular movement, domestic combustion activities, and exposed bare surfaces. SP2 recorded the lowest dry season concentration ($21.4 \mu\text{g}/\text{m}^3$), while SP3 exhibited moderate values in both seasons.

Rainy season concentrations at all locations remained within acceptable limits due to atmospheric cleansing effects associated with rainfall and higher humidity. However, the dry season value recorded at SP1 slightly exceeded the WHO recommended guideline value of $25 \mu\text{g}/\text{m}^3$ for 24-hour exposure, although values remain characteristic of mildly disturbed rural environments with seasonal dust influence.

Overall, $PM_{2.5}$ levels indicate moderate seasonal particulate loading primarily associated with natural dust generation and localized human activities rather than industrial emissions.

4.4.1.3 PM_{10} (Coarse Particulate Matter)

PM_{10} concentrations ranged from $24.1 \mu\text{g}/\text{m}^3$ (SP2, rainy season) to $48.9 \mu\text{g}/\text{m}^3$ (SP1, dry season). Similar to $PM_{2.5}$, concentrations were consistently higher during the dry season across all monitoring locations.

The observed increase in dry season concentrations reflects the influence of wind-blown dust, agricultural activities, unpaved access routes, and reduced wet deposition processes during

periods of limited rainfall. SP1 consistently recorded the highest concentrations, while SP2 exhibited the lowest values across both seasons.

Despite seasonal increases, all PM₁₀ values remained below the FMEnv and WHO permissible guideline limit of 50 µg/m³, indicating that ambient coarse particulate levels within the Project area do not currently constitute a significant environmental or public health concern.

4.4.2 Carbon monoxide (CO)

Carbon monoxide (CO) is a colorless, odorless gas produced primarily through incomplete combustion of carbon-containing fuels such as petrol, diesel, firewood, and biomass. Major sources include vehicle exhausts, generator emissions, bush burning, and domestic cooking activities. Elevated CO exposure reduces oxygen transport within the bloodstream and may cause adverse health effects at high concentrations.

CO concentrations within the study area ranged from non-detectable levels during the rainy season at SP2 and SP3 to 2.44 ppm at SP3 during the dry season. Concentrations were generally higher during the dry season, attributable to increased combustion activities, reduced atmospheric dispersion, and lower humidity conditions.

SP3 recorded the highest dry season concentration (2.44 ppm), followed by SP1 (2.03 ppm) and SP2 (1.19 ppm). The elevated dry season values likely reflect localized domestic fuel combustion, minor vehicular activity, and generator usage within nearby settlements.

All measured concentrations remained significantly below the FMEnv permissible limit of 10 ppm, indicating that ambient carbon monoxide levels within the Project environment are low and consistent with a predominantly rural setting with limited combustion-related pollution sources.

4.4.2.1 Sulfur dioxide (SO₂)

Sulphur dioxide (SO₂) is a reactive gas primarily generated from combustion of sulphur-containing fossil fuels and industrial processes. Prolonged exposure may cause respiratory irritation and contribute to acid rain formation.

In the present study, SO₂ concentrations were below detectable limits at all sampling locations during both rainy and dry seasons. This indicates the absence of significant sulphur-emitting sources such as heavy industrial activities, large combustion facilities, or sulphur-rich fuel utilization within the Project area.

The results confirm that the study environment is essentially non-industrial, with atmospheric conditions representative of natural rural background air quality.

4.4.2.2 Nitrogen dioxide (NO₂)

Nitrogen dioxide (NO₂) is a combustion-related pollutant commonly associated with vehicular emissions, fuel combustion, and generator use. It contributes to photochemical smog formation and may adversely affect respiratory health at elevated concentrations.

NO₂ concentrations were below detection limits at most sampling locations and seasons. Trace concentrations of 0.001 mg/m³ were detected only at SP1 during the dry season.

The recorded concentration is substantially below the FMEnv guideline limit of 0.2 mg/m³, indicating minimal combustion-related atmospheric pollution within the Project area. The slight dry season occurrence likely reflects localized generator use or minor vehicular activity combined with reduced atmospheric dilution during dry weather conditions.

Overall, NO₂ levels within the study area remain very low and pose no environmental or public health concern.

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. 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/m³ at all sampling locations, and this is consistent with the natural environment.

4.4.2.4 Hydrogen Sulfide

Hydrogen sulfide (H₂S) is a toxic and odorous gas commonly associated with sewage systems, waste decomposition, petroleum processing, and industrial operations.

H₂S concentrations were below detectable limits at all sampling locations during both rainy and dry seasons. This confirms the absence of significant H₂S-generating activities such as petroleum handling facilities, waste treatment operations, or industrial processing activities within the Project area.

4.4.2.5 Carbon Dioxide (CO₂)

Carbon dioxide (CO₂) 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, biomass burning, and industrial activities. Although CO₂ is not directly toxic at ambient concentrations, it is a major greenhouse gas contributing to global warming and climate change.

In the study area, CO₂ concentrations ranged from 207 ppm (SP1, rainy season) to 514 ppm (SP2, dry season). Values were generally lower during the rainy season, reflecting enhanced vegetation uptake, higher soil moisture, and improved atmospheric dispersion, while higher concentrations recorded during the dry season are attributed to increased combustion activities

(such as generator use and domestic fuel burning), biomass burning, and reduced vegetation cover.

All measured values fall within the typical natural background range for ambient environments and are well below any health-based thresholds of concern. The observed seasonal variations are consistent with natural ecosystem dynamics and mild anthropogenic influence, indicating no evidence of significant atmospheric pollution or adverse impact on local air quality.

4.5 Noise Characteristics

Ambient noise measurements across the study area ranged from 33.98 dBA (SP1, rainy season) to 54.72 dBA (SP1, dry season). Noise levels were generally higher during the dry season, likely due to increased human activities, vehicular movement, agricultural operations, and reduced sound attenuation associated with lower atmospheric moisture.

SP1 recorded the highest noise level during the dry season (54.72 dBA), possibly reflecting localized traffic movement and community activities, while SP3 maintained relatively moderate noise levels across both seasons.

All recorded values remained within the FMEnv permissible daytime limit of 55 dBA for residential and rural environments. This indicates that the Project area currently maintains a relatively quiet acoustic environment with low anthropogenic noise intrusion.

Environmental Implications

The dominant seasonal effect indicates that meteorological factors (wind, rainfall, humidity, and atmospheric mixing) play a greater role in controlling CO₂ variability than direct anthropogenic emissions within the study area.

- Dry season elevations in CO₂ are associated with increased combustion activities and reduced vegetation uptake, and are considered typical of rural and semi-rural environments rather than indicators of industrial pollution.
- The absence of SO₂ and very low NO₂ and CO concentrations further confirms that there are no significant industrial or high-density vehicular emission sources within the Project area.
- The overall air quality pattern reflects a predominantly natural and low-impact environment with limited anthropogenic disturbance.
- In summary, the results demonstrate that ambient air quality and noise levels across the study locations are generally good and remain within applicable regulatory limits for both rainy and dry seasons. Spatial and temporal variations are minor and largely natural, driven by seasonal meteorological conditions and low-intensity human activities. This baseline therefore provides a reliable reference condition for future environmental impact assessment once project construction and operational activities 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 4.10 and 4.11.

Table 4.10: Physico-chemical properties of soil (0–15 cm) from the study area

Parameters	SP1	SP2	SP3
pH	7.10	6.58	7.05
Moisture Content (%)	2.85	2.71	2.97
TOC %	5.47	5.27	5.58
Chloride (mg/Kg)	22.50	31.50	21.47
Nitrate (mg/Kg)	0.189	0.242	0.274
Sulphate (mg/Kg)	1.92	2.08	1.89
Phosphate (mg/Kg)	0.0013	0.0014	0.0013
Copper (mg/Kg)	0.0012	0.0017	nd
Lead (mg/Kg)	0.0024	nd	0.0017
Iron (mg/Kg)	6.637	6.285	6.264
Zinc (mg/Kg)	0.0059	0.0043	0.0044
Nickel (mg/Kg)	nd	nd	nd
Cd (mg/Kg)	nd	nd	nd
Cr (mg/Kg)	0.06	0.0103	0.024
Mn (mg/Kg)	0.9056	1.0125	0.557
V (mg/Kg)	0.1319	0.1314	0.1303
Na (mg/Kg)	3.41	3.147	2.276
K (mg/Kg)	13.039	14.174	12.706
Ca (mg/Kg)	1.344	2.264	2.33
Mg (mg/Kg)	0.293	0.375	0.371
Sand %	79.86	76.94	77.87
Silt %	8.96	10.43	10.94
Clay %	10.95	11.12	11.19

Table 4.11: Predominant species of microorganisms isolated from soil samples in the study area

S/N	Sample code	THB	THF	%HUB	Predominant species of microorganisms isolated
1.	SP1	1.19x10 ⁶	12.44 x10 ⁴	1.246	<i>Pseudomonas spp.</i> , <i>Bacillus spp.</i> , <i>Rhizopus spp.</i> , <i>Corynebacterium spp.</i> , <i>Aspergillus wentu.</i> , <i>Geotrichum spp.</i> , <i>Trichoderma spp.</i>
2.	SP2	1.3x10 ⁴	6.56x10 ⁵	1.981	<i>Bacillus ssp.</i> , <i>Micrococcus spp.</i> , <i>Pseudomonas aeruginosa.</i> , <i>Clostridium spp.</i> , <i>Mucor spp.</i> , <i>Aspergillus fumigates.</i>
3.	SP3	1.04x10 ³	8.07 x10 ⁵	0.129	<i>Fusarium Bacillus spp.</i> , <i>Pseudomonas Putida.</i> , <i>Micrococcus spp.</i> , <i>Escherichia coli.</i> , <i>Mucor spp.</i> , <i>Trichoderma spp.</i> , <i>Aspergillus niger.</i>

The results of the physico-chemical properties and microbiological characteristics of soil samples collected from the study area (SP1–SP3) are discussed as follows:

Soils within the project area are predominantly sandy loam to sandy clay loam, with sand fractions ranging from 76.94–79.86%, silt from 8.96–10.94%, and clay from 10.95–11.19%. This textural composition indicates well-drained soil conditions with moderate structural

stability. The relatively high sand content enhances aeration and infiltration capacity but also implies low to moderate water and nutrient retention potential, which is important for irrigation planning and long-term soil fertility management under intensified agricultural use.

Soil reaction across the study area ranges from slightly acidic to near neutral (pH 6.58–7.10). SP2 exhibits the lowest pH (6.58), indicating mild acidity, while SP1 and SP3 are near neutral. These conditions are generally favourable for most agricultural crops; however, slight acidity in localized areas may influence micronutrient availability and nutrient solubility dynamics.

Soil moisture content is generally low across all sampling points (2.71–2.97%), reflecting relatively dry soil conditions, consistent with seasonal climatic influence and the sandy texture of the soils, which promotes rapid drainage and reduced water-holding capacity.

Total Organic Carbon (TOC) values range from 5.27–5.58%, indicating moderate organic matter content across the study area. SP3 records the highest TOC (5.58%), suggesting slightly enhanced organic accumulation, possibly from vegetation inputs or reduced disturbance. This level of organic carbon supports moderate soil biological activity and nutrient cycling.

Nutrient and ion concentrations (chloride, nitrate, sulphate, phosphate) are generally low to moderate and within normal agronomic ranges. Nitrate values range from 0.189–0.274 mg/kg, with SP3 recording the highest concentration, suggesting slightly enhanced nitrogen mineralization or organic input. Phosphate levels are very low (0.0013–0.0014 mg/kg), indicating potential phosphorus limitation for intensive crop production if not supplemented through fertilization.

Exchangeable base cations (Na, K, Ca, Mg) show moderate variability across the sampling points. Potassium is relatively higher (12.706–14.174 mg/kg), which is beneficial for crop physiological processes. Sodium levels remain low (2.276–3.41 mg/kg), indicating no salinity risk, while calcium and magnesium levels are moderate and supportive of soil structural stability and plant nutrition.

Heavy metal analysis indicates that most toxic metals such as Ni and Cd were below detection limits across all sampling points, confirming the absence of contamination. Trace levels of Pb, Cr, Zn, Cu, Mn, Fe, and V are present but remain very low and within natural background concentrations, indicating a clean and uncontaminated soil environment. Iron is the most abundant trace element (6.264–6.637 mg/kg), reflecting typical geogenic soil composition.

Soil microbial populations show notable spatial variation in total heterotrophic bacteria (THB), total heterotrophic fungi (THF), and percentage heterotrophic microbial abundance (%HUB), reflecting differences in organic matter availability, moisture conditions, and localized anthropogenic influence.

THB ranges from 1.04×10^3 cfu/g (SP3) to 1.19×10^6 cfu/g (SP1), indicating that SP1 supports the highest bacterial activity, likely due to higher organic inputs or greater disturbance from

human or agricultural activities. SP3 shows the lowest bacterial count, suggesting comparatively reduced microbial proliferation or more stable but less enriched soil conditions.

In contrast, THF values range from 1.24×10^5 cfu/g (SP1) to 6.56×10^5 cfu/g (SP2), indicating that SP2 provides more favourable conditions for fungal growth, likely associated with moisture retention and organic substrate availability.

The %HUB varies from 0.129% (SP3) to 1.981% (SP2), showing that SP2 has the highest microbial dominance and active decomposition processes, while SP3 exhibits the lowest microbial contribution relative to total microbial load.

Microbial species isolated across the sampling points include functionally important bacteria such as *Bacillus spp.*, *Pseudomonas spp.* (including *P. aeruginosa* and *P. putida*), *Micrococcus spp.*, and *Clostridium spp.*, alongside fungi such as *Aspergillus spp.* (*A. niger*, *A. fumigatus*), *Mucor spp.*, *Rhizopus spp.*, *Trichoderma spp.*, *Geotrichum spp.*, and *Fusarium spp.*

The presence of *Bacillus spp.* and *Pseudomonas spp.* indicates active nutrient cycling and organic matter decomposition, while *Trichoderma spp.* reflects beneficial soil fungal activity with potential biocontrol functions. However, the detection of *Escherichia coli* at SP3 suggests localized faecal or anthropogenic contamination, likely linked to nearby human or livestock activities.

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

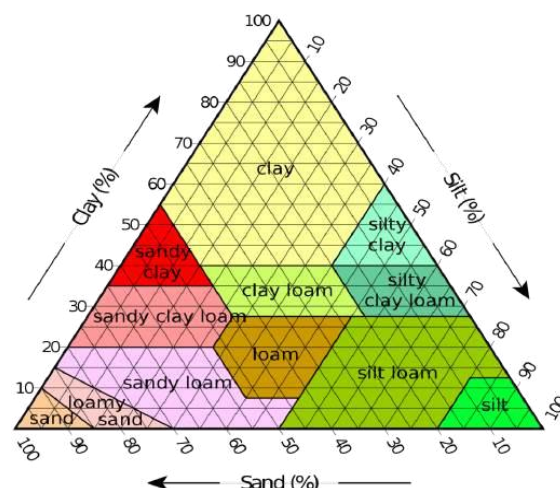


Figure 4.10: Soil texture triangle

4.7 Surface and Groundwater Quality

A surface water sample was collected from the Water Cooperation Dam (SP4), as indicated in Figure 4.9, while a groundwater sample (SP5) was obtained from a local well, as presented in Table 4.12. Plate 4.4 displays the sampling of water.



Plate 4.4: Pictures of water collection from Water Cooperation Dam at the Eruwa ATC 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 4.12: Physicochemical and microbial results of surface water (Dam) and well water samples (surface and underground)

pH and Temperature

Parameters	SP4	SP5	NESREA Limits	FMEnv
			Irrigation and reuse standards	Water for Agricultural uses - Irrigation
pH	6.37	6.85	6.5-8.5	NS
Temperature °C	27.8	29.1	NS	NS
Conductivity µS/cm	340	322	NS	NS
TDS mg/L	167	161	NS	500
Appearance	Transparent	Transparent	NS	NS
Total Hardness mg/L	230	114	NS	NS
Colour PtCo	10.00	6.50	NS	NS
Alkalinity mg/L	24	38	NS	NS
Turbidity NTU	3.67	1.08	NS	NS
DO mg/L	5.82	5.3	>4.0	7.5
BOD5 mg/L	2.01	0.7	6.0	2.0
COD mg/L	22.04	12.92	30.0	NS
Chloride mg/L	48.67	24	350	100
Nitrate mg/L	1.12	0.95	40.0	NS
Sulphate mg/L	52	47	200	NS
Phosphate mg/L	0.037	nd	3.5	NS
Copper mg/L	0.003	nd	0.01	0.2
Lead mg/L	nd	nd	0.1	0.2
Iron mg/L	0.0283	0.016	0.5	5.0
Zinc mg/L	nd	nd	0.2	5.0
Nickel mg/L	nd	nd	0.1	0.2
Cd mg/L	nd	nd	0.01	0.01
Cr mg/L	nd	nd	0.5	0.1
Mn mg/L	0.0211	nd	NS	0.2
Na mg/L	4.281	2.2	120	NS
K mg/L	1.027	4.3	50	NS
Ca mg/L	0.700	0.98	180	NS
Mg mg/L	0.208	0.36	40	NS
Oil/Grease mg/L	nd	nd	0.1	NS
Total Heterotrophic Bacteria (cfu/ml)	2.11 X10 ⁴	2.2 X10 ³	-	-
Total Heterotrophic Fungi (cfu/ml)	1.04x10 ²	No growth	-	-
Total Coliform (cfu/ml)	3.01 x10 ¹	1.2 X10 ¹	1.0x10 ²	1.0x10 ²

The pH values for SP4 (6.37) and SP5 (6.85) fall within acceptable ranges for irrigation water, with SP4 being slightly acidic and SP5 near-neutral. The secondary data from the Eruwa study further support this pattern, showing pH values of 5.76 (rainy) and 6.75 (dry) for surface water. The rainy-season value reflects the influence of dilution, decomposing vegetation, and organic acids, which naturally lower pH. In contrast, the dry-season shift toward neutrality is consistent with reduced runoff, increased interaction with mineral-rich soils, and greater ionic concentration—the same factors likely contributing to the SP4 and SP5 pH characteristics.

For groundwater, SP5 recorded a pH of 6.85, aligning closely with the secondary groundwater pH of 6.66, and both lying within the NESREA irrigation guideline of 6.5–8.5. These values represent the typical geochemical signature of groundwater in basement-complex terrains, shaped by the dissolution of soil minerals rather than any anthropogenic inputs. This consistency across both datasets reinforces the reliability of the SP5 measurement and indicates a stable, naturally regulated aquifer system.

Temperature values for SP4 (27.8°C) and SP5 (29.1°C) also align with the seasonal trends observed in the secondary data, which recorded 22.4°C (rainy) and 29.0°C (dry) for surface water. The cooler rainy-season temperatures in the secondary dataset are attributed to higher cloud cover, increased water volume, and reduced direct solar heating, while dry-season temperatures reflect greater evaporation, solar radiation, and reduced flow—all conditions consistent with those observed in SP4 during the dry season.

The groundwater temperature at SP5 (29.1°C) similarly matches the secondary groundwater value of 29.5°C, which is typical of shallow aquifers where water temperature equilibrates with warm tropical subsurface conditions. Such temperatures support normal biochemical processes and pose no limitation for irrigation, aquaculture, or ecological functioning.

Overall, when viewed alongside the broader seasonal dataset, the SP4 and SP5 pH and temperature values confirm that both surface and groundwater in the Eruwa Farm Settlement are hydrologically normal, seasonally predictable, and fully suitable for agricultural use.

Electrical Conductivity, Turbidity and TDS

Turbidity is a measure of the extent to which light passing through water is reduced by scattering, induced by suspended and colloidal materials. It is of general concern in water due to aesthetic considerations, filterability and disinfection. As turbidity level increases, the aesthetic value decreases, and filtration of water is rendered more difficult and costly, reducing the effectiveness of disinfection procedure.

Total dissolved solids (TDS) are made up of inorganic fraction (silts, clays, calcium, potassium, calcium, calcium, bicarbonates, chlorides etc.) and an organic fraction (algae, zooplankton, bacteria and detritus) that are within the water column.

The EC values of 340 µS/cm (SP4) and 322 µS/cm (SP5) indicate freshwater of low salinity. Although NESREA does not specify limits for irrigation EC, these values show minimal ionic concentration and pose no salinity hazard.

Secondary data from the Eruwa study reported EC values of 203 µS/cm (rainy) and 257 µS/cm (dry), showing slight increases in the dry season due to evaporation-driven concentration of ions. This seasonal trend supports the interpretation that the SP4/SP5 values represent typical ionic behaviour of water in the Eruwa environment.

TDS values of 167 mg/L (SP4) and 161 mg/L (SP5) are far below the FMEnv limit of 500 mg/L for irrigation water, indicating low mineral content with no risk of soil salinization or adverse crop effects.

Secondary TDS data from the Eruwa study ranged from 98 mg/L (rainy) to 129 mg/L (dry), also very low and consistent with the primary findings. This agreement strengthens the conclusion that both surface and groundwater at the project site contain low dissolved solids and are highly suitable for sustained agricultural use.

Dissolved Oxygen (DO), BOD and COD

The Dissolved Oxygen (DO) concentrations recorded for SP4 (5.82 mg/L) and SP5 (5.30 mg/L) are consistent with well-aerated freshwater systems, and both exceed the NESREA minimum requirement of >4.0 mg/L for surface waters. These values indicate good environmental quality capable of supporting normal oxidative and ecological processes. Secondary seasonal data from the Eruwa study show slightly higher DO values of 9.15 mg/L (rainy) and 8.35 mg/L (dry) for surface water. The higher rainy season DO reflects enhanced mixing, lower temperature, and increased turbulence, while the moderate decline in the dry season is due to reduced aeration and increased microbial activity as water levels fall. The SP4 and SP5 DO values fit perfectly into this seasonal trend, confirming their ecological stability.

For groundwater, SP5 recorded a DO of 5.30 mg/L, which closely aligns with the secondary groundwater DO value of 6.75 mg/L. Groundwater generally has lower DO due to minimal atmospheric contact; thus, both values reflect shallow aquifer conditions where recharge and sampling processes introduce some oxygen. These DO levels indicate that the groundwater is not anaerobic and does not show signs of organic or chemical pollution.

Biological Oxygen Demand (BOD₅) values were low for both sources—2.01 mg/L (SP4) and 0.70 mg/L (SP5)—indicating minimal biodegradable organic loading. These results are supported by secondary data showing BOD₅ values of 2.15 mg/L (rainy) and 4.09 mg/L (dry) in surface water, both well within the NESREA irrigation guideline of <6.0 mg/L. The slightly higher dry-season values in the secondary dataset reflect natural concentration effects and mild organic inputs, similar to the slightly higher BOD observed at SP4. The very low BOD at SP5 confirms that the groundwater is free from significant organic contamination.

Chemical Oxygen Demand (COD) values for SP4 (22.04 mg/L) and SP5 (12.92 mg/L) are also well below the NESREA limit of 30 mg/L, indicating low levels of oxidizable chemical substances. These results are reinforced by the secondary dataset, which recorded COD values of 18.94 mg/L (rainy) and 21.14 mg/L (dry)—typical of natural surface waters receiving leaf litter, soil organic matter, and minor anthropogenic inputs. The lower COD for SP5 is expected in groundwater due to natural filtration through soil layers, which removes particulate and dissolved organic compounds.

Overall, the oxygen-related parameters from both primary (SP4 and SP5) and secondary datasets demonstrate:

- Low organic pollution
- Healthy oxidative capacity
- Absence of industrial or domestic contamination
- Favourable conditions for irrigation and ecological functioning

Collectively, these findings confirm that the water quality at Eruwa Farm Settlement is excellent, and the aquatic environment is stable, well-oxygenated, and suitable for sustained agricultural use.

BOD is a measure of the amount of dissolved oxygen required to break down the organic material in a given volume of water through aerobic biological activity and could be sometimes used in assessing water quality (Figure 4.11). BOD is used to indirectly measure the amount of biodegradable organic matter within a sample.

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 4.12: BOD water quality chart.

Source: www.pharmaguideline.com

Hardness and Alkalinity

Alkalinity indicates capacity of water to buffer against acid impacts. It is used to measure water fertility while hardness is the sum of Ca^{2+} , Mg^{2+} hardness and other divalent cations. Total hardness values of 230 mg/L (SP4) and 114 mg/L (SP5) classify the dam water as moderately hard and the well water as soft–moderately hard. The secondary data showed hardness values of 161 mg/L (rainy) and 192 mg/L (dry), demonstrating that hardness tends to increase slightly during the dry season due to mineral concentration.

This seasonal pattern aligns with SP4/SP5 values and indicates that the observed hardness results primarily from natural dissolution of calcium and magnesium minerals in basement-complex geology. Hardness at these levels is not harmful for irrigation and may enhance soil Ca^{2+} and Mg^{2+} balance.

Alkalinity values of 24 mg/L (SP4) and 38 mg/L (SP5) indicate low buffering capacity, consistent with alkaline trends reported in the secondary data (21 mg/L rainy and 28 mg/L dry). In both datasets, alkalinity remains stable and does not pose any restriction for irrigation use. Low alkalinity also means the water is unlikely to cause carbonate precipitation or clogging of irrigation equipment.

Cations and Anions

Primary major ions (Na^+ , K^+ , Ca^{2+} , Mg^{2+} , Cl^- , SO_4^{2-} , NO_3^-) were all very low and far below FMEEnv/NESREA limits.

Secondary seasonal data revealed the same patterns but with slightly higher wet-season values due to rainfall-induced mobilization. The only secondary ion of concern was chloride, which was elevated (289–345 mg/L). This contrasts with the low chloride values in primary data, suggesting that:

- SP4/SP5 sources are better protected from chloride inputs.

- The secondary data reflect other parts of Eruwa where chloride mobilization is higher. The combined interpretation shows that your project-site sources are of superior ionic quality compared to the broader Eruwa area.

Heavy Metals

The primary data show that all toxic metals—including Cu, Pb, Cd, Zn, Ni, Cr, and Mn—were below detection limits (ND) in both SP4 (dam water) and SP5 (well water). This absence of detectable metallic contaminants indicates that neither surface nor groundwater at the project site is influenced by industrial discharges, vehicular runoff, mining activities, or metal-processing operations. The results align strongly with the secondary Eruwa dataset, which also reported non-detectable concentrations of these toxic metals across both rainy and dry seasons, further confirming that the region is free from metallic pollution and that the water system remains geochemically natural.

Iron (Fe) levels showed measurable concentrations in the secondary seasonal data, recorded as 2.03 mg/L (rainy) and 4.55 mg/L (dry). These values exceed the NESREA limit of 0.5 mg/L but remain below the FMEnv threshold of 5.0 mg/L for agricultural water. The higher values during the dry season reflect seasonal concentration effects associated with evaporation and reduced water volume. Similarly, the primary groundwater value of 4.03 mg/L (SP5) also exceeds the NESREA limit but falls comfortably within FMEnv's permissible range.

These iron concentrations do not represent anthropogenic contamination; instead, they are characteristic of lateritic soils rich in iron oxides, which dominate the geology of Eruwa and most parts of southwestern Nigeria's basement complex terrain.

Although elevated iron may cause aesthetic effects such as staining of irrigation equipment, it poses no toxicological or agricultural risk. Plants are generally tolerant of dissolved iron in this concentration range, and such levels do not impair soil chemical balance or irrigation suitability.

Overall, the combined primary and secondary data confirm that heavy metal content in both surface and groundwater is extremely low, dominated only by naturally occurring iron, and presents no threat to environmental integrity, agriculture, or public health.

Surface and underground Water Microbiological Characteristics

The primary data showed that Total Heterotrophic Bacteria (THB) were 2.11×10^4 cfu/mL (SP4) and 2.2×10^3 cfu/mL (SP5). These values fall within natural ranges for surface and shallow groundwater influenced by organic matter.

Secondary data showed THB values between 5.5×10^3 cfu/mL (surface water) and 1.4×10^2 cfu/mL (irrigation water), supporting the finding that bacterial populations fluctuate seasonally and spatially but remain within acceptable ecological limits. The similarity in bacterial loads confirms the natural origin of microbial presence in Eruwa waters.

Total Heterotrophic Fungi (THF) were 1.04×10^2 cfu/mL (SP4) and not detected (SP5). The secondary data similarly reported low fungal activity, with 1.1×10^2 cfu/mL in surface water

and none in well water, indicating good water quality in terms of organic content and absence of conditions that promote fungal proliferation.

Total Coliforms (TC) were 3.01×10^1 cfu/mL (SP4) and 1.2×10^1 cfu/mL (SP5)—both well below NESREA and FMEnv limits (1.0×10^2 cfu/mL).

The secondary seasonal data showed wider variability, with TC levels ranging from 5.0×10^3 cfu/mL (surface) to 1.0×10^2 cfu/mL (irrigation), demonstrating that wet-season runoff and animal activity often increase microbial counts in surface waters.

Against this backdrop, SP4/SP5 values are significantly lower, indicating minimal contamination at the project site and cleaner water sources compared to the broader Eruwa environment.

Overall, both the primary and secondary datasets show low to moderate microbial loads, absence of pathogenic contamination, and general suitability for irrigation. Continued monitoring is recommended to track seasonal fluctuations, especially during the rainy season.

4.8 Terrestrial Flora and Fauna

4.8.1 Terrestrial Flora

Vegetation assessment was undertaken within the Eruwa Project area to characterize site-specific ecological conditions and establish a reliable baseline for subsequent environmental impact evaluation. The assessment focused on species composition, vegetation structure, spatial distribution patterns, and the presence of economically and ecologically important plant species within the Project influence area.

The Project area located in Eruwa within Ibarapa East Local Government Area of Oyo State lies within the derived savanna ecological zone. Field observations indicate that the vegetation reflects a regenerating and human-influenced mosaic system, shaped by historical land use activities such as agriculture, settlement expansion, and periodic land clearing. Despite this disturbance history, the area now exhibits noticeable secondary succession and natural regeneration, resulting in moderate vegetation cover typical of derived savanna environments in southwestern Nigeria.

Vegetation structure across the area is characterized by a mixture of cultivated crops, fallow regrowth species, and semi-naturalized woody vegetation, with scattered trees and herbaceous undergrowth. Dominant and frequently observed species include *Manihot esculenta*, *Zea mays*, *Musa paradisiaca*, *Elaeis guineensis*, *Carica papaya*, *Mangifera indica*, *Azadirachta indica*, *Psidium guajava*, *Talinum triangulare*, *Pennisetum purpureum*, *Theobroma cacao*, *Terminalia catappa*, and *Calotropis procera*. The presence of these species reflects a landscape strongly influenced by agroforestry practices, smallholder farming systems, and settlement-associated vegetation, rather than intact natural forest ecosystems.

The derived savanna vegetation of the area is largely a human-modified ecosystem, formed through long-term interaction between natural forest remnants and anthropogenic activities

such as farming and controlled burning. It is typically characterized by fire-tolerant and drought-resistant species, including economically important trees such as *Elaeis guineensis* and *Anacardium occidentale*, as well as cultivated perennial crops like *Theobroma cacao*. This ecological transition zone supports a mix of savanna grasses and broadleaved species with scattered woody vegetation.

Vegetation cover in Eruwa and the wider Ibarapa East area is predominantly derived savanna, characterized by tall tussock grasses interspersed with broadleaved species and scattered trees, consistent with Figure 4.12. Although some built-up areas and cultivated plots exist, natural regeneration processes have allowed vegetation to persist, resulting in moderate plant diversity and patchy but functional ecological cover across the landscape.

Importantly, no evidence of undisturbed primary forest or highly sensitive ecological habitats was observed within the immediate Project footprint. The vegetation is therefore best described as a secondary, agro-ecological system with varying degrees of human influence and natural regeneration, typical of rural southwestern Nigeria.

Plants within the study area provide important indicators of environmental conditions, as their presence, abundance, and physiological tolerance reflect underlying ecological characteristics such as soil fertility, moisture availability, disturbance intensity, and land-use history. Vegetation assessment in this context included species identification, evaluation of dominance patterns, and assessment of vegetation distribution across sampling locations, providing a basis for understanding ecosystem stability and potential environmental sensitivity.

In summary, the vegetation of the Eruwa Project area is typical of a derived savanna ecosystem under continuous human influence, dominated by cultivated and secondary regrowth species with moderate ecological complexity. The landscape shows clear evidence of ongoing ecological recovery and agro-ecological integration, with no indication of rare, endangered, or highly sensitive vegetation communities within the Project area.

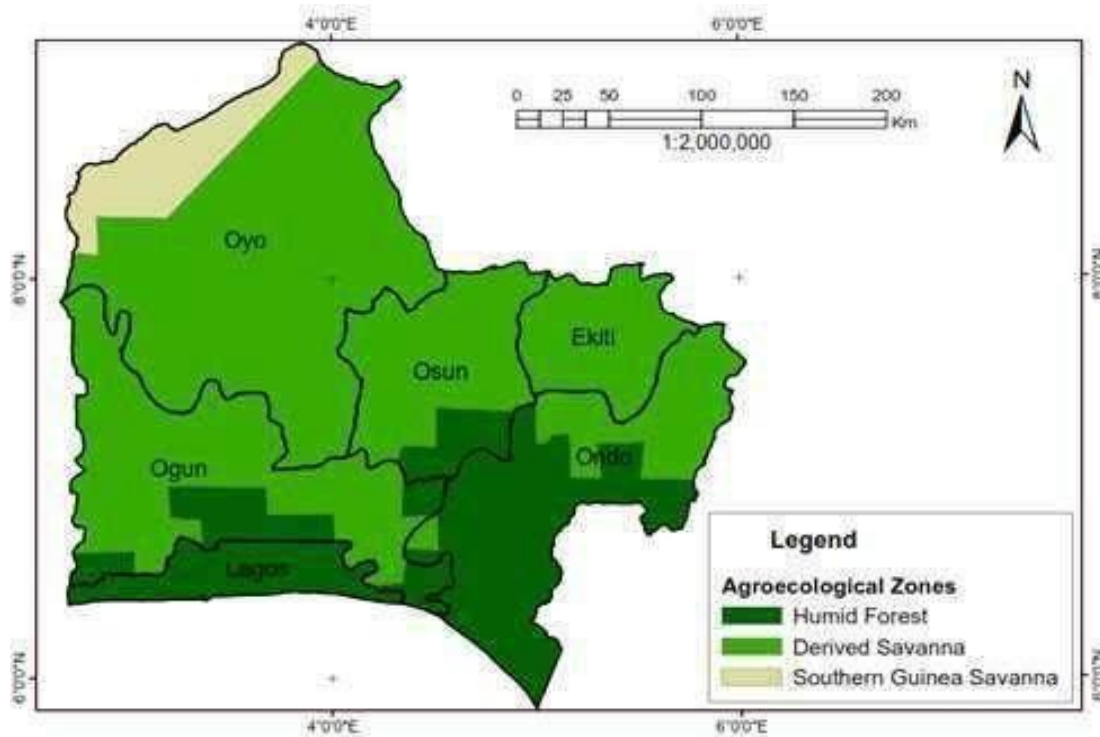


Figure 4.12: A map showing the different ecological zones within Oyo State

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. Some flora species (shown in Plate 4.6) observed to be abundant across sampling locations within the proposed project location include *Theobroma cacao*, *Musa paradisiaca*, *Mannihot spp*, *Cola nitida*, *Bambusa vulgaris*, *Parkia biglobosa*, *Gliricidia sepium* and *Anacardium occidentale*



Plate 4.5: Sample pictures of vegetation in the study area



Plate 4.6: Vegetation species encountered across sampling locations

The ecology team (Plates 4.7) consulted some stakeholders from 24 to 26th March 2020 in Eruwa community, Ibarapa-East Local Government Area, Oyo State. Additional data were obtained between 8 and 13, October 2025. Useful information regarding flora and fauna composition of the Project area was provided by indigenous Farmers and hunters as they gave an account of indigenous/endemic species found within and around the Project area.



Plate 4.7: Ecology team comprising OYSADA Staff, Agro4you (Consultants), and Prof. Dicson, A Professor of Agronomy

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 four 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 four (4) strategic locations within and around the Project site. A transect size of 50 m² 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).

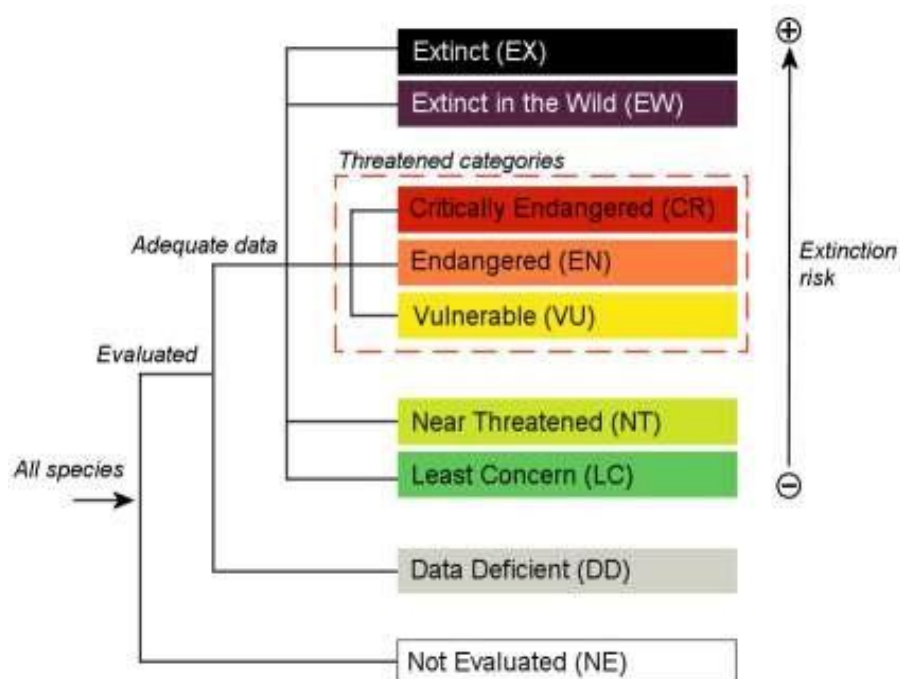


Figure 4.13: IUCN Red List Categories and Criteria

Table 4:13 IUCN categorization

S/N	IUCN CATEGORY	No of Plant Species	Percentage (%)
1.	Near Threatened (NT)	2	12
2.	Data Deficient (DD)	2	12
3.	Least Concern (LC)	4	23
4.	Not Evaluated (NE)	9	53

The floristic composition and habitat description of the sample transect points in the Proposed project site is shown in Tables 4.14 (see annex). Plant species encountered were assessed and evaluated as Near Threatened, Data Deficient, Least Concern and Not Evaluated with a percentage of 12%, 12%, 23% and 53% respectively as shown in Figure 4.14.

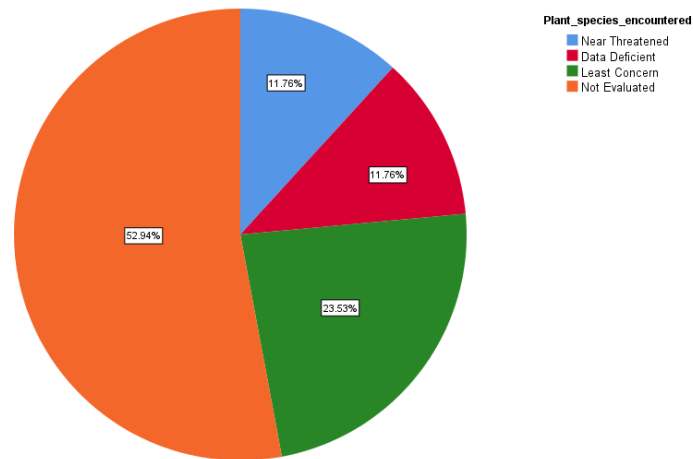


Figure 4.14: Percentage of IUCN Evaluation for plant species encountered. Field survey 2020 and 2025

A summary of evaluation for diverse status of species encountered is presented in Table 4.15. From the study, 17 plants species were identified, belonging to 17 families and 17 genera. Plant species were observed to occur as herbs, grasses, shrubs and trees, with a percentage distribution of 12%, 6%, 35% and 47% respectively (Figure 4.15). Herb and tree species were noted to occur in abundance. Some of the plant and fruits species encountered during the study are shown in Plate 4.8.

Table 4.15: Species biodiversity status across the study area

S/N	Plant species	Family Names	Common names	Habits	IUCN status
1.	<i>Azadiracta indica</i>	Meliaceae	Neem tree	Tree	NE
2.	<i>Cucumis sativus</i>	cucurbitaceae	Cucumber	Shrub	NE
3.	<i>Talinum triangulare</i>	Talinaceae	Gbure	Shrub	LC
4.	<i>Musa paradisiaca</i>	Musaceae	Banana	Herb	NE
5.	<i>Blighia sapida</i>	Sapindaceae	Ackee	Tree	NE
6.	<i>Parkia biglobosa</i>	Fabaceae	Locust tree	Tree	NT
7.	<i>Manihot esculenta</i>	Euphorbiaceae	Cassava	Shrub	NE
8.	<i>Gmelina arborea</i>	Lamiaceae	Malena tree	Tree	NE
9.	<i>Anacardium occidentale</i>	Anacardiaceae	Cashew tree	Shrub	NE
10.	<i>Bambusa vulgaris</i>	Poaceae	Oparun	Tree	NT
11.	<i>Lantana camara</i>	Verbenaceae	Common lantana	Herb	NE
12.	<i>Sida acuta</i>	Malvaceae	Common wire weed	Shrub	DD
13.	<i>Theobroma cacao</i>	Malvaceae	Cocoa	Tree	NE
14.	<i>Pennisetum purpureum</i>	Poaceae	Elephant grass	Grass	DD
15.	<i>Vitex doniana</i>	Verbenaceae	Black Plum	Tree	LC
16.	<i>Albizia julibrissin</i>	Fabaceae		Tree	LC
17.	<i>Gliricidia sepium</i>	Fabaceae	Agun maniye (YL)	Shrub	LC

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

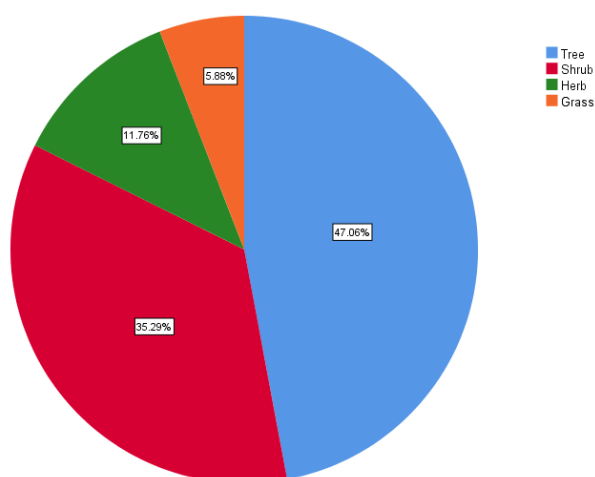


Figure 4.15: Percentage distribution of various life habits observed during ecological survey
Field survey 2020 and 2025.

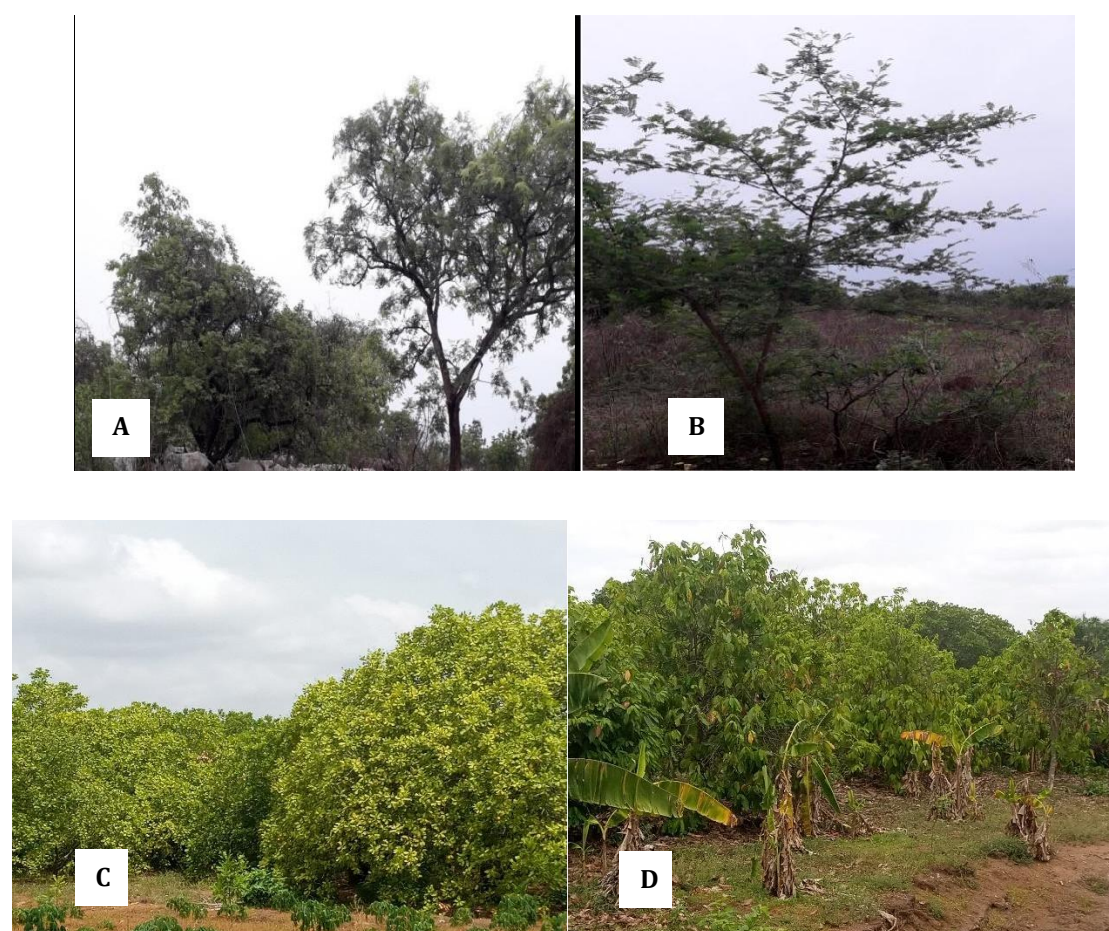


Plate 4.8: A; Parkia biglobosa, B; Gliricidia sepium, C; Anacardium occidentale, D;
Theobroma cacao and Musa paradisiaca encountered within sample transect locations

Field survey 2020 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 4.16 shows the distribution and abundance of plant species encountered within sample transect locations.

Table 4.16: Distribution and abundance of Plant Species across sample transect locations

PLANT SPECIES	FAMILY NAMES	SP1	SP2	SP3	SP4
<i>Azadiracta indica</i>	Meliaceae	-	-	1	5
<i>Cucumis sativus</i>	cucurbitaceae	-	300	45	189
<i>Talinum triangulare</i>	Talinaceae	100	120	10	89
<i>Musa paradisiaca</i>	Musaceae	67	107	34	105
<i>Blighia sapida</i>	Sapindaceae	-	2	-	-
<i>Parkia biglobosa</i>	Fabaceae	1	16	2	3
<i>Manihot esculenta</i>	Euphorbiaceae	1300	850	1400	1800
<i>Gmelina arborea</i>	Lamiaceae	2	2	-	3
<i>Anacardium occidentale</i>	Anacardiaceae	200	550	600	230
<i>Bambusa vulgaris</i>	Poaceae	-	14	-	450
<i>Lantana camara</i>	Verbenaceae	-	20	-	-
<i>Sida acuta</i>	Malvaceae	34	56	20	55
<i>Theobroma cacao</i>	Malvaceae	54	120	56	34
<i>Pennisetum purpureum</i>	Poaceae	-	2	-	1
<i>Vitex doniana</i>	Verbenaceae	1	3	-	10
<i>Albizia julibrissin</i>	Fabaceae	-	10	-	-
<i>Gliricidia sepium</i>	Fabaceae	14	10	30	12

❖ *Inventory of Economic Plants*

Economic plants are essential for the wellbeing of mankind and have a variety of uses including food, vegetables, fruits, oilseed, sugar, medicinal beverages, timber, paper production, ornamental, etc. Table 4.17 presents the economic plants observed in the study area.

Table 4.17: Economic Importance of Flora Species Encountered

Plant species	Family Names	Habits	Economic Importance
<i>Azadiracta indica</i>	Meliaceae	Tree	Medicinal
<i>Cucumis sativus</i>	cucurbitaceae	Shrub	Food, Medicinal
<i>Talinum triangulare</i>	Talinaceae	Shrub	Vegetables, Medicinal
<i>Musa paradisiaca</i>	Musaceae	Herb	Food, Medicinal
<i>Blighia sapida</i>	Sapindaceae	Tree	Medicinal
<i>Parkia biglobosa</i>	Fabaceae	Tree	Food, Medicinal
<i>Manihot esculenta</i>	Euphorbiaceae	Shrub	Food, Medicinal
<i>Gmelina arborea</i>	Lamiaceae	Tree	Fuel wood
<i>Anacardium occidentale</i>	Anacardiaceae	Shrub	Food, Medicinal
<i>Bambusa vulgaris</i>	Poaceae	Tree	Fuel wood
<i>Lantana camara</i>	Verbenaceae	Herb	Medicinal
<i>Sida acuta</i>	Malvaceae	Shrub	Medicinal
<i>Theobroma cacao</i>	Malvaceae	Tree	Food, Medicinal,
<i>Pennisetum purpureum</i>	Poaceae	Grass	Fodder
<i>Vitex doniana</i>	Verbenaceae	Tree	Fodder, Medicinal
<i>Albizia julibrissin</i>	Fabaceae	Tree	Medicinal
<i>Gliricidia sepium</i>	Fabaceae	Shrub	Fodder

4.8.3.1 Terrestrial Fauna

The detection of faunal species is highly variable and dependent on the complex relationship between an animal's behavioural adaptations and its environment. Consequently, there is a high degree of variation in determining the composition of species in faunal assemblages. 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 adopted for wildlife assessment were in accordance with the acceptable international standards. Indirect survey methods (footprint, nest type, feeding site, voice, faecal 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 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 caused usually as a result of behavioral adaptations of animals) information about the animals found in the study area.

The study area recorded very minimal presence of fauna. Tables 4.18 to 4.20 present some of the species present in the study area. Prominent fauna encountered are shown in Plate 4.9

Table 4.18: Domestic animals within the study area

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

Table 4.19: Wildlife in the study area

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

Table 4.20: Bird species in the study area

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



Plate 4.9: Some sheep, ram, cows and cattle sited during fauna survey within Eruwa Farm Settlement

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 was observed to be of four major classes. These classes were categorized as follows; Vegetation, Farmland (Crop, Piggery, Poultry, Animal husbandry and Fishery), uncultivated land and housing (as shown in Figure 4.16). The estimated area covered by each of the land use types is presented in Table 4.21.

Table 4.21: Existing Land Use within the Project Site boundary

S/N	Land use/ Land cover	Area (Ha)	Percentage (%)
1	Uncultivated land	460	13
2	Farmland	2400	80
3	Vegetation and wetland	200	7
4	Housing	7	0
	Total	3067	100

Field Survey, 2020 and 2025

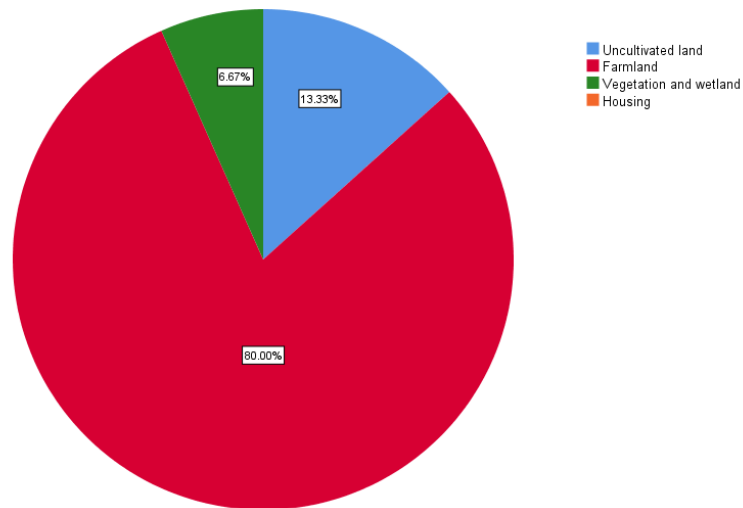


Figure 4.16: Land use within the Project Site.

Field Survey, 2020 and 2025

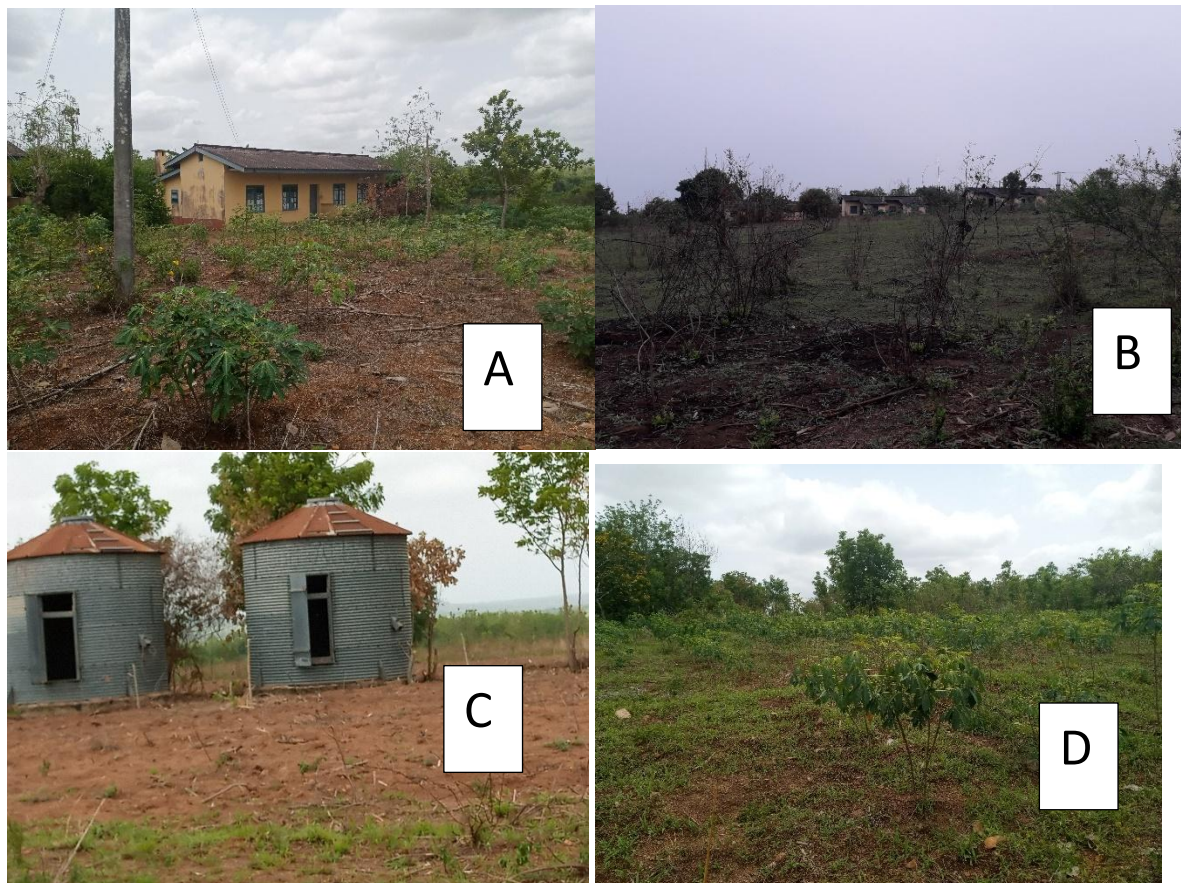


Plate 4.10a: A – Housing unit; B - Uncultivated land, C- Silos at Eruwa and D – Vegetation species.

Uncultivated land: This class was observed to be the second most dominant land cover type within the Project site (Plates 4.10 b&c). It consists majorly of the cleared vegetation and harvested crops within the Project site boundary. The class covers over 15 % of the proposed project site.

Farmland: This class is the most dominant and it covers 78 % of the Farm Settlement. Classes of crops grown are Cassava, palm tree, banana, cocoa, cucumber etc (Plates 4.10a and 4.11). Settlers are aware of the Project and have agreed to key to Government initiatives.



Plate 4.10b: A view of Farmland within the Project site

Vegetation and wetland: This class consists of the yet-to-be cleared processing plant area within the Project site boundary (Plate 4.11). The vegetation types are majorly grass and shrubs which were sparsely distributed and occupy 7% of the proposed Project site.



Plate 4.10c: Vegetation class and wetland within the Project site



Plate 4.11: Road paths within Eruwa Farm Settlement

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

Livelihood patterns in Eruwa further emphasize the prominence of agriculture. Survey findings indicate that crop farming accounts for 60% of all household livelihood activities, confirming its role as the primary income source for most families. Livestock production (11.11%) also contributes to household earnings, though typically as a complementary venture rather than a standalone enterprise.

Beyond agriculture, a significant proportion of the population engages in trading (15.56%), largely involving the sale of farm produce, household goods, and artisanal products in local markets. Processing activities (6.67%) include cassava processing, palm oil extraction, milling, and other small-scale agro-processing enterprises that add value to primary agricultural outputs.

A smaller share of the population practices artisanship (2.22%), comprising carpenters, welders, mechanics, and tailors who provide essential support services within the community. Other livelihood activities (4.44%) involve petty services, transportation, communal labor, and seasonal work that supplement household incomes.

Overall, the Eruwa economy is agrarian, with farming (both crop and livestock) forming the foundation of livelihood security, while trade, processing, and artisanal work serve as important secondary sectors.

Land Tenure and Ownership

The land tenure system in Eruwa reflects a blend of customary, communal, and individually driven acquisition processes, similar to the structure observed in established farm settlements within the region. However, survey findings indicate a strong shift toward market-based individual ownership, with land purchase emerging as the dominant means of acquisition among respondents.

Data from the field survey show that 52.38% of land users acquired their farmland through purchase, demonstrating a growing trend toward private ownership as farmers seek greater autonomy and long-term security over their agricultural investments. This pattern also reflects the influence of expanding peri-urban markets and increasing land value within the area.

Communal ownership accounts for 19.05%, representing lands allocated by community leaders or local authorities—often tied to the original settlement structure or collective farmlands made available for group cultivation. These communal parcels remain important for new entrants, youth farmers, or groups without immediate access to privately owned land.

Customary inheritance contributes 14.29%, indicating that intergenerational transfer is still practiced but is no longer the dominant tenure pathway, unlike in some older settlements. This

underscores the gradual shift from traditional lineage-based allocation to modern, purchase-driven ownership patterns.

Another 14.29% of respondents fall under the category of “not owned”, referring to land users operating on rented, leased, borrowed, or informally encroached parcels. These individuals often face tenure insecurity, limited investment capacity, and greater vulnerability to displacement.

Overall, land tenure in Eruwa is transitioning toward individualized, purchase-based systems while still retaining elements of traditional communal access and customary inheritance. This evolving pattern shapes land-use decisions, investment behaviour, and the long-term sustainability of agricultural activities within the community.

Land Suitability and Utilization

Field observations and soil assessments indicate that most of the land in Eruwa farm settlement 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 Eruwa Agricultural Transformation Centre (ATC) 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 Ibarapa-East 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 Eruwa, 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) of Eruwa, 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 Eruwa and its environs. 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 $\pm 10\%$.
- 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 country with 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 4.22.

Table 4.22: 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)

4.10.5 Demographic Profile and Ethnic Groups Oyo State and Ibarapa-East 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 Ibarapa-East LGA in 2006 was 118,288. It occupies a total of 986 km² (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. Eruwa is bounded in the North by Iseyin; East by Ido and South by Ogun State. The most remarkable feature is the chain of hills. It is situated in the grass savannah with a number of streams. Eruwa is the headquarters of Ibarapa-East and according to 2006 population census, the population of Ibarapa-East LGA is 118,288. It occupies a total of 986 km² (National Population Commission, 2006).

Eruwa is host to Adeseun Ogundoyin Polytechnic established as a satellite campus of The Polytechnic Ibadan in 1982 and later converted to autonomous Polytechnic in 2014 (Plate 4.12).



Plate 4.12: Photograph of Adeseun Ogundoyin Polytechnic Eruwa

Educational Facilities:

Eruwa hosts two tertiary institutions—Adeseun Ogundoyin Polytechnic and Ibarapa Polytechnic—as well as a network of public and private primary and secondary schools, providing accessible basic and

post-basic education for children within Eruwa and surrounding communities. These educational facilities reduce travel distance for learners and support improved literacy, skill acquisition, and human capital development, thereby contributing to the future labour pool required for the ATC.

Health Center

The Eruwa community is served by three major healthcare facilities, namely the General Hospital located near Adeseun Ogundoyin Castle, the Oke-Oba Primary Health Care Centre, and a privately owned medical facility, Awojobi Clinic. These facilities provide essential healthcare services to residents within the community and surrounding settlements.



Plate 4.13: General Hospital Eruwa and Awojobi Clinic

Fuel and Gas Supply Facilities

Eruwa community is served by several fuel service stations that provide Premium Motor Spirit (PMS), diesel, and cooking gas (LPG) to residents, transport operators, and commercial users within the town and adjoining communities. Major filling stations identified during the survey include BOVAS Filling Station located at Orita, Eruwa Titun; Olaide Oil and Gas situated along the Abeokuta–Igboora–Iseyin Road; and LATAK Filling Station located along the New Garage Road at Odo Baba Ode Anko. Other functional stations within the area include Yusade Oil and Gas, Adetunji Adedeji Oil & Gas, Emma Petroleum, and MAO Fuel Station.

These stations support local transportation, domestic energy supply, and commercial activities within the community. Some facilities also provide ancillary services such as vehicle washing and minor convenience services.

In addition to liquid fuel supply, the community also has access to cooking gas (Liquefied Petroleum Gas, LPG) through outlets such as Liberation Gas Venture located opposite Baptist School 1 in Sanngo. The availability of LPG services contributes to improved domestic energy access and supports the gradual transition from traditional biomass fuels to cleaner household energy sources within the area.



Plate 4.14: One of the filling stations within Eruwa

Eruwa Farm Settlement is one of the nine Farm Settlements established some 50 years ago by the Administration of Obafemi Awolowo regime. It has Farm housing units, abandoned Farm equipment and other facilities built many years ago (Plate 4.13)



Plate 4.15: Sample pictures of silos and Farmhouse within Eruwa Farm Settlement

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

The Eruwa project area exhibits a demographic profile similar to other agrarian communities in Oyo State, with farming serving as the dominant livelihood activity. Survey data show that crop farming accounts for 60% of all livelihood activities, demonstrating the community's heavy dependence on agriculture. Livestock production (11.1%), trading (15.6%), processing (6.7%), artisanship (2.2%), and other informal activities (4.4%) complement the agricultural economy and provide additional income opportunities for households (Figure 4.17a).

Petty trading is also a major activity among the people of Eruwa (Plate 4.14 A). Motorcycle riding is the second most practiced job in the three communities (Plate 4.14 B).

Farming remains the primary occupation, with 86.2% of respondents identifying as farmers and only 13.8% as traders. This confirms the highly agrarian character of Eruwa, where livelihoods are strongly tied to seasonal crop production and small-scale livestock keeping.

The population is predominantly male (77.8%), reflecting the traditionally male-dominated nature of agricultural labour in the area. Females account for only 22.2%, a pattern consistent with rural communities where men are more commonly engaged in land preparation, long-distance farming, and commercial crop production (Figure 4.17b).

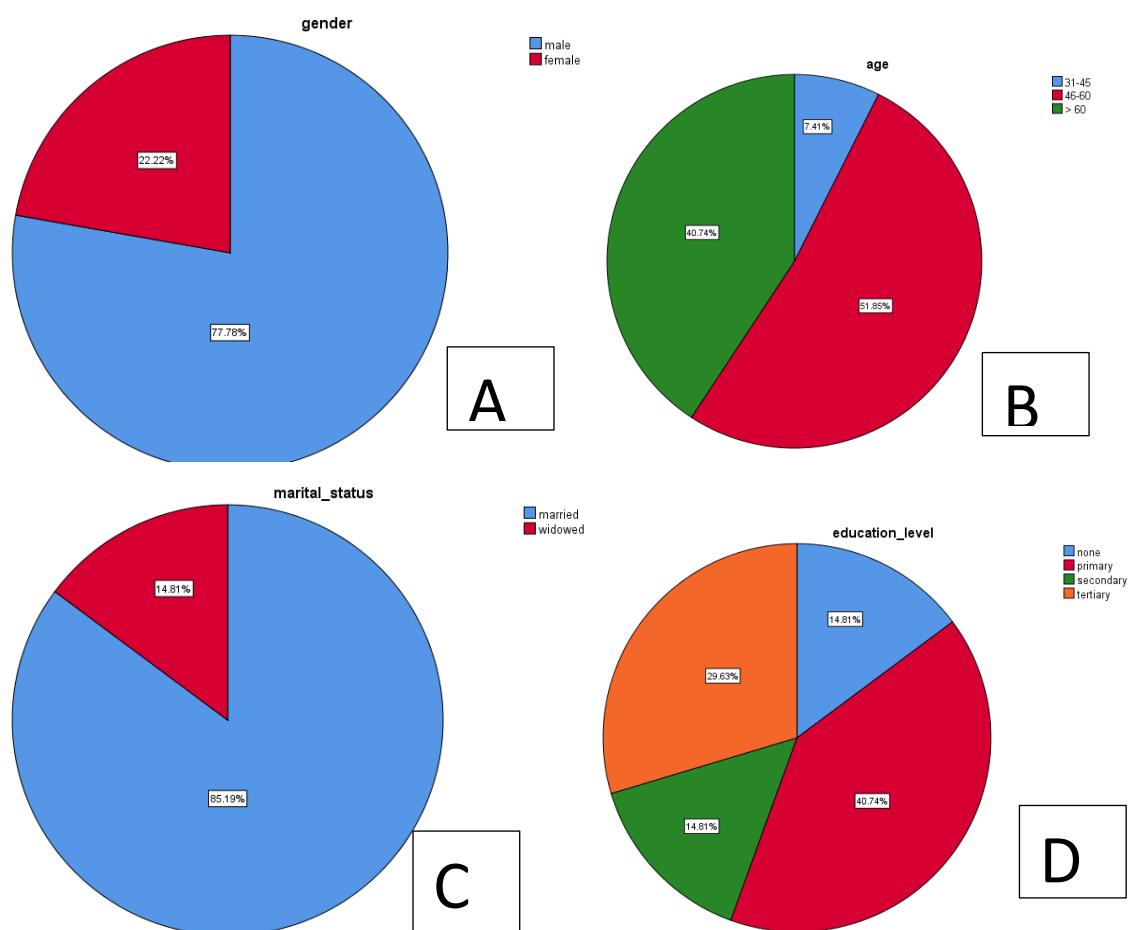
The major crops cultivated are cassava (29%), maize (28%), vegetables (8.6%), cocoa (9.7%), yam (5.4%), soybean (3.2%), palm oil (4.3%), and small quantities of rice (2.2%). This diversity demonstrates a mixed production system balancing food security and cash crop opportunities (Figure 4.17H). Cassava and maize dominate food production, while cocoa and palm oil support long-term income generation.

Livestock activities are mainly small-scale: 58.3% keep poultry and 41.7% rear goats. There was no reported fish farming in the dataset.





Plate 4.16: Some occupations of residents of Eruwa



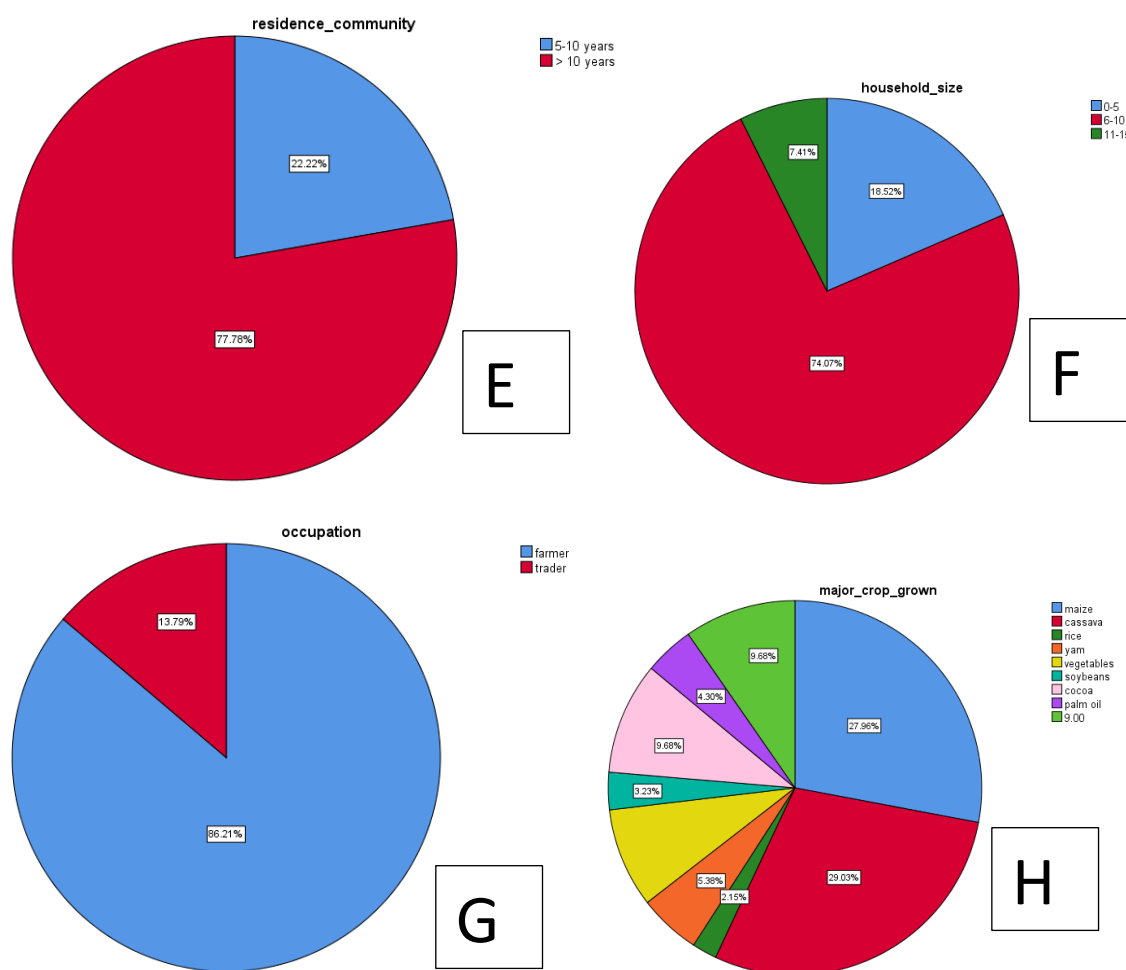


Figure 4.17 a - h: Demographic and household characteristics of residents of AoI

The age distribution is skewed toward older farming households. More than half of respondents (51.9%) fall within the 46–60 years age group, while an additional 40.7% are above 60 years. Only 7.4% are between 31–45 years (Figure 4.17B). This indicates a mature, ageing farming population with extensive experience, but also suggests limited youth participation in mainstream farming activities.

Most residents are married (85.2%), while 14.8% are widowed. Household sizes are relatively large, with 74.1% having 6–10 members and 18.5% having 0–5 members (Figure 4.17E). This reflects strong family units capable of supplying household labour for farming, processing, and trading activities.

Educational attainment is moderate. While 29.6% have tertiary education and 14.8% have secondary education, a significant portion attained only primary education (40.7%), and 14.8% have no formal schooling (Figure 4.17D). This distribution suggests a community capable of adopting improved agricultural practices but still constrained by gaps in formal education.

Although post-harvest losses represent 9.7% of the reported challenges—lower than other constraints—they remain an important environmental and economic concern. Losses occur due to inadequate storage facilities, long transport distances, and the absence of cold chains. Perishable crops such as vegetables and maize are especially vulnerable, leading to:

- Reduced household income

- Food waste
- Increased greenhouse gas emissions from decomposing organic waste
- Loss of labour and input investments

The social baseline assessment for Eruwa highlights several critical challenges across the agricultural value chain, underscoring the need for establishing the proposed Eruwa ATC. These challenges significantly limit the efficiency, profitability, and sustainability of farming activities within the community.

• **Roads and Public Transportation**

In 2010, Nigeria reported 54 airports, 38 of which have paved runways. The country's major port terminal is located in Lagos (World Bank, 2010). There is a total of 3,505 km of rail networks in the country, and 193,200 km of roadways, approximately 28,980 km of which are paved (CIA World Factbook, 2011). Data from 2007 reports that there are approximately 31 motor vehicles per 1,000 people in the country (World Bank, 2010). At Eruwa, Cars, lorries, motorcycles and tippers are used to convey their goods (Plate 4.15).

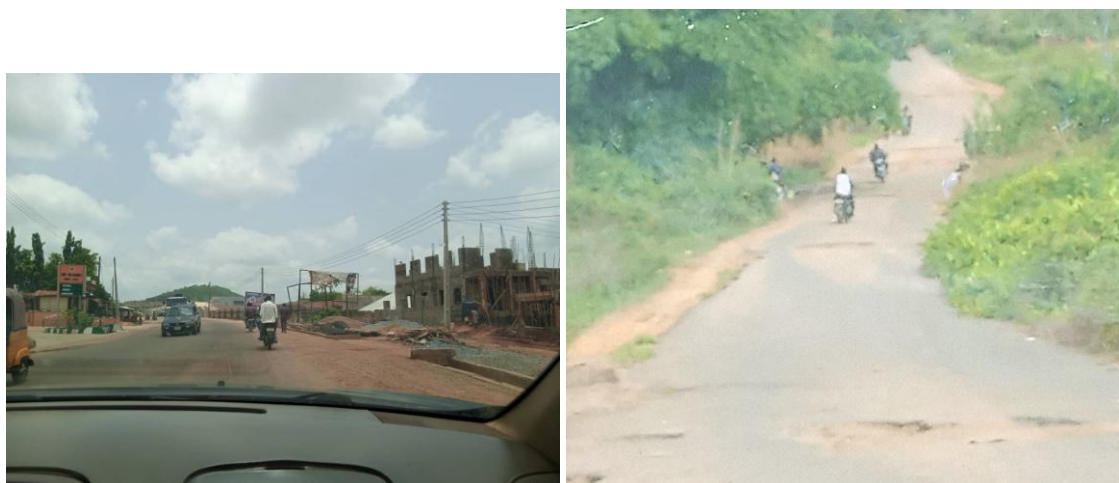


Plate 4.17: Vehicles and motorcycles plying the major road within Eruwa and its road network

Survey results show that the most significant constraint is poor road infrastructure (37.5%), which affects all stages of agricultural production and marketing. The current road conditions increase transportation time, raise the cost of moving goods, and contribute to crop damage during transit. Poor accessibility particularly affects smallholder farmers located more than 5 km from the proposed hub, reducing their ability to transport perishable crops such as vegetables and maize efficiently.

The second major limitation is lack of access to stable markets (23.6%). Farmers frequently rely on middlemen and informal market systems, resulting in inconsistent pricing and reduced bargaining power. This market uncertainty discourages investment in high-value crops and contributes to income instability, especially among low-capital households.

Together, these infrastructural and market challenges lead to reduced profitability, high vulnerability to price fluctuations, and lower motivation among youth to participate in agricultural activities. Beyond roads and market access, farmers in Eruwa also experience challenges related to agricultural inputs and financial services. Survey findings indicate that 12.5% of respondents identified inadequate input supply—including fertilizers, improved

seeds, and agrochemicals—as a major value chain bottleneck. Irregular input availability forces farmers to plant late, use substandard materials, or rely on low-yield varieties.

Similarly, 16.7% of respondents reported limited access to agricultural credit, reflecting barriers such as high collateral requirements, lack of cooperative financing, and absence of rural banking services. These financial constraints prevent farmers from acquiring improved technologies, expanding production, or building resilience against seasonal shocks.

The proposed Eruwa ATC therefore needs to integrate:

- Input distribution centres
- Agrochemical shops
- Seed supply outlets
- Microcredit and cooperative financing services
- Farmer support desks for insurance and extension

These components will directly address the critical systemic gaps limiting productivity in the Eruwa farming economy.

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, with access significantly better in urban areas than in rural communities (World Bank, 2010). Similarly, the 2006 national census reported that only about 10% of households in Oyo State had piped water within their dwellings, while another 15% had access to piped water outside their homes. Consequently, many rural communities continue to depend on rainwater, streams, rivers, and shallow groundwater sources for domestic use.

In Eruwa, there is a water supply scheme operated by the Oyo State Water Corporation (Plate 4.16), which abstracts and treats water from the dam for distribution to the community. However, the scheme is inadequate to meet growing demand and is complemented largely by hand-dug wells, rainwater harvesting, and nearby streams and rivers, many of which are vulnerable to seasonal depletion and contamination.



Plate 4.18: Dam and Signpost showing source of water and water corporation

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 groundwater sources, 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

Access to potable water remains a major environmental and public health concern in Eruwa, as the community relies predominantly on natural and unimproved water sources. Socioeconomic survey results indicate that 73.3% of respondents depend on streams and rivers as their primary source of water, 23.3% rely on rainwater harvesting, while only 3.3% obtain water from hand-dug wells. This heavy dependence on surface water sources exposes the population to seasonal scarcity, poor water quality, and waterborne disease risks.

Assessment of water availability and quality reveals significant vulnerability within the community. Only 13.8% of respondents reported adequate water conditions, whereas 37.9% identified outright scarcity as a major challenge, 34.5% experienced seasonal fluctuations in water availability, and 13.8% reported pollution of existing water sources. Collectively, this means that approximately 86.2% of the sampled population experiences some form of water inadequacy or contamination.

These findings reflect broader rural water access challenges across southwestern Nigeria, where communities depend heavily on environmentally sensitive water systems that are easily affected by climate variability, sedimentation, agricultural runoff, and poor sanitation practices. In the context of the proposed Eruwa Agricultural Transformation Centre (ATC), this dependency implies that project implementation must avoid additional stress on local water resources and ensure sustainable water management practices.

Accordingly, the proposed Project should incorporate:

- Efficient water-use technologies to reduce pressure on local water resources;
- Rainwater harvesting systems for supplementary supply;
- Protection of surface and groundwater resources from contamination;
- Proper wastewater collection, treatment, and disposal systems; and
- Routine monitoring of water quality and availability during project implementation and operation.

Waste Management, Pollution, and Sanitation

Waste management systems within Eruwa are largely informal and inadequate, thereby contributing significantly to environmental degradation and public health risks. Survey data indicate that although 48.1% of respondents described current waste handling practices as “very effective” due largely to household self-management, only 14.8% considered the system fairly effective, while 11.1% rated it poor and 25.9% reported the complete absence of organized waste collection services. This suggests that over one-third of residents’ experience either ineffective or non-existent waste management systems.

Household waste disposal practices further highlight the inadequacy of existing sanitation infrastructure. Approximately 50% of residents dispose of waste through open dumping, 35% practice open burning, 5% bury household waste, and only 10% utilize designated collection points. Consequently, more than 80% of households rely on environmentally unsafe waste disposal methods.

These practices pose serious environmental and health implications, including:

- Surface and groundwater contamination from indiscriminate dumping;
- Air pollution arising from incomplete combustion during waste burning;
- Increased breeding of disease vectors such as flies and rodents;
- Soil contamination and degradation;
- Public health risks including waterborne and respiratory diseases.

The survey findings further reveal that environmental health challenges affecting livelihoods include pesticide exposure (43.9%), waterborne diseases (19.5%), and respiratory illnesses associated with smoke and particulate emissions (12.2%).

Given these conditions, the ESIA identifies waste management as a priority mitigation area for the proposed Eruwa ATC. The following interventions are therefore recommended:

- Provision of centralized waste collection points with covered bins at strategic community and project locations;
- Collaboration with local government authorities and licensed private waste contractors for regular waste evacuation and disposal;
- Development of an integrated waste management plan for the Eruwa ATC, including segregation of organic, recyclable, and hazardous wastes at source;
- Promotion of composting and beneficial reuse of biodegradable agricultural wastes to improve soil fertility;
- Community-based environmental awareness and sanitation campaigns;
- Periodic environmental monitoring and waste management audits to ensure compliance with regulatory standards.

These measures are consistent with the provisions of NESREA's National Environmental (Sanitation and Waste Control) Regulations, 2009, and would significantly reduce pollution risks associated with both community and project-related activities.

❖ Electricity Supply

Eruwa community is connected to the national electricity grid (Plate 4.16); however, participants during Focus Group Discussions (FGDs) reported that power supply remains highly erratic despite moderate daily availability. Survey respondents indicated that electricity is typically available for approximately 10–15 hours per day, although supply fluctuations are frequent and unpredictable.

In response to unreliable grid supply, households and small businesses depend on alternative energy sources such as petrol-powered generators, rechargeable lamps, kerosene lanterns, and battery-powered devices. These alternatives contribute to elevated atmospheric emissions, including carbon monoxide (CO), nitrogen oxides (NO_x), sulphur dioxide (SO₂), and particulate matter.

Socioeconomic survey results reveal severe infrastructure limitations within the community. About 84.6% of respondents reported lacking reliable access to electricity, while 70.4% lacked

potable water infrastructure, 85.7% had limited access to formal healthcare services, and 70.4% reported inadequate access to educational facilities.

Electricity was identified as one of the most inadequate social amenities within the area, alongside roads and water supply. Poor road infrastructure further constrains transportation, market accessibility, and agricultural productivity, especially during the rainy season when road conditions deteriorate significantly. Unpaved roads also contribute to increased dust generation and vehicular emissions.

For effective implementation of the proposed Eruwa ATC, priority should therefore be given to:

- Improvement of electricity supply infrastructure;
- Adoption of renewable and hybrid energy systems to reduce dependence on fossil-fuel generators;
- Upgrading of access roads and drainage systems;
- Enhancement of potable water infrastructure;
- Strengthening of social infrastructure and public utility services.

These interventions would reduce environmental impacts associated with current coping mechanisms while improving productivity, public health, and socioeconomic resilience within the Project area.

❖ Major Environmental Challenges

The major environmental issues identified within Eruwa include:

- Water scarcity and seasonal water shortages resulting from dependence on streams, rainfall, and limited water infrastructure;
- Poor waste management and indiscriminate disposal practices contributing to land, air, and water pollution;
- Air pollution associated with generator use, waste burning, and dust emissions from unpaved roads;
- Soil degradation and declining land productivity linked to unsustainable agricultural practices and erosion;
- Public health concerns arising from poor sanitation, contaminated water, and pesticide exposure; and
- Inadequate infrastructure, particularly roads, electricity, potable water, and healthcare facilities.

Collectively, these environmental pressures contribute to declining environmental quality, increased public health vulnerability, and reduced socioeconomic productivity within the community. The observed conditions indicate moderate ecological stress driven primarily by inadequate infrastructure, poor environmental management practices, and unsustainable resource utilization.

If left unmanaged, these challenges could undermine the sustainability objectives of the proposed Eruwa Agricultural Transformation Centre (ATC). Consequently, integrated environmental planning, infrastructure improvement, sustainable waste management, and resource conservation measures will be essential to ensuring environmentally sustainable project implementation and long-term community resilience.

Grievance Redress Mechanism (GRM)

A structured, transparent, and accessible Grievance Redress Mechanism (GRM) will be established for the proposed Eruwa Agricultural Transformation Centre (ATC) to ensure that stakeholder concerns and complaints are addressed promptly and fairly throughout the project lifecycle. The GRM will provide a formal platform for receiving, documenting, tracking, and resolving grievances arising from project activities in a manner that is inclusive, culturally appropriate, and consistent with international best practices.

The GRM will incorporate:

Multiple grievance uptake channels, including community leaders, local grievance committees, dedicated grievance officers, telephone hotlines, written submissions, and project offices, to ensure broad accessibility.

A grievance registration and tracking system, including grievance logs, unique case identification numbers, and documentation procedures for monitoring complaint status and resolution outcomes.

Clearly defined timelines for acknowledgment, investigation, feedback, and resolution of complaints, with escalation procedures from community level to the Project Implementation Unit (PIU).

Confidential, inclusive, and non-discriminatory procedures that ensure equal access for women, youth, elderly persons, and other vulnerable groups within the host communities.

Provisions for independent mediation and legal recourse where grievances cannot be resolved through internal mechanisms.

Integration of GBV/SEA/SH Safeguards

Considering the potential social risks associated with labour influx, contractor activities, and community interactions during project implementation, the GRM will include specific safeguards addressing Gender-Based Violence (GBV), Sexual Exploitation and Abuse (SEA), and Sexual Harassment (SH).

The GBV/SEA/SH grievance procedures will include:

- Confidential reporting channels that allow survivors to report incidents safely and anonymously where desired;
- A survivor-centred approach that prioritizes dignity, confidentiality, non-discrimination, and protection against retaliation; Immediate referral pathways to qualified service providers for healthcare, psychosocial support, legal assistance, and protection services;
- Designated and trained GBV focal persons within the PIU to manage sensitive cases appropriately;
- Strict confidentiality protocols ensuring that sensitive information is disclosed only with informed consent;
- Mandatory Codes of Conduct for all workers and contractors, including sanctions for SEA/SH violations; and
- Continuous awareness and sensitization programmes for workers and host communities to prevent GBV/SEA/SH incidents.

GBV-related grievances will be managed separately from standard grievance procedures, with emphasis placed on survivor safety, confidentiality, and timely support rather than routine investigation timelines.

The perception of the Eruwa community toward the proposed Eruwa Agricultural Transformation Centre (ATC) was assessed through socioeconomic surveys, Focus Group Discussions (FGDs), and stakeholder consultations. The findings reveal an overwhelmingly positive disposition toward the project, demonstrating strong community acceptance and willingness to support implementation activities.

Among respondents, 64% expressed strong support for the project, while 32% were supportive, 4% were neutral, and no respondents expressed opposition. This indicates that approximately 96% of respondents hold favourable views regarding the proposed ATC initiative.

The high level of support reflects community expectations regarding the anticipated socioeconomic benefits of the Project, including:

- Employment opportunities during construction and operational phases;
- Improved market access for farmers and local traders;
- Enhanced agricultural productivity and value-chain development;
- Improvement in infrastructure and social amenities; and
- Capacity development, technology transfer, and livelihood enhancement opportunities.

The small proportion of neutral respondents (4%) may reflect limited awareness of specific project components or concerns relating to land acquisition, compensation, and potential livelihood impacts. These concerns highlight the importance of sustained stakeholder engagement, continuous sensitization, and transparent communication throughout project implementation.

Preferred Communication Channels

Survey findings indicate that community engagement within Eruwa is strongly rooted in traditional and face-to-face communication systems. Approximately 96.3% of respondents identified community meetings as their preferred channel for receiving project information and updates, while only 3.7% preferred radio broadcasts.

This preference demonstrates the importance of leveraging existing community leadership structures and participatory forums for stakeholder engagement. Consequently, the ESIA recommends that regular community meetings and consultations be conducted:

- Prior to commencement of major construction activities;
- During project implementation and environmental monitoring phases;
- Before introducing changes that may affect community livelihoods or access to resources; and
- When communicating project progress, mitigation measures, and monitoring results.

Community Grievance Preferences and Existing Systems

The survey results further indicate that grievance resolution within Eruwa is predominantly community-based. Approximately 86.4% of respondents stated that they would channel complaints through community leaders, while 9.1% preferred the project office and 4.5% indicated the local government as their preferred grievance pathway.

Despite this reliance on traditional systems, only 23.1% of respondents considered existing grievance mechanisms effective, while 76.9% regarded them as ineffective. This finding

underscores the need for strengthening grievance management structures to ensure accessibility, fairness, transparency, and timely response to complaints during project implementation.

Accordingly, the ESIA recommends the establishment of a multi-tier Grievance Redress Mechanism integrating both formal and community-based approaches as follows:

❖ **First Level – Community-Based Redress:**

Complaints shall initially be submitted to community leaders or local grievance committees for acknowledgment, documentation, and resolution within seven (7) days.

❖ **Second Level – Project Grievance Office:**

Unresolved grievances shall be escalated to the Project Implementation Unit (PIU), where a dedicated Grievance Officer will investigate and mediate complaints within a fourteen (14)-day period.

❖ **Third Level – Independent Mediation/Local Government Review:**

Where complaints remain unresolved, cases may be referred to Local Government mediation committees or independent third-party mediators for impartial resolution.

❖ **Final Level – Legal Recourse:**

As a final option, complainants may seek redress through the formal judicial system in accordance with Nigerian laws and regulations.

The GRM will ensure:

- Accessibility for all stakeholders, including women, youth, and vulnerable groups;
- Confidentiality and protection against retaliation;
- Clear communication channels and feedback mechanisms;
- Multiple reporting pathways (physical, phone, written, and digital submissions);
- Systematic documentation and grievance tracking; and Periodic review, reporting, and analysis of grievance trends.

A Grievance Register will be maintained throughout the project lifecycle to document complaint type, date received, responsible officer, actions taken, resolution timeline, and closure status.

Institutional Capacity and Awareness

Institutional awareness within the community is moderate. Survey findings indicate that 41.7% of respondents are aware of existing environmental and social management institutions, while 58.3% reported no awareness of such structures.

Among respondents familiar with these institutions, 52.4% considered them very effective, 28.6% rated them fairly effective, and 19% viewed them as ineffective. These findings suggest the need for strengthening institutional visibility, operational capacity, and community confidence in environmental governance systems.

To improve institutional effectiveness and support implementation of the Environmental and Social Management Plan (ESMP), respondents identified the following priority needs:

- Training and capacity development (69.6%);
- Increased funding and logistical support (21.7%);

- Clearer institutional roles and mandates (4.3%); and Improved coordination among institutions (4.3%).
- Consequently, the ESIA recommends:
- Capacity-building programmes for local officers on environmental monitoring, social safeguards, and grievance handling;
- Provision of financial and logistical support for environmental oversight activities;
- Community awareness and environmental education programmes;
- Strengthening institutional coordination frameworks; and
- Clarification of roles and responsibilities among implementing agencies and community institutions.

GRM Budget and Implementation

₦162,000,000 has been allocated for GRM implementation. This covers:

- Establishment and operation of grievance offices and communication systems;
- Staffing of grievance officers and community liaison personnel;
- Stakeholder sensitization and awareness campaigns;
- Documentation, reporting, monitoring, and grievance tracking systems; and
- Capacity-building activities for community grievance committees and project staff.

The Project Implementation Unit (PIU) will oversee GRM implementation, while contractors and community liaison officers will support local-level stakeholder engagement and grievance management activities.

The proposed redress framework will be guided by AfDB 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 Eruwa ATC 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.

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 Guideline (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 96% 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 Annex 2 and Table 4.24. 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 4.23: 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 4.24: 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		
Staff of Adeseun Ogundoyin Polytechnic	Mr Soji Adewumi			✓	Intention of Oyo State Government to build Eruwa ATC	✓
OYSADA	Mr Popoola			✓	Intention of Oyo State Government to build Eruwa ATC	✓
OYSADA	Mr. Ajetunmobi			✓	Intention of Oyo State Government to build Eruwa ATC	✓
OYSADA	Dr. Peter			✓	Intention of Oyo State Government to build Eruwa ATC	✓
Farm settlement	Mr. Falowo Kayode, Chairman			✓	Intention of Oyo State Government to build Eruwa ATC	✓
Farm settlement	Adesegun Felix, Vice-Chairman			✓	Intention of Oyo State Government to build Eruwa ATC	✓
Farm Settlement	Mr. Okedere Sunday			✓	Intention of Oyo State Government to build Eruwa ATC	
Farm Settlement	Mr. Akinyode Akinlolu			✓	Intention of Oyo State Government to build Eruwa ATC	✓
Farm Settlement	Chief Olajire Egbedokun			✓	Intention of Oyo State Government to build Eruwa ATC	✓

Chapter Five

5.

POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACT IDENTIFICATION AND EVALUATION

This chapter provides information on the assessment of the potential environmental and socio-economic risks and impacts of the ATC project. A description of the identification and evaluation methodology used to assess the significance of impacts, having taken into account impact magnitude and sensitivity of receptors and resources affected, is provided below.

5.1 Methodology for Impact Identification and Evaluation

The potential environmental and social risks and impacts that are likely to arise as a result of the Oyo State SAPZ intervention project were assessed by harmonizing the project components with the surrounding environmental, social and cultural resources. This chapter presents the potential impacts resulting from the proposed sub-projects Intervention. A combination of methods was employed in assessing the potential impacts of the proposed intervention in the Oyo State SAPZ Eruwa ATC. These methods include: the use of checklists, E&S matrix, public consultation, professional experience and judgment. The phases of impacts assessment include:

- i. **Impact Identification:** to specify the impacts associated with each phase of the project activities;
- ii. **Impact Prediction:** to forecast the nature, magnitude, extent and duration of the impacts; and
- iii. **Impact Evaluation:** to determine the significance of the impacts.

5.1.1 Impact Identification

A checklist based on an in-depth understanding of the local environment, existing baseline information and the key project activities was used to develop list of the potential impacts of the project. The following were appraised:

- The source and/or the cause of the problem (project activity/environment aspect);
- The receptor of the impact (environment component i.e. existing ecological and socio-economic condition of the project environment);
- The way in which the effect is transmitted from the source to the receptor (pathway); and
- The potential consequences (environmental impact).

5.1.2 Impact Prediction

In order to further qualify the impacts of the various sub-project activities on the environment, the identified impacts were characterised based on the nature, duration, and reversibility of the impacts as follows:

- **Beneficial Impacts:** these are impact that have positive and beneficial effects
- **Adverse Impacts:** these are impact that have negative and untoward effects

- **Direct Impacts:** these are impacts that are most obvious and are directly related to the proposed sub-project and can be connected to the actions that caused them
- **Indirect Impacts:** these are secondary impacts that occur later in time or further away from the impact source
- **Cumulative Impacts:** these typically occur from the incremental impact of an action when combined with impacts from projects that have been undertaken recently or would be carried out in the near future
- **Reversible Impacts:** these are impact over which the components involved have the ability to recover after the disturbances caused by the impact
- **Irreversible Impacts:** these are impact whose effects are such that the environmental component cannot be returned to its original state even after adequate mitigation measures are applied
- **Residual Impacts:** these are impact whose effects remain after mitigation measures have been applied
- **Short Term Impacts:** these are impact whose effects remain over a short period of time, and are removed after the application of mitigation measures
- **Long Term Impacts:** these are impact whose effects remain over a long period of time, even after the application of mitigation measures.

5.1.3 Impact Evaluation

The third stage in the assessment procedure involved the evaluation of the concerns, issues and impacts identified. At this stage an assessment of the significance of impacts that may result from the proposed intervention was carried out. This also include outlines of the general assessment methods and a presentation of the criteria for determining receptor sensitivity, impact magnitude and impact significance. This is based on the following criteria:

- **Duration of the Impact**
 - A temporary impact can last days, weeks or months, but must be associated to the notion of reversibility.
 - A permanent impact is often irreversible. It is observed permanently or may last for a very long term.
- **Extent of the Impact**
 - ⑩ The extent is regional if an impact on a component is felt over a vast spatial territory or affects a large portion of its population.
 - ⑩ The extent is local if the impact is felt on a limited portion of the zone of study or by a small group of its population.
 - ⑩ The extent is site-specific if the impact is felt in a small and well-defined space or by only some individuals.
- **Intensity of the Impact**
 - The intensity of an impact is qualified as strong when it is linked to very significant modifications of a component.

- An impact is considered to be of average intensity when it generates perceptible disturbance in the use of a component or of its characteristics, but not in a way to reduce them completely and irreversible.
- A weak intensity is associated with an impact generating only weak modifications to the component considered, without putting at risk some of its utilization or its characteristics.
- **Impacts Severity**
Once the magnitude of the impact and sensitivity of a receptor have been characterized, the significance can be determined for each impact. The impact significance rating was determined, using the matrix provided in Table 5.1.

Table 5.1: Impact Evaluation Matrix				
Impact Rating Schema		Sensitivity/Vulnerability of Receptor		
		Low	Medium	High
Magnitude of Impact	Negligible	Negligible	Negligible	Negligible
	Small	Negligible	Low	Medium
	Medium	Low	Medium	High
	Large	Medium	High	High

- **High Impact:** An impact of major significance, hereafter referred to as a ‘high impact’ is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to a highly valued/sensitive resource/receptors. Repercussions on the environment are very strong and cannot easily be reduced.
- **Medium Impact:** An impact of moderate significance hereafter referred to as a ‘medium impact’, will be within the accepted limits and standards. Medium impacts may cover a broad range, from a threshold below which the impact is minor, up to a level that might be just short of breaching an established (legal) limit. Repercussions on the environment are substantial but can be reduced through specific measures.
- **Low Impact:** An impact of minor significance, hereafter referred to as a ‘low impact’ is one where an effect will be experienced, but whose magnitude is sufficiently small and well within accepted standards, and/or the receptor is of low sensitivity/value. Repercussions on the environment are significant but subdued and may or may not require the application of mitigation measures.

5.2 Project Activities of Environmental and Social Concern

The SAPZ Project as stated chapter three is designed to transform the essential agricultural crops of value chain including Cassava, Cocoa, Palm Oil, Rice, and Timber woods, by engaging the large expanse of agricultural land (brown fields) into an agricultural production, and processing zones. The project activities have been divided into three which include; Agricultural activities, Agro-Processing facilities and Infrastructural development at the SAPZ ATC as highlighted below:

- **Infrastructure Development and AIH Management:**

- Construction and operation of AIHs and ATCs in selected locations.
 - Development of essential infrastructure, including processing facilities, storage, and support services.
 - Common facilities such as administrative offices, research and development labs, training centres, and utilities are provided.
 - Land acquisition and preparation for industrial park (ATC) and agricultural activities.
- **Agricultural Productivity Enhancement:**
 - Support farmers through providing quality inputs, mechanization, and extension services.
 - Development of irrigation systems, farm-to-market roads, and storage facilities.
 - Implementation of contract farming and out-grower schemes.
 - Promotion of climate-smart agricultural practices

5.2.1 Summary of Environmental & Social Impact Indicators

Environmental and social impact indicators are measurable variables that track changes in the environment and society resulting from project, policy, or intervention. These indicators help assess the effectiveness of mitigation measures, identify areas for improvement, and inform decision-making. For the Oyo State SAPZ ATC intervention, the environmental and social components and potential indicators reflective of project activities as discussed in Section 5.2, is presented in Table 5.2.

Table 5.2: Environmental &. Social Components Potential Indicators

S/N	ENVIRONMENTAL/ SOCIAL COMPONENTS	IMPACT INDICATORS
Environmental Component		
1.	Air Quality	SPM, CO ₂ , NO _x , Sox, CO, VOC, CH ₄ , NH ₃ , etc.
2.	Sound/ Vibration & Noise	Noise level dB(A)
3.	Soil/Geology	Soil type and structure, physico-chemical, heavy metals load and microbiological characteristics, etc.
4	Terrestrial flora and fauna	Spp. Abundance and diversity
5	Surface and Groundwater Quality	Dissolved and suspended solids, turbidity, toxicity, physico-chemistry, heavy metals content and microbiological characteristics, etc
6	Hydrology	Seasonality, dissolved and suspended solids, turbidity, toxicity, physico-chemistry, heavy metals content and microbiological characteristics, etc
7	Ecology	Ecosystem and conservation
Social Component		
8	Community and workplace safety	Accident and incident records
9	Socio-economic/ Health	Needs and concern of host communities, perception on the proposed project/ health risks, waste streams, handling treatment and disposal, income/livelihoods, employment, etc.
10	Employment, economy, and Livelihoods	Number of local vs. non-local workers employed, skill acquisition training offered, percentage of women/youth employed vs percentage of men, Number of PAPs compensated on-time/Delayed Compensation
11	Labour Management	Percentage of local employee vs foreign worker, number of GBV/SEA cases reported and redressed, number of grievances reported and redressed
12	Public health, safety & security	Accident and incident records and reporting.
13	Cultural heritage, and Infrastructure	Sacred places within direct project impacted areas, chance finds, and impacts on proximate infrastructures.
14	Gender, and Vulnerable (social inclusion)	Gender, and vulnerable inclusion, and mainstreaming into project activities
15	Resettlement	Accountability, fair play, and timeliness

By tracking these indicators, projects/ programme, organization, and institutions can make data-driven decisions to minimize harm and maximize benefits for both the environment and society.

5.3 Evaluation of Potential Impacts of the Proposed Intervention

5.3.1 Potential Positive Environmental and Social Impact

The potential positive impacts of the proposed Intervention by Oyo State SAPZ are listed below and evaluated in Table 5.3.

- ⑩ Improved crops yields productivity of farmers;
- ⑩ Increased farm incomes from crops output and ensuring dignity in farming practices;
- ⑩ Enhanced rural income and national economy;
- ⑩ Employment creation for community members;
- ⑩ Improved infrastructure through AIH/ ATC development;
- ⑩ Employment generation for youths and women;
- ⑩ Enhanced income and livelihoods of farmers; and

⑩ Improvement in the revenue base of key institutions and regulatory bodies

Table 5.3: Evaluation of Potential Positive Impacts				
S/N	Potential Impact	Key Receptors	Evaluation	Significance
1	Improved crops and productivity yields of farmers;	Farmers	Improved methods of crops production and less dependence on rainfall will reduce production losses. Provision of aggregation centres, warehousing and rehabilitation of farm access/inspection roads will also reduce postharvest losses by farmers. The magnitude is medium and the sensitivity is high .	Major
2	Increased farm incomes from crops output and ensuring dignity in farming practices;	Farmers	The proposed SAPZ project will have a positive impact on food security. This combined with improved access to markets will help commercial farmers to make better production decisions that will increase their income variability. The magnitude is large and the sensitivity is high .	Major
3	Elevation of rural income and national economy;	Farmers, Neighbouring communities, State and National economy	The local and national economy will be boosted through the following: • direct and indirect job creation; • increased income for workers; • increase in business activities in the ATC communities and beyond; • increased food production will reduce food cost; • payment of taxes will improve the revenue base of the economy. On the national front, the expected increment in food productivity will contribute to reducing the nation's food importation bill. The impact will be regional and permanent, lasting throughout the duration of the project. The magnitude is large and the sensitivity is high.	Major
4	Employment creation for community members;	Farmers, Community members, people from other communities	The proposed project will result in the engagement of skilled and unskilled labour for the planning, construction, operation, maintenance phases of the SAPZ AIH/ ATC sub-projects. The project will also improve the capacity of farmers to employ more hands on their farms owing to the increase in productivity. The project will therefore have a major positive impact on the socio-economic conditions of the local communities in and around the project area as a whole through the creation of permanent and temporary direct jobs as well as indirect jobs. The magnitude is large and the sensitivity is high.	Major
5	Improved infrastructure;	Farm, community	This is the crux of the SAPZ AIH/ ATC programme. The proposed intervention for infrastructure improvement will have socio-economic benefits which includes the all-weather road reducing transportation costs, increased access to markets for local produce and products, better access to health care and other social services. The provision of storage facilities will significantly reduce post-harvest losses of farmers on the project. In the long term, this will have more positive benefits to local economic development. The impact will be major	Major

Table 5.3: Evaluation of Potential Positive Impacts				
			and of regional extent. The magnitude is large and the sensitivity is high .	
6	Employment generation for youths and women;	Neighbouring community	It is anticipated that a good percent of the total direct beneficiaries will be women and youths. By design, the project has a dedicated sub-component to benefit women and youth in such a way that will allow them to develop agri-business that is expected to create jobs and improve their livelihoods. The impact will be major and of regional extent. The magnitude is large and the sensitivity is high .	Major
7	Enhanced income and livelihoods of farmers;	Farmers, Community members	The incomes and livelihoods of the participating farmers will be enhanced through the following: • all year-round cropping will ensure farmers have reliable source of income; • reduction in investment losses by farmers; • efficient and effective management unit will ensure ready market for farmers via ATCs; • increased crops productivity of farmers will boost their incomes and livelihoods, and steady supply to ATC; • women will participate in the project, earning some income to support their families. The implementation of the project will inspire commercial activity in the project areas and also provide direct and indirect jobs. The impact on out growers and other workers' incomes and livelihoods will be major and permanent. The magnitude is large and the sensitivity is high.	Major
8	Improvement in the revenue base of key institutions and regulatory bodies	Neighbouring Communities, local government, state and national economy	Revenue will accrue to traditional authorities and regulatory institutions through the payment of royalties and regulatory fees and levies in business partnership with the AIH/ ATCs. The impact will be permanent, lasting throughout the duration of the project. The magnitude is large and the sensitivity is Medium	Major

5.3.2 Potential Negative Risks and Impact

The potential negative risks and impacts of the sub-project activities in the proposed intervention by the Oyo State SAPZ with a focus on the AIH and ATC infrastructure development, and the five agricultural value chains crops (Cassava, Cocoa, Palm Oil, Rice, and Timber woods) are consistent with category 'A'/1 projects. While the potential negative risks and impacts that could derive from the sub-projects' activities are outlined in Tables 5.4, 5.5 and 5.6, the evaluation of their potential impacts are presented in Tables 5.7 and 5.8 based on ATC sub-project implementation activities.

Table 5.4: Environmental & Social Risks and Impacts of Agricultural Activities	
SAPZ Support to Agricultural Activities	
Environmental Impacts	Social Impacts
⑩ Disturbance of flora and fauna; ⑩ Loss of vegetation and impacts on flora and fauna; ⑩ Air quality deterioration; ⑩ Vibration, sound & noise nuisance; ⑩ Water quality issues; ⑩ Changes in soil nutrient cycles; ⑩ Soil impacts and sediment transport. ⑩ Stressful impacts on climate change resilience	⑩ Land acquisition and compensation issues; ⑩ Loss of employment ⑩ Generation and disposal of solid waste; ⑩ Elimination of smallholder farmers; ⑩ Increasing demand for lands for farming/settlements by fringe communities because productive lands not available; ⑩ Chance finds of cultural resources; ⑩ Interference with local cultural identity and heritage ⑩ Occupational, Health & Safety issues; ⑩ Public safety; ⑩ Restriction and outright loss of land; ⑩ Increase in Gender Based Violence; ⑩ Increase in Child labour incidents; ⑩ Social exclusion of women or the vulnerable persons; ⑩ Influx of workers and migrants resulting in spread of communicable diseases.

Table 5.5: Environmental & Social Risks and Impacts of Crop processing for Value Addition at the ATC	
ATC Crop Processing for Value Addition	
Environmental Impacts	Social Impacts
⑩ Impacts on natural habitats; ⑩ Impacts from air emissions; ⑩ Soil quality degradation; ⑩ Impact from water abstraction; ⑩ Pollution of environment due to processing with high concentration of organic matter, cyanide and processing chemicals; ⑩ Pollution of water sources; ⑩ Dust emissions from milling operations ⑩ Noise and vibration; ⑩ Water quality impacts.	⑩ Impacts of waste generation and disposal; ⑩ Occupational, Health and Safety; ⑩ Sanitation issues and public health; ⑩ Impacts on livelihood; ⑩ Visual intrusion; ⑩ Conflicts over land and water use and plot allocation; ⑩ Fire risk; ⑩ Pest and rodent infestation; ⑩ Post-harvest glut and losses; ⑩ Impacts on Physical Cultural Resources ⑩ Impact on nearby communities; and ⑩ Sustainability of the farming venture.

Table 5.6: Environmental & Social Impacts of Infrastructure Support to agribusiness cluster	
ATC Infrastructure Support to Agribusiness	
Environmental Impacts	Social Impacts
• Impact on sensitive terrestrial ecosystems; • Alterations in local natural water cycles/hydrology; • Degradation due to vehicular movement, mobilization of equipment, construction activities such as earthworks; • Deterioration from burning of biomass from clearing and addition of carbon into atmosphere; • Damage local habitat, compact soil, and create erosion via building and occupation of construction camps; • Contaminate surface water; • Obstruction of access ways to communities; • Road impacts & traffic issues.	• Generation of construction and other types of waste; • Utility disruption; • Impacts on Physical Cultural Resources; • Impact on nearby communities; • Alteration of socio-cultural values and the stability of communities adversely affected by the project; • Exposure to rapid social change or tourism; • Accidents from operation of construction equipment; • Social tension due to the exclusion of local people from the project activities; • Pastoralists loss of feed for their livestock; • Failure of equipment and facilities.

5.4 Qualitative and Quantitative Impact Risk Evaluation

Having established the main project and sub-projects' activities with their potential environmental and social impacts (adverse and beneficial) as characterised above, risk evaluation comes next. In stepwise progression, the identification of potential impacts of the proposed project was followed by impact prediction using the most simple and common impact prediction tools especially, the environmental management system (EMS) ISO14001 approach amplified with professional judgement. The impact prediction tools allowed the prediction of changes that will alter the baseline environment (biophysical, cultural and socio-economic).

While it was noted that the characteristics of identified and predicted impacts can vary, the assessment relied on the consistency of typical parameters of evaluation as follows:

- ⑩ **Nature of impacts** (beneficial, adverse, direct, indirect, cumulative);
- ⑩ **Magnitude of impacts** (severe, moderate, low);
- ⑩ **Extent/location of impacts** (area/volume covered, distribution);
- ⑩ **Timing of impacts** (during construction, operation, decommissioning, immediate, delayed, rate of change);
- ⑩ **Duration of impacts** (short term, long term, intermittent, continuous);
- ⑩ **Trend of Impacts** Normality/abnormality of impacts;
- ⑩ **Likelihood of impacts** (probability, uncertainty or confidence in the prediction).

Following from the characterization of impacts, the potential impacts were next quantified to determine their significance using a set of criteria and weighting scale, as follows:

- ⑩ Legal/Regulatory Requirements (L)
- ⑩ Risk Factor (R)
- ⑩ Frequency of Occurrence of Impact (F)
- ⑩ Importance of Impact on Affected Environmental Components (I)
- ⑩ Public Perception (P)

An **ISO14001** Environmental Management System (EMS) approach was adopted for rating of significance of the project impacts as follows:

1. **Legal/Regulatory Requirements (L):** The criterion is to essentially determine whether there is a legal/regulatory requirement or permit.

- 0 = There is no legal/regulatory requirement
- 3 = There is legal/regulatory requirement
- 5 = There is a legal/regulatory requirement and permit

2. **Risk Factor:** A risk assessment matrix (RAM) evaluates the risk factor of the impacts

- 1 = Low risk
- 3 = Medium risk
- 5 = High risk

3. **Frequency of impact (F):** What is the frequency rating of impact based on the RAM?

- 1 = Low frequency
- 3 = Medium
- 5 = High frequency

4. **Importance of impacts and environmental component affected (I):** What is the rating of importance based on consensus of opinions?

- 1 = Low
- 3 = Medium
- 5 = High

5. **Public perception/concerns (P):** What is the rating of public perception and concerns on project impacts based on consultations and interviews

- 1 = Low perception/concerns
- 3 = Medium perception/concerns
- 5 = High perception/concerns

The above criteria and rating of potential impacts of the project activities was based on a number of factors including the following:

- The known and likely presence of environmental receptors and resources.
- Vulnerability or sensitivity of affected resources and receptors.
- Ability of receptors or resources to absorb change
- The extent, nature and duration of physical change resulting from the construction and operation of the ATC.

The rating of each of the impacts resulting from the project activities were based on EMS ISO14001 approach where the criteria are summed up and categorized as either significant or not significant. That is where:

- a. $= L+R+F+I+P \geq 15$; $F+I > 6$ or $P=5$, the impact significance is regarded as high;
- b. $= L+R+F+I+P \geq 8$ but < 15 the impact significance is regarded as medium; and
- c. $= L+R+F+I+P \leq 8$ the impact significance is regarded as low or not significant.

Tables 5.6 and 5.7 present a simplified assessment matrix that summarizes project activities and the associated and potential impacts and their rating. The following abbreviations are used for the impact qualification columns: *Adverse (AD)*; *Beneficial (BN)*; *Long-term (LT)*; *Short-term (ST)*; *Direct (DT)*; *Indirect (ID)*; *Normal (NM)*; *Abnormal (AB)*

Table 0.7a: Simplified Assessment Matrix of Project Action and Environmental Impacts																		
Project Phase	Project Activity	Potential Impact	Impact Receptors	Impact Qualification								Impact Quantification					Overall Rating	Project Phase
				Adverse	Beneficial	Long-Term	Short-Term	Direct	Indirect	Normal	Abnormal	L	R	F	I	P	L+R+F+I+P	High Medium Low
Pre-construction Phase	Equipment and Personnel Mobilization	Noise pollution from heavy duty trucks, equipment, and people	Host Communities Mobilized	x			x	x		x		0	3	3	3	1	10	Medium
		Air pollution from vehicle emission brought on by elevated concentration of CO, NO ₂ , SPM, SO ₂ , etc	construction workers	x			x	x		x		0	3	3	3	2	11	Medium
	Site Clearing	Vegetation loss of about 37.84 ha and habitat disturbance of 12.5 ha	Host Communities Ecosystem	x			x	x		x		3	3	1	3	3	13	Medium
		Removal of top soil of about 97,983.6 m ³ and soil compaction increased erosion potential		x		x		x		x		0	3	5	5	3	16	High
		Reduced carbon sequestration capacity due to vegetation loss of about 32,220 m ³ amounting to about 164,082m ³ biomass	Ecosystem	x			x	x				3	5	3	3	3	17	High
		Increased noise levels, vibration and air quality degradation from machines and equipment	Host Communities Mobilised Individuals (construction workers)	x			x	x		x		3	3	1	3	3	13	Medium
		Dust generated from about 130,203.6 m ³ soil stockpiles and handling	Host communities	x			x	x		x		1	3	1	3	2	10	Medium

Table 0.7a: Simplified Assessment Matrix of Project Action and Environmental Impacts																		
Project Phase	Project Activity	Potential Impact	Impact Receptors	Impact Qualification								Impact Quantification					Overall Rating	Project Phase
				Adverse	Beneficial	Long-Term	Short-Term	Direct	Indirect	Normal	Abnormal	L	R	F	I	P	L+R+F+I+P	High Medium Low
			Construction workers															
		Vegetative waste generation due to trees, shrubs and grasses clearing	Ecosystem	x			x	x		x		3	3	1	3	2	12	Medium
		Increased erosion potential due to vegetation loss		x			x	x		x		3	3	1	3	3	13	Medium
		Reduction in structural stability and percolation ability of soil due to compaction and other engineering activities		x			x	x		x		3	3	1	3	3	13	Medium
Construction Phase	Site Preparation through; Removal of vegetation and soil compaction from 37.84 ha	Increase dust generation from cleared land and windblown stockpiles.	Host communities	x			x	x		x		3	1	1	3	3	11	Medium
		Increased soil erosion potential; reduction in structural stability and percolation ability of soil.	Construction workers Ecosystem	x			x	x		x		5	5	3	3	3	19	High
	Civil and Construction activities through ground levelling, excavation and foundation	Noise from the operations of engines, heavy duty construction machines and motors vehicles on site		x		x		x		x		0	3	3	3	3	12	Medium
		Air quality impacts due to emissions of about 164,082 m³ from the operation of heavy-duty construction		x		x		x		x		0	3	3	3	3	12	Medium

Project Phase	Project Activity	Potential Impact	Impact Receptors	Impact Qualification								Impact Quantification					Overall Rating	Project Phase
				Adverse	Beneficial	Long-Term	Short-Term	Direct	Indirect	Normal	Abnormal	L	R	F	I	P	L+R+F+I+P	High Medium Low
		machines such as bulldozer and motors vehicles on site																
	Cement mixing, concrete batching and handling	Contamination of surface water sources		x			x	x			x	2	1	3	3	3	12	Medium
		Poor air quality due to the release of fine dust, including PM _{2.5} and PM ₁₀ , into the air atmosphere		x			x	x			x		1	3	3	3	10	Medium
		Batching plants and mixing sites generate construction waste of about 51 m ³ in form of cement bag, formwork waste, scrap metals and fasteners		x			x	x		x		3	3	1	3	3	11	Medium
		Spills of chemicals, fuels, or other pollutants can contaminate the soil.		x			x	x		x		3	1	1	3	3	11	Medium
		Leaks from vehicles or equipment can also lead to soil contamination.		x			x	x		x		3	1	1	3	2	10	Medium
	Haulage of construction /building materials	Increased GHG emissions from trucks, heavy duty machines and equipment of about 164,082 tCO ₂ e		x			x	x			x	2	3	3	2	3	13	Medium
		Increased SPM due to wind blowing particles from operation trucks hauling sands and aggregates		x			x		x		x	3	3	3	3	3	15	Medium
	Extraction, processing,	Alteration of landscapes due to the removal of topsoil,	Ecosystem	x		x	x	x			x	3	2	2	3	3	13	Medium

Project Phase	Project Activity	Potential Impact	Impact Receptors	Impact Qualification								Impact Quantification					Overall Rating	Project Phase
				Adverse	Beneficial	Long-Term	Short-Term	Direct	Indirect	Normal	Abnormal	L	R	F	I	P	L+R+F+I+P	High Medium Low
	and transportation of quarried materials (such as sand, and stone)	excavation of large pits, and creation of spoil heaps.																
		Heavy machinery on and around the quarry can also compact soil, inhibiting future vegetation growth.		x			x	x		x		3	1	1	3	2	10	Medium
		Quarrying activities like drilling, blasting, crushing, and transporting materials generate large amounts of dust.		x			x	x			x	3	2	3	3	3	14	Medium
		Heavy machinery and frequent blasting create significant noise and vibrations that can disturb wildlife and communities near the quarry.	Host communities Construction workers	x			x	x			x	2	1	3	3	3	12	Medium
		Increase air quality pollution and greenhouse gas emission due to machinery used in quarries emits pollutants like nitrogen oxides and carbon dioxide (CO ₂)		x			x	x			x	3	2	2	3	3	13	Medium
	Construction of fence, buildings and utilities	Noise from the operations of engines, heavy duty construction machines and motors vehicles on site	Ecosystem	x		x		x		x		2	2	5	4	5	18	High
		Disruption of wildlife migration patterns		x			x	x		x		3	1	1	3	2	10	Medium
		Introduction of pollutants (such as cement dust,	Host communities	x			x	x			x	2	1	3	3	3	12	Medium

Table 0.7a: Simplified Assessment Matrix of Project Action and Environmental Impacts																		
Project Phase	Project Activity	Potential Impact	Impact Receptors	Impact Qualification								Impact Quantification					Overall Rating	Project Phase
				Adverse	Beneficial	Long-Term	Short-Term	Direct	Indirect	Normal	Abnormal	L	R	F	I	P	L+R+F+I+P	High Medium Low
		leftover cement mix) into nearby water bodies through run-off																
		Soil contamination due to improper disposal of construction materials waste (e.g. cement bag, formwork waste, scrap metals and fasteners etc.)	Host communities Ecosystem	x		x		x		x		2	2	5	4	5	18	High
Operational Phase	OYS SAPZ-ATC facilities and operations	Increase in noise level from the operations of various machines and equipment such as power plant	Host communities Ecosystem	x		x		x		x		1	1	4	3	2	12	Medium
		The daily release of nitrogen oxides (NOx), carbon monoxide (CO), hydrocarbons, and particulate matter (PM _{2.5} , PM ₁₀) from machineries and equipment directly affects local air quality	Ecosystem	x			x	x		x		3	1	1	3	2	10	Medium
		Streams of agricultural waste generated such as peeling process, separations of raw materials and processed waster from production		x		x		x	x			3	2	4	3	2	14	Medium
		Increase soil pollution potential due to spilled fuel, spent oil, lubricants, aluminium oxide paint etc. during routine maintenance		x			x	x			x							

Table 0.7a: Simplified Assessment Matrix of Project Action and Environmental Impacts																		
Project Phase	Project Activity	Potential Impact	Impact Receptors	Impact Qualification								Impact Quantification					Overall Rating	Project Phase
				Adverse	Beneficial	Long-term	Short-term	Direct	Indirect	Normal	Abnormal	L	R	F	I	P	L+R+F+I+P	High Medium Low
		of the operating machineries and equipment																
Decommissioning Phase	Demolition and Removal of camps, cabins, equipment etc.	Increase in noise level and dust generation due to the demolition and removal of camps components and other structures	Construction worker	x		x		x		x		1	1	4	3	3	12	Medium
		Increase in noise and air quality pollution due to transfer of heavy-duty equipment and construction machineries	Host communities Construction worker	x			x	x			x	1	1	4	3	3	12	Medium
		Solid waste generation and improper disposal waste facility		x		x		x		X		1	1	4	3	2	11	Medium

Table 5.7b: Simplified Assessment Matrix of Project Action and Social Impacts																		
Project Phase	Project Activity	Potential Impact	Impact Receptors	Impact Qualification								Impact Quantification					Overall Ratings	Project Phase
				Adverse	Beneficial	Long-term	Short-term	Direct	Indirect	Normal	Abnormal	L	R	F	I	P	L+R+F+I+P	High Medium Low
Pre-construct ion Phase	Land takeover (repossession) of 37.8 ha	Economic displacement of 340 people across 68 households losing farmlands and crops	Host communities	x		x		x		x		5	5	4	5	5	24	High
		Conflicts may emerge due to insufficient stakeholders' engagement and/or perceived inadequate compensation for farmland and crops loss or perceived disparity in compensation		x		x		x		x		5	3	2	3	5	18	High
	Equipment and Personnel Mobilization	Population surge of about 50 workers leading to pressure on available resources (e.g., water, space etc.)	Host Communities	x		x		x		x		0	1	1	3	5	10	Medium
		Outbreaks of communicable diseases such as Flu, Tuberculosis, Ringworm	Mobilised Individuals (construction workers)	x		x		x		x		0	2	1	3	5	11	Medium
		Worsening anti-water and anti-sanitation practices;		x		x		x		x		0	1	1	3	5	10	Medium
		Social interactions including sexual relations between workers and community members may lead to increased incidence of sexually transmitted infections (STI) including HIV/AIDS		x		x		x		x		0	3	1	3	1	8	Medium

Project Phase	Project Activity	Potential Impact	Impact Receptors	Impact Qualification								Impact Quantification					Overall Ratings	Project Phase
				Adverse	Beneficial	Long-term	Short-term	Direct	Indirect	Normal	Abnormal	L	R	F	I	P	L+R+F+I+P	High Medium Low
		Risk of respiratory diseases in personnel and members of the community		x			X	x		x		0	3	2	3	3	11	Medium
		Reducing aesthetic value of the area.		x			x	x		x		3	1	1	3	3	11	Medium
		Population surge of about 50 workers will increase the domestic waste generation by ~300 m ³ of solid waste leading to sanitation challenges.		x			x	x			x	2	2	5	2	3	14	Medium
	Site Clearing	Increased earnings to local labourer from the clearing of vegetation and site preparation Improved standard of living	Host Communities		x		x	x		x		N	N	N	N	N		
		Reduce crime and social vices due to various engagement through job opportunities			x		x	x		x		N	N	N	N	N		
		Reduced local landscape aesthetic value due to natural vegetation clearing		x			x	x			x	2	1	1	1	2	7	Low
		Clearing activities may eliminate access to plant used for medicinal purpose and other cultural practices		x			x	x			x	2	1	1	1	2	7	Low

Table 5.7b: Simplified Assessment Matrix of Project Action and Social Impacts																		
Project Phase	Project Activity	Potential Impact	Impact Receptors	Impact Qualification								Impact Quantification					Overall Rating	Project Phase
				Adverse	Beneficial	Long-term	Short-term	Direct	Indirect	Normal	Abnormal	L	R	F	I	P	L+R+F+I+P	High Medium Low
Construction Phase	Site Preparation through; • Removal of vegetation and soil compaction from 37.94 ha	Disruption of established social ties and support networks due to the displacement of farming household	Host Communities	x			x	x		x		3	1	1	3	3	11	Medium
	Civil and Construction activities through ground levelling, excavation and foundation	Destruction of crops and farm lands due to excavation and grading of farmland	Host Communities	x			x	x		x		3	1	1	3	3	11	Medium
		Respiratory illness from airborne dust due to earthwork activities could lead to common colds, flu, asthma etc.		x			x	x		x		2	3	1	3	3	12	Medium
		Prolonged exposure to noise from earthwork activities can cause stress, hearing loss, and sleep disturbance.		x			x	x		x		2	3	1	3	3	12	Medium
	Hiring of construction personnel	Employment of community locals	Host communities		x	x		x		x								
		Boost of local economy and improvement of standard of living through job opportunities and high purchasing rate			x		x	x		x								

Project Phase	Project Activity	Potential Impact	Impact Receptors	Impact Qualification								Impact Quantification					Overall Rating	Project Phase
				Adverse	Beneficial	Long-term	Short-term	Direct	Indirect	Normal	Abnormal	L	R	F	I	P	L+R+F+I+P	High Medium Low
		Provision or improvement of local infrastructure and amenities			x	x		x		x								
		Conflicts may emerge during site clearing and preparation activities due to insufficient stakeholder engagement and/or perceived disparities in employment opportunities		x		x		x			x	2	3	3	2	3	13	Medium
	Cement mixing, concrete batching and handling	Water-related health conditions due to water source contamination	Host communities Construction workers	x			x	x			x	2	1	3	3	3	12	Medium
		Occupational, health and safety concerns for the workers due to potential skin and eye irritation, respiratory and allergic concerns.	Construction Workers	x		x	x	x			x	5	5	3	3	3	19	High
		Abrasive damage to the lung due inhalation of airborne dust from cement and silica.		x		x	x	x			x	5	5	3	2	3	18	High
		Damage to the natural landscapes due to quarrying for raw materials	Ecosystem	x		x		x	x		x	5	5	2	2	2	16	High
		Destruction of flora and fauna habitats and		x		x		x	x		x	5	5	2	2	2	16	High

Project Phase	Project Activity	Potential Impact	Impact Receptors	Impact Qualification								Impact Quantification					Over all Rating	Project Phase
				Adverse	Beneficial	Long-term	Short-term	Direct	Indirect	Normal	Abnormal	L	R	F	I	P	L+R+F+I+P	High Medium Low
		potentially disrupting ecological balance due to quarrying for raw materials																
	Haulage of construction/building materials	Aggregates falling off and hitting and damaging third party windshields and causing other forms of injuries	Road Users	x			x	x			x	3	2	2	3	3	13	Medium
		Deterioration of existing roads	Host Communities Road Users	x		x		x			x	2	3	3	2	3	13	Medium
		Increased accident rate due to increased movement of trucks and other earth-moving vehicles	Road Users Construction workers	x		x		x			x	2	4	3	2	3	14	Medium
	Extraction, processing, and transportation of quarried materials (such as sand, and stone)	Provide employment for the locals	Host Communities		x		x	x		x		N	N	N	N	N		
		Large and unmanaged quarry pits poses safety risks to community members		x			x	x			x	1	1	2	3	3	10	Medium
	Construction of fence, buildings and utilities	Noise from the operations of engines, heavy duty construction machines and motors vehicles on site	Host Communities	x		x		x		x		1	3	3	3	3	13	Low

Table 5.7b: Simplified Assessment Matrix of Project Action and Social Impacts																		
Project Phase	Project Activity	Potential Impact	Impact Receptors	Impact Qualification								Impact Quantification					Over all Rating	Project Phase
				Adverse	Beneficial	Long-term	Short-term	Direct	Indirect	Normal	Abnormal	L	R	F	I	P	L+R+F+I+P	High Medium Low
Operational Phase		cause stress, hearing loss, and sleep disturbance.	Construction workers															
		Impact on water quality if hazardous wastes are discharged to watercourses or from runoff from inappropriately stored hazardous waste		x			x	x			x	2	2	5	2	3	14	Medium
	OYS SAPZ-ATC facilities and operations	Employment of community locals	Host communities		x	x		x		x								
		Boost of local economy and improvement of standard of living through job opportunities and high purchasing rate			x		x	x		x								
		Provision or improvement of local infrastructure and amenities			x	x		x		x								
		Reduction in crime and social vices through engagement of local youth		x		x		x		X								
		Enhance socio-economic potential of the locals and increase interaction beyond immediate localities			x	x	x	x	x	x								
		Pressure on local housing and infrastructure due to influx of people seeking for		x	x	x		x	x	x		1	2	5	4	3	15	Medium

Table 5.7b: Simplified Assessment Matrix of Project Action and Social Impacts																		
Project Phase	Project Activity	Potential Impact	Impact Receptors	Impact Qualification								Impact Quantification					Overall Rating	Project Phase
				Adverse	Beneficial	Long-term	Short-term	Direct	Indirect	Normal	Abnormal	L	R	F	I	P	L+R+F+I+P	High Medium Low
		job opportunity and those working in the area																
Decommissioning Phase	Demolition and Removal of camps, cabins, equipment etc.	Job opportunity for the demolition exercise	Host Communities		x		x	x	x									
		Positively improve living standard of the youth			x		x	x	x									
		Reduction in crime and social vices through engagement of local youth			x		x	x	x									
		Health and safety risks to workers from demolition activities	Construction worker	x			x	x		x		1	1	4	4	3	13	Medium

5.5 Description of Potential Impacts

The potential impacts of the project across its different phases (Pre-Construction, Construction, Operational, and Decommissioning) involves specific activities with varying levels of interaction with the biophysical and socio-economic environment. The impacts are categorized as adverse or beneficial, direct or indirect, short-term or long-term, local or regional, and are rated based on their significance as stated in Tables 5.6 and 5.7 in the preceding Section.

5.5.1 Pre-Construction Phase

▪ Equipment and Personnel Mobilization

Environmental Impacts

- Noise pollution from heavy-duty trucks, equipment, and personnel movement: The mobilization of heavy trucks, construction machinery, and workers will generate continuous noise in the project area. This is an adverse, short-term, direct, and normal impact, because it results from routine mobilization activities. Although temporary, the noise can cause considerable disturbance to the host environment, affecting both human comfort and ecological balance. Considering its limited duration but widespread effect, the overall significance is Medium.
- Air pollution from vehicle emissions: Exhaust emissions from mobilized vehicles and equipment will increase the concentration of pollutants such as carbon monoxide, nitrogen oxides, sulphur oxides, and suspended particulate matter in the atmosphere. This is an adverse, short-term, direct, and normal impact, as it originates directly from fuel combustion and dissipates after mobilization ends. However, poor air circulation may worsen its immediate effects on local air quality, making the overall significance Medium.

Social Impacts

- Population surge and pressure on local resources: The influx of approximately 25 workers will create a sudden increase in demand for food, water, housing, and other social amenities. This situation is beneficial, short-term, direct, and normal in terms of stimulating local economic activity and service demand, but simultaneously adverse, short-term, direct, and normal as it overstretches already limited community resources. The competing outcomes balance each other, with an overall significance of Medium.
- Outbreaks of communicable diseases: High population density and increased interaction between mobilized workers and the local community increases the likelihood of disease transmission. Respiratory illnesses such as flu and tuberculosis, as well as skin infections like ringworm, could spread easily. This is an adverse, short-term, direct, and abnormal impact, as it introduces public health risks beyond normal community conditions. Because of its potential to affect both workers and residents, the overall significance is Medium.
- Poor sanitation and hygiene practices: Influx of workers may lead to indiscriminate waste disposal, inadequate toilet facilities, and increased water contamination, resulting in declining sanitation levels. This constitutes an adverse, short-term, direct, and

abnormal impact, since it could trigger public health challenges not typical of the community under normal conditions. The overall significance is Medium.

- Risk of sexually transmitted infections (STIs), including HIV/AIDS: The arrival of new groups of workers introduces different social dynamics and relationships, which may increase exposure to STIs and HIV/AIDS. This is an adverse, long-term, indirect, and abnormal impact, as the effects extend beyond the mobilization period and have lasting health and social consequences. The overall significance is Medium.
- Respiratory health risks: Exposure to exhaust fumes and dust from mobilized vehicles and equipment may cause short-term respiratory conditions such as coughing, asthma aggravation, and eye irritation. This is an adverse, short-term, direct, and abnormal impact, as it arises directly from vehicle use. The overall significance is Medium.
- Reduction in local aesthetic value: Increased movement of vehicles, dust emissions, and temporary worker camps will degrade the visual appeal of the project environment. This is an adverse, short-term, indirect, and abnormal impact, as it does not directly damage environmental components but reduces the attractiveness of the locality. The overall significance is Medium.
- Increase in solid waste generation: The influx of 25 workers will result in an estimated 150 m³ of domestic waste, which requires proper collection and disposal. If not managed, this becomes an adverse, short-term, direct, and abnormal impact, as poor waste handling can cause pollution and health hazards. The overall significance is Medium.

▪ **Site Clearing**

Environmental Impacts

- Vegetation loss and habitat disturbance: Clearing of approximately 20.0 hectares of land and disturbance of 10 hectares of habitat will significantly alter the ecological setting of the project area and its environ. This is an adverse, long-term, direct, and normal impact, as it directly removes natural vegetation and reduces available habitat for wildlife. Biodiversity depletion is expected, and natural regeneration may be slow. The overall significance is Medium.
- Topsoil removal and soil compaction: The extraction of about 97,983.6 m³ of topsoil coupled with soil compaction will degrade soil fertility and increase erosion susceptibility. This represents an adverse, long-term, direct, and abnormal impact, as it permanently alters soil structure and productivity. Given the scale of soil disturbance, the overall significance is High.
- Reduced carbon sequestration: Clearing of 20.1 hectares of vegetation will reduce the carbon storage capacity of the environment, resulting in a biomass loss of about 124,082 m³. This is an adverse, long-term, direct, and abnormal impact, as it weakens the area's role in climate regulation. The overall significance is High.

- Noise, vibration, and degraded air quality from equipment: Operation of clearing equipment will release noise, vibration, and exhaust gases, leading to deterioration of local air quality and temporary disturbance of the environment. This is an adverse, short-term, direct, and normal impact, with an overall significance of Medium.
- Dust generation from soil stockpiles: Movement and storage of excavated soil will generate dust particles, lowering ambient air quality and increasing respiratory risks. This is an adverse, short-term, direct, and normal impact, with the overall significance of Medium.
- Vegetative waste generation: Large quantities of shrubs, grasses, and tree debris will be produced, requiring proper handling and disposal. This is an adverse, short-term, direct, and normal impact, as unmanaged waste could create secondary environmental concerns. The overall significance is Medium.
- Increased potential erosion: Vegetation removal leaves soils exposed to wind and water erosion, potentially leading to land degradation. This is an adverse, long-term, direct, and normal impact, with the overall significance rated Medium.
- Reduced soil structural stability and percolation: Heavy equipment use during clearing will compact soils, reducing their ability to absorb water and sustain vegetation. This is an adverse, long-term, direct, and normal impact, with the overall significance considered Medium.

Social Impacts

- Increased earnings for local labourers: Engagement of local workers during site clearing provides jobs and income, improving household livelihoods. This is a beneficial, short-term, direct, and normal impact with positive implications for poverty reduction.
- Reduction in crime and social vices: Employment opportunities reduce idleness among youth, helping to minimize crime and anti-social behaviours. This is a beneficial, short-term, indirect, and normal impact, contributing to community stability.
- Reduction in local aesthetic value: Loss of vegetation reduces the scenic appeal of the project area. This is an adverse, long-term, indirect, and normal impact, with the overall significance rated Low.
- Loss of medicinal and cultural plant resources: Clearing activities may remove species used for traditional medicine or cultural practices. This is an adverse, long-term, indirect, and normal impact, with an overall significance of Low.

▪ Land Takeover (Repossession of 20.0 ha)

Social Impacts

- Economic displacement of households: About 140 people across 20 households will lose farmland and crops due to land repossession, disrupting their primary means of livelihood. This is an adverse, long-term, direct, and abnormal impact with profound socio-economic implications. Because the displacement is permanent and affects household income security, the overall significance is High (though mitigated with RAP compensation).
- Conflicts due to inadequate or unequal compensation: Where compensation for land and crops is perceived as inadequate or unfairly distributed, disputes and grievances are likely to arise. This represents an adverse, long-term, indirect, and abnormal impact, as it undermines community cohesion and may escalate into social conflict. The overall significance is High.

5.5.2 Construction Phase

- **Site Preparation (Removal of Vegetation and Soil Compaction within 20.0 ha)**

Environmental Impacts

- Increase in dust generation from cleared land and stockpiles: The removal of vegetation and exposure of bare soils will generate dust, particularly when stockpiles are dispersed by wind. This is an adverse, short-term, direct, and normal impact, since it results directly from site preparation activities and will reduce once surfaces are stabilized. The impact contributes to reduced air quality and discomfort in nearby areas, with the overall significance rated Medium.
- Increased soil erosion and reduction in structural stability: Soil compaction and vegetation removal will leave the ground vulnerable to erosion, while also diminishing its structural integrity and water infiltration capacity. This is an adverse, long-term, direct, and abnormal impact, as it fundamentally alters soil properties beyond natural recovery without intervention. Given its persistence and severity, the overall significance is High.

Social Impacts

- Disruption of established social ties and support networks: Farming households that depend on the land may experience displacement and disruption of long-standing social and economic support systems. This is an adverse, long-term, indirect, and abnormal impact, since it affects the socio-cultural structure of communities in a way that is not easily reversible. The overall significance is Medium.

- Civil and Construction Activities (Ground Levelling, Excavation, and Foundation Works)

Environmental Impacts

- Noise from engines, machinery, and vehicle operations: The operation of heavy-duty construction equipment and vehicles will produce significant noise on the site. This is an adverse, short-term, direct, and normal impact, persisting for the duration of construction but diminishing once the phase is complete. The overall significance is Medium.

- Air quality impacts due to emissions from heavy-duty equipment and vehicles: Construction machinery will release exhaust gases, including CO, NO_x, and particulate matter, which degrade air quality in the immediate area. This is an adverse, short-term, direct, and normal impact, continuing for as long as machines are in use. The overall significance is Medium.

Social Impacts

- Destruction of crops and farmlands: Excavation and grading works may encroach on croplands, leading to direct loss of agricultural output. This is an adverse, short-term, direct, and normal impact, as it stems directly from construction earthworks. The overall significance is Medium.
- Respiratory illness from airborne dust: Dust released during earthworks can lead to respiratory ailments such as asthma and bronchitis. This is an adverse, short-term, direct, and normal health impact, with the overall significance considered Medium.
- Stress, hearing loss, and sleep disturbance from prolonged noise exposure: Workers and residents near the construction site may experience stress, fatigue, and hearing impairment from persistent exposure to construction noise. This is an adverse, long-term, direct, and normal impact, with the overall significance rated Medium.

▪ Cement Mixing, Concrete Batching, and Handling

Environmental Impacts

- Contamination of surface water sources: Runoff from batching activities may carry cement residues and chemicals into surface water bodies, causing contamination. This is an adverse, short-term, direct, and abnormal impact, introducing pollutants that are not naturally occurring in these waters. The overall significance is Medium.
- Poor air quality from release of fine dust (PM_{2.5}, PM₁₀): Dust emissions from batching and handling processes reduce ambient air quality, especially near mixing sites. This is an adverse, short-term, direct, and normal impact, with the overall significance assessed as Medium.
- Generation of construction waste (about 51 m³ of debris): Batching and mixing will produce waste in the form of cement bags, formwork scraps, and metals. This is an adverse, short-term, direct, and normal impact, contributing to solid waste challenges on site. The overall significance is Medium.
- Soil contamination from chemical or fuel spills: Accidental spills of fuels, lubricants, or cement residues can degrade soil quality. This is an adverse, long-term, direct, and abnormal impact, as soil contamination may persist over time. The overall significance is Medium.

Social Impacts

- Water-related health conditions from contamination: Communities relying on affected water sources may suffer gastrointestinal and other waterborne diseases. This is an adverse, short-term, direct, and abnormal impact, with the overall significance rated Medium.
- Occupational, health, and safety risks to workers: Workers exposed to cement dust and chemicals are at risk of skin and eye irritation, respiratory ailments, and allergic reactions. This is an adverse, long-term, direct, and abnormal impact, with the overall significance assessed as High.
- Abrasive lung damage from inhalation of dust: Prolonged inhalation of cement and silica dust particles can cause severe lung damage. This is an adverse, long-term, direct, and abnormal impact, considered of High significance.

▪ Haulage of Construction and Building Materials

Environmental Impacts

- Greenhouse gas emissions from haulage trucks and machinery: The transportation of materials will emit CO₂ and other greenhouse gases, contributing to air pollution and climate change. This is an adverse, short-term, direct, and normal impact, with the overall significance of Medium.
- Increased suspended particulate matter from haulage operations: Windblown particles from trucks hauling sand and aggregates will degrade air quality. This is an adverse, short-term, direct, and normal impact, with the overall significance rated Medium.

Social Impacts

- Falling aggregates causing road accidents and injuries: Poorly secured loads may fall from moving trucks, endangering other road users. This is an adverse, short-term, direct, and abnormal impact, with the overall significance of Medium.
- Deterioration of existing roads: Heavy vehicle use will degrade road surfaces and accelerate wear and tear. This is an adverse, long-term, direct, and normal impact, with the overall significance considered Medium.
- Increased accident rate from high truck movement: The rise in traffic involving large trucks increases the likelihood of accidents. This is an adverse, short-term, direct, and abnormal impact, with the overall significance rated Medium.

▪ Extraction, Processing, and Transportation of Quarried Materials

Environmental Impacts

- Alteration of landscapes through excavation and spoil heaps: Large pits and heaps formed during quarrying alter the natural landscape permanently. This is an adverse, long-term, direct, and abnormal impact, with the overall significance assessed as Medium.

- Soil compaction from heavy machinery: Frequent use of quarry machinery compacts soils, reducing their ability to support vegetation recovery. This is an adverse, long-term, direct, and normal impact, with the overall significance rated Medium.
- Dust emissions from quarrying activities: Blasting, drilling, and crushing of materials generate significant dust, reducing air quality. This is an adverse, short-term, direct, and normal impact, with the overall significance of Medium.
- Noise and vibrations from blasting and heavy machinery: Quarry operations generate continuous noise and vibrations that disturb communities and wildlife. This is an adverse, short-term, direct, and abnormal impact, with the overall significance considered Medium.
- Air pollution and GHG emissions from quarry machinery: The use of heavy equipment in quarries releases greenhouse gases and pollutants such as NO_x and CO₂. This is an adverse, long-term, direct, and normal impact, with the overall significance assessed as Medium.

Social Impacts

- Employment opportunities for local workers: Quarrying activities will create jobs for locals, providing economic benefits. This is a beneficial, short-term, direct, and normal impact with positive socio-economic significance.
- Safety risks from unmanaged quarry pits: Abandoned or poorly managed pits present hazards to community members, particularly children. This is an adverse, long-term, direct, and abnormal impact, with the overall significance rated Medium.

Construction of Perimeter Fences, Buildings, and Utilities

Environmental Impacts

- Noise from engines, heavy machinery, and vehicles: Construction works will generate substantial noise over extended periods. This is an adverse, short-term, direct, and normal impact, with the overall significance assessed as High.
- Disruption of wildlife migration patterns: Fences and buildings may interfere with natural wildlife movement routes. This is an adverse, long-term, indirect, and normal impact, with the overall significance of Medium.
- Introduction of pollutants into nearby water bodies: Runoff from construction sites carrying cement residues and chemicals contaminates water sources. This is an adverse, short-term, direct, and abnormal impact, with the overall significance considered Medium.

- Soil contamination from improper waste disposal: Cement bags, scrap metals, and formwork waste can pollute soil if disposed of improperly. This is an adverse, long-term, direct, and abnormal impact, with the overall significance rated High.

Social Impacts

- Noise-induced stress and health impacts: Prolonged noise from construction activities may lead to stress, fatigue, and hearing challenges. This is an adverse, long-term, direct, and normal impact, with the overall significance assessed as Medium.
- Water quality impacts from hazardous waste runoff: Hazardous construction materials stored or disposed of inappropriately may contaminate watercourses. This is an adverse, short-term, direct, and abnormal impact, with the overall significance rated Medium.

5.5.3 Operational Phase

OYS SAPZ–ATC Facilities and Operations

Environmental Impacts

- Increase in noise levels from operational machinery and equipment: The continuous operation of machinery, including power plants and processing equipment, will elevate noise levels within and around the facility. This is an adverse, long-term, direct, and normal impact, as it is a natural consequence of facility operations. While persistent throughout the operational life, its effects are localized. The overall significance is Medium.
- Air quality degradation from machinery emissions: The daily release of pollutants such as nitrogen oxides (NO_x), carbon monoxide (CO), hydrocarbons, and particulate matter (PM_{2.5} and PM₁₀) from operational machinery will reduce local air quality. This is an adverse, long-term, direct, and normal impact, as it is tied directly to ongoing facility functions. The persistence of emissions makes the overall significance Medium.
- Generation of agricultural waste streams: Processing activities such as peeling, separation of raw materials, and production will generate significant volumes of agricultural waste. This is an adverse, long-term, direct, and normal impact, as it occurs regularly throughout operations. If not effectively managed, it may contribute to environmental pollution. The overall significance is Medium.
- Soil pollution from spills and maintenance activities: Routine maintenance of machinery, including the use of fuels, lubricants, and aluminum oxide paints, poses a risk of soil contamination from spills and leakages. This is an adverse, long-term, direct, and abnormal impact, as contamination introduces pollutants not naturally present in soils and persists over time. The overall significance is Medium.

Social Impacts

- Employment of community members: Facility operations will create direct and indirect jobs for community members, boosting household incomes. This is a beneficial, long-

term, direct, and normal impact, contributing positively to livelihoods and poverty reduction.

- **Boost to local economy and standard of living:** Employment and trade opportunities associated with the facility will enhance purchasing power and improve living standards. This is a beneficial, long-term, indirect, and normal impact, with broad socio-economic benefits.
- **Improvement of local infrastructure and amenities:** Facility development and associated services may improve roads, utilities, and other community infrastructure. This is a beneficial, long-term, indirect, and normal impact, which strengthens community development.
- **Reduction in crime and social vices:** Engagement of local youths in gainful employment will reduce idleness, helping to minimize crime and antisocial behavior. This is a beneficial, long-term, indirect, and normal impact, supporting social stability.
- **Enhanced socio-economic interactions:** The presence of the facility will increase opportunities for trade, collaboration, and social exchange beyond local boundaries. This is a beneficial, long-term, indirect, and normal impact, fostering regional integration.
- **Pressure on housing and infrastructure due to population influx:** Influx of workers and job seekers will create pressure on housing, water, and other local infrastructure. This is an adverse, long-term, indirect, and normal impact, as it results from increased demand beyond existing capacity. The overall significance is Medium.

5.5.4 Decommissioning Phase

- **Demolition and Removal of Camps, Cabins, and Equipment**

Environmental Impacts

- **Increase in noise and dust generation from demolition activities:** The dismantling of camps, cabins, and associated structures will produce significant noise and dust emissions. This is an adverse, short-term, direct, and normal impact, arising naturally from demolition operations. While temporary, it can affect both the environment and human comfort. The overall significance is Medium.
- **Increase in noise and air pollution from transfer of heavy-duty equipment:** The removal and transportation of heavy-duty construction machinery will elevate noise levels and release vehicular emissions. This is an adverse, short-term, direct, and normal impact, with effects ceasing once equipment is evacuated from the site. The overall significance is Medium.
- **Generation of solid waste from dismantled facilities:** Demolition will generate substantial volumes of solid waste, including debris from structures and equipment parts. Improper disposal of this waste poses risks of soil and water contamination. This

is an adverse, short-term, direct, and abnormal impact, as it introduces waste materials that are not naturally present in the environment. The overall significance is Medium.

Social Impacts

- Job opportunities from demolition activities: The decommissioning process will create employment for local workers involved in demolition, waste handling, and equipment removal. This is a beneficial, short-term, direct, and normal impact, improving short-term household incomes.
- Improvement in youth livelihoods and reduction in social vices: Engagement of local youths during decommissioning may enhance their living standards and reduce crime or antisocial behaviour by providing productive opportunities. This is a beneficial, short-term, indirect, and normal impact, contributing positively to social wellbeing.
- Health and safety risks to demolition workers: Workers engaged in demolition activities face risks of accidents, injuries, dust inhalation, and other occupational hazards. This is an adverse, short-term, direct, and normal impact, given the physically intensive and hazardous nature of demolition works. The overall significance is Medium.

Chapter Six

6.

Impacts Mitigation Measures

6.1 Introduction

Following the detailed description of the associated and potential impacts of the proposed Project in Chapter 5, this chapter presents environmental and social mitigation measures to ameliorate the identified negative consequences, and improve on the positive outcomes that have been identified through the impact assessment process in Chapter Five. Given the assessment and impacts ranking in the preceding chapter, the proposed ATC sub-project development implementation shall impact various components of the biophysical, socio-economic environment, as well as the health ecosystem of the project impacted communities.

The mitigation of these impacts, especially the significant medium and high-ranking adverse impacts are discussed in this chapter to enhance the remediation and preservation of the environment of the project area of influence. To objectively achieve the aim of this chapter, it became realisable that relevant stakeholder agencies and institutions, as well as industry best practice regulatory policies must be deployed for tasks responsibility and accountability for the implementation of the mitigation measures proposed for the predicted impacts. The identified stakeholders and regulatory policies are as follows:

- Environmental laws in Nigeria and permissible limits for waste streams (NESREA, 2007);
- AfDB's guidelines for mitigation measures as contained in AfDB ISS 2023 designed to:
- Integrate environmental and social considerations into all aspects of project planning and implementation.
- Minimize negative impacts on the environment and communities' social ecosystem.
- Promote sustainable development and social inclusion.
- Ensure accountability and transparency in project management.
- Best available technology for healthy sustainable development;
- Feasibility of application of the measures in Nigeria;
- Incorporation of the concerns and views of stakeholders profiled during extensive fieldwork consultations, and
- Management of the residual effects likely to arise despite the mitigation measures, to ensure effective mitigation and sustainable development practices.

6.2 Impact Mitigation Measures

The management of identified mitigation measures for the pre-construction phase, and at the sub-project construction and operational phases are discussed in Table 6.1, with their respective

environmental monitoring and management requirements. Essentially, the implementation and compliance to impacts mitigation measures in this ESIA rests on the responsibility and accountability of the Oyo State SAPZ SPIU, the infrastructure development and construction Contractors (DBOC), as well as other allied service providers.

In addition, other stakeholders with relevant oversight influence in ensuring compliance to E&S safeguards implementation regulations include FMEnv., SMOEnv., FMAFS, SMAFS, Traditional Head of sub-project host community, NGOs and AfDB with other project financiers. While these are not part of the daily regulators of the ESIA mitigation measures, they however, constitute the major institutional influencers to E&S safeguards compliance and adherence to international best practice in development projects.

Table 0.1: Environmental Impact Mitigation Measures across the Project Phases

Project Phase	Project Activity	Potential Impact	Receptor	Significance (Pre-mitigation)	Mitigation Measures	Significance (Post-mitigation)
	PRE-CONSTRUCTION PHASE					
Pre-construction Phase	Equipment and Personnel Mobilization	Noise pollution pollution from heavy-duty trucks, equipment, and personnel movement to construction site.	Host Communities Mobilised Individuals (construction workers)	Medium	OYS-SAPZ SPIU shall: Control and restrict mobilization of heavy-duty trucks, equipment, and personnel to daylight hours. Maintain machinery with functional silencers Install temporary noise barriers near sensitive receptors such as school area, religious area etc. Limit engine idling times.	Low
		Air pollution Air pollution from vehicle emissions (CO, NO ₂ , SPM, SO ₂)	Host Communities Mobilised Individuals (construction workers)	Medium	OYS-SAPZ SPIU shall: Ensure low-emission or fuel-efficient heavy-duty trucks, equipment is mobilised for the project Conduct periodic emission testing to ensure low emission output Enforce “no idling” policy for resource maximization Use low-sulphur fuels where possible.	Low
	Site Clearing	Vegetation: Vegetation loss of an estimated secondary forest of 20 hectares, and habitat disturbance of 35.7 hectares	- Host Communities - Ecosystem	Medium	OYS-SAPZ SPIU shall: Give adequate notice to tenant farmers before clearing Target post-harvest period for clearing to ensure farmers have harvested their crops Restrict clearing to project allocated footprint; Revegetation of native plant species shall be ensured; Prepare and implement flood and erosion control plan.	Low

Table 0.1: Environmental Impact Mitigation Measures across the Project Phases						
Project Phase	Project Activity	Potential Impact	Receptor	Significance (Pre-mitigation)	Mitigation Measures	Significance (Post-mitigation)
		Soil: Removal of top soil, and soil compaction may increase erosion potential	• Host Communities • Ecosystem	High	OYS-SAPZ SPIU shall ensure contractors: Strip and store topsoil separately (to a depth of 150–300 mm) before excavation for later re-use in site rehabilitation. Limit clearing and topsoil removal to the smallest area necessary at any one time to reduce exposure. Avoid heavy machinery movement on wet soils to minimize compaction.	Low
		GHG Reduced carbon sequestration capacity due to vegetation loss of about 16,110m ³ amounting to about 82,041m ³ biomass	• Ecosystem	High	OYS-SAPZ SPIU shall ensure contractors: Clear the vegetation from the project footprint selectively; Implement compensatory afforestation by planting native species of trees and shrubs along the entire site perimeter and internal fences and the proposed internal major and minor road network at 10 m interval. This will give about 521 trees. At maturity, in 5-7 years, these will increase the annual carbon sequestration capacity of the site by an estimated 7.3 tons of CO ₂ depending on the choice of trees. Avoid ecologically sensitive area by preserving the 8.4 hectares of riparian vegetation along the River Ade waters/ drainage channel within the ATC site.	Low
		Noise level: Increased noise levels, vibration and air quality degradation from machines and equipment	• Host Communities • Mobilised Individuals (construction workers)	Medium	OYS-SAPZ SPIU shall ensure contractors: Schedule noisy operations to avoid early mornings (6 am - 10 am) and nights (7pm – 6am). Maintain equipment in good working condition to reduce noise output and emission. Apply water sprays and wetting to suppress dust.	Low

Table 0.1: Environmental Impact Mitigation Measures across the Project Phases						
Project Phase	Project Activity	Potential Impact	Receptor	Significance (Pre-mitigation)	Mitigation Measures	Significance (Post-mitigation)
		Dust: Dust generated from about 65,101m ³ soil stockpiles and handling	• Host communities • Construction workers	Medium	OYS-SAPZ SPIU shall ensure contractors: Cover stockpiles with tarpaulins. Wet exposed surfaces during dry periods. Limit vehicle speeds on unpaved roads to ≤ 20 km/h (Traffic MP refers) Inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as providing the contact details of the CLO. Evacuate vegetative waste as soon as they generated to avoid putrefaction	Low
		Vegetative waste generation due to trees, shrubs and grasses clearing	Ecosystem	Medium	OYS-SAPZ SPIU shall ensure contractors: Reuse chipped material for mulching or erosion control. Use potential hard woods for construction, and Allow waste woods for community fuel	Low
		Erosion: Increased erosion potential due to vegetation loss	Ecosystem	Medium	OYS-SAPZ PIU shall ensure contractors: Install silt fences and sediment traps Restrict machinery movement to defined access routes and stabilize exposed soil promptly.	Low
		Reduction in structural stability and percolation ability of soil due to compaction and other	Ecosystem	Medium	OYS-SAPZ PIU shall ensure contractors: De-compact soils in non-structural areas post-works Use light-weight equipment where possible. Construct silt fences to prevent the wash away of the topsoil Construct sediment basins to capture sediment-laden runoff from rainfall	Low

Table 0.1: Environmental Impact Mitigation Measures across the Project Phases						
Project Phase	Project Activity	Potential Impact	Receptor	Significance (Pre-mitigation)	Mitigation Measures	Significance (Post-mitigation)
		engineering activities				
	CONSTRUCTION PHASE					
Construction Phase	Site Preparation through; • Removal of vegetation and soil compaction from 20.0 hectares	Increased dust generation from cleared land and windblown stockpiles.	• Host communities • Construction workers	Medium	OYS SAPZ SPIU shall ensure and enforce contractors' compliance to: Regularly spray water on exposed soil surfaces and stockpiles, especially during dry or windy conditions. Cover stockpiles with tarpaulin, geotextile sheets, or fast-growing ground cover vegetation to reduce wind erosion. Restrict vehicle speeds on unpaved surfaces to ≤ 20 km/h to reduce dust from movement. Schedule high-dust-generating activities (e.g., grading, excavation) during periods of low wind speeds. Evacuate vegetative waste as soon as they are generated to avoid putrefaction Provide and enforce the use of appropriate PPE OHSP & LMP refers)	Low
		Increased soil erosion potential; reduction in structural stability and percolation ability of soil.		Medium	OYS-SAPZ SPIU/DBOC shall ensure contractors compliance to: Strip and store topsoil separately for later use in site restoration Limit clearing to the minimum area of about 20.0 hectares of the sub-project specific area of influence Avoid machinery movement on wet soils.	Low

Table 0.1: Environmental Impact Mitigation Measures across the Project Phases						
Project Phase	Project Activity	Potential Impact	Receptor	Significance (Pre-mitigation)	Mitigation Measures	Significance (Post-mitigation)
					Install erosion controls (silt fences, sediment basins) before earthworks. Maintain buffer vegetation along waterways (FECF refers).	
	Civil and Construction activities through ground levelling, excavation and foundation	Noise from the operations of engines, heavy duty construction machines and motor vehicles on site		Medium	OYS-SAPZ SPIU/DBOC shall: Monitor noise levels regularly to ensure compliance with FMEnv standards. Use temporary noise barriers or acoustic screens near sensitive receptors (schools, hospitals, residences). Provide hearing protection (ear muffs/plugs) to workers exposed to noise >85 dB(A). Maintain all machinery to manufacturer specifications to minimise noise. Fit equipment with functional silencers/mufflers. Restrict noisy operations to 07:30–17:00HRS and avoid night-time work.	Low
		Air quality impacts due to emissions of about 82,041 m ³ from the operation of heavy-duty construction machines such as bulldozer and motor vehicles on site		Medium	OYS-SAPZ SPIU/DBOC shall: Regularly spray water on exposed soil surfaces and haul roads during dry conditions. Cover soil stockpiles with tarpaulin to prevent wind erosion. Limit vehicle speeds on unpaved surfaces to ≤ 20 km/h. Use low-emission or well-maintained machinery and vehicles	Low

Table 0.1: Environmental Impact Mitigation Measures across the Project Phases

Project Phase	Project Activity	Potential Impact	Receptor	Significance (Pre-mitigation)	Mitigation Measures	Significance (Post-mitigation)
	Cement mixing, concrete batching and handling	Contamination of surface water sources		Medium	OYS-SAPZ SPIU/DBOC shall ensure compliance to: Site batching plants at least 200m away from water bodies and outside flood-prone zones. Prevent direct discharge of wastewater into drains or watercourses. Implement spill prevention and response protocols for cement and additives	Low
		Poor air quality due to the release of fine dust, including PM _{2.5} and PM ₁₀ , into the atmosphere		Medium	OYS-SAPZ SPIU/DBOC shall ensure compliance to: Store cement in sealed silos or under cover to prevent wind exposure. Fit cement silos with dust filters and use enclosed transfer systems Spray water or use fogging systems at aggregate transfer points. Enforce the use of PPE (P2/N95 masks) for workers handling dry cement (OHSP and LMP refer) Limit drop heights during loading/unloading to reduce airborne dust.	Low
		Batching plants and mixing sites generate construction waste of about 51 m ³ in form of cement bag, formwork		Medium	OYS-SAPZ SPIU/DBOC shall ensure compliance to: Implement a waste minimization plan to avoid over-mixing. Segregate concrete waste for reuse in backfilling or road base where feasible. Collect and store non-recyclable residues in designated waste areas for appropriate management.	Low

Table 0.1: Environmental Impact Mitigation Measures across the Project Phases						
Project Phase	Project Activity	Potential Impact	Receptor	Significance (Pre-mitigation)	Mitigation Measures	Significance (Post-mitigation)
		waste, scrap metals and fasteners			Dispose of hardened waste through licensed waste management contractors. Maintain accurate waste disposal records for compliance tracking.	
		Spills of chemicals, fuels, or other pollutants can contaminate the soil and flora biomass.		Medium	OYS-SAPZ SPIU/DBOC shall ensure contractors and service providers compliance to: Store fuels, oils, and chemical admixtures in bunded areas with impermeable flooring. Use drip trays during refuelling and equipment servicing. Train workers in safe handling of chemicals and emergency spill response Keep spill kits accessible at all batching and storage locations Immediately clean contaminated soil and dispose of as hazardous waste.	Low
		Leaks from vehicles or equipment can also lead to soil contamination.		Medium	OYS-SAPZ SPIU/DBOC shall ensure contractors and service providers compliance to: Conduct daily inspections of mixers, pumps, and other equipment for leaks. Repair or replace defective equipment immediately. Park machinery on impermeable surfaces with containment bunds. Capture leaks with absorbent pads or trays and dispose of them appropriately.	Low

Table 0.1: Environmental Impact Mitigation Measures across the Project Phases						
Project Phase	Project Activity	Potential Impact	Receptor	Significance (Pre-mitigation)	Mitigation Measures	Significance (Post-mitigation)
					Maintain a preventive maintenance schedule for all batching equipment.	
	Haulage of construction/building materials	Increased GHG emissions from trucks, heavy duty machines and equipment of about 82,041 tCO ₂ e		Medium	OYS-SAPZ SPIU/DBOC shall ensure contractors and service providers compliance to: Use fuel-efficient or low-emission vehicles for all construction activities. Implement a preventive maintenance schedule to ensure engines operate efficiently. Optimize delivery routes to minimize travel distance and idle time. Enforce “no-idling” policy for stationary vehicles. Monitor fuel consumption and emissions regularly to track efficiency improvements.	Low
		Increased SPM due to wind blowing particles from operation trucks hauling sands and aggregates		Medium	OYS-SAPZ SPIU/DBOC shall ensure contractors and service providers compliance to: Cover all loads with tarpaulin before transportation. Avoid overloading trucks to prevent spillage. Apply water spraying to haul roads during dry conditions. Restrict haulage truck speeds to ≤ 30 km/h in communities and unpaved areas (Traffic Management Plan refers). Install wheel-wash facilities at site exits to reduce dust tracking onto public roads.	Low
	Extraction, processing,	Alteration of landscapes due	Ecosystem	Medium	OYS-SAPZ SPIU/DBOC shall ensure contractors and service providers compliance to:	Low

Table 0.1: Environmental Impact Mitigation Measures across the Project Phases

Project Phase	Project Activity	Potential Impact	Receptor	Significance (Pre-mitigation)	Mitigation Measures	Significance (Post-mitigation)
	and transportation of quarried materials (such as sand, and stone)	to the removal of topsoil, excavation of large pits, and creation of spoil heaps.			Restrict quarrying to approved and licensed areas. Maintain buffer zones around sensitive habitats and water bodies. Implement progressive rehabilitation by regrading and re-vegetating disturbed areas. Use visual screening (vegetative buffers or berms) to minimize landscape intrusion.	
		Heavy machinery on and around the quarry can also compact soil, inhibiting future vegetation growth.		Medium	OYS-SAPZ SPIU/DBOC shall ensure contractors and service providers compliance to: Limit heavy machinery movement to designated haul routes. Use low ground-pressure machinery where feasible. De-compact soils in non-operational areas through scarification or ripping after use. Apply mulch or ground cover vegetation to restore infiltration and prevent erosion.	Low
		Quarrying activities like drilling, blasting, crushing, and transporting materials generate large amount of dust.		Medium	OYS-SAPZ SPIU/DBOC shall ensure contractors and service providers compliance to: Use water spray systems at crushers, conveyors, and loading points. Enclose conveyors and material handling systems where possible. Schedule blasting during low-wind conditions and notify nearby communities in advance.	Low

Table 0.1: Environmental Impact Mitigation Measures across the Project Phases						
Project Phase	Project Activity	Potential Impact	Receptor	Significance (Pre-mitigation)	Mitigation Measures	Significance (Post-mitigation)
					Monitor dust levels and adjust suppression measures as needed. Require workers in dusty areas to wear approved PPE (P2/N95 masks) (OHSP and LMP refer)	
		Heavy machinery and frequent blasting create significant noise and vibrations that can disturb wildlife and communities near the quarry zone.	• Host communities • Construction workers	Medium	OYS-SAPZ SPIU/DBOC shall ensure contractors and service providers compliance to: Limit blasting to designated times and avoid night-time operations. Maintain and fit machinery with noise-reducing devices. Install seismographs to monitor vibration levels and ensure they remain below damage thresholds. Notify local communities at least 24 hours before blasting. Provide hearing protection to workers in high-noise areas.	Low
		Increased air pollution and greenhouse gas emission due to pollutants associated with machinery in quarries, e.g. nitrogen oxides and carbon dioxide (CO ₂)		Medium	OYS-SAPZ SPIU/DBOC shall ensure contractors and service providers compliance to: Maintain engines to operate at peak efficiency. Use fuel-efficient or low-emission equipment. Optimize operational schedules to reduce idle times. Monitor fuel use and emissions regularly.	Low

Table 0.1: Environmental Impact Mitigation Measures across the Project Phases

Project Phase	Project Activity	Potential Impact	Receptor	Significance (Pre-mitigation)	Mitigation Measures	Significance (Post-mitigation)
	Construction of perimeter fence, facilities buildings, and allied utilities' infrastructure.	Noise from the operations of engines, heavy duty construction machines and motor vehicles on site	Ecosystem	High	OYS-SAPZ SPIU/DBOC shall ensure contractors and service providers compliance to: Maintain machinery in good working condition and fit silencers/mufflers. Restrict high-noise operations to between 11 am –4 pm. Install temporary acoustic barriers near noise-sensitive receptors Provide hearing protection (ear muffs/plugs) to workers. Conduct periodic noise monitoring to ensure compliance with FMEnv standards.	Low
		Disruption of wildlife Habitat and migration patterns.		Medium	OYS-SAPZ SPIU/DBOC shall ensure contractors and service providers compliance to: Incorporate wildlife crossings and buffer-zone (culverts, underpasses) where feasible. Limit construction operations during peak breeding or migration seasons for sensitive species (especially endangered ones). Maintain vegetative corridors where possible. Limit night-time work and use down-shielded lighting to reduce disturbance.	Low
		Introduction of pollutants (such as cement dust, leftover cement mix)	Host communities	Medium	OYS-SAPZ SPIU/DBOC shall ensure contractors and service providers compliance to: Install sediment barriers, silt fences, or sediment basins to capture runoff.	Low

Table 0.1: Environmental Impact Mitigation Measures across the Project Phases						
Project Phase	Project Activity	Potential Impact	Receptor	Significance (Pre-mitigation)	Mitigation Measures	Significance (Post-mitigation)
		into nearby water bodies through run-off			Collect cement slurry and wash water in lined containment pits. Dispose of concrete debris through licensed waste handlers. Prevent construction materials from entering drainage channels and water bodies.	
		Soil contamination due to improper disposal of construction materials waste (e.g. cement bag, formwork waste, scrap metals and fasteners etc.)	• Host communities • Ecosystem	Medium	OYS-SAPZ SPIU/DBOC shall ensure contractors and service providers compliance to: Store hazardous materials in bunded, leak-proof containers. Designate and manage hazardous waste storage areas. Engage FMEEnv-approved contractors for hazardous waste disposal. Train workers in proper handling of asphalt, paints, and chemical additives. Clean spills immediately and dispose of contaminated soil as hazardous waste.	Low
	OPERATIONAL PHASE					
Operational Phase	OYS SAPZ ATC facilities and operations	Increased noise level from the operations of various machines and equipment such as power plants, excavators,	Ecosystem	Medium	OYS-SAPZ SPIU shall ensure contractors and service providers compliance to: Install acoustic enclosures, silencers, or mufflers on noisy equipment. Schedule high-noise activities during daytime working hours to minimize community disturbance.	Low

Table 0.1: Environmental Impact Mitigation Measures across the Project Phases

Project Phase	Project Activity	Potential Impact	Receptor	Significance (Pre-mitigation)	Mitigation Measures	Significance (Post-mitigation)
		and timber sawing machines.			Implement preventive maintenance to reduce unnecessary noise from faulty machinery. Provide hearing protection devices (earplugs, earmuffs) to workers in high-noise zones (OHSP and LMP refers). Establish a noise monitoring program to ensure compliance with permissible limits. Introduce green buffer zones (trees/shrubs) around the facility to dampen noise propagation (BMP refers)	
		The daily release of nitrogen oxides (NOx), carbon monoxide (CO), hydrocarbons, and particulate matter (PM) from traffic directly affects local air quality		Medium	OYS-SAPZ ATC Management shall: Promote regular maintenance of company vehicles and machinery to ensure optimal combustion and reduced emissions. Encourage shuttle buses, or non-motorized transport for staff to reduce traffic volume. Establish dust suppression measures (e.g., water spraying on unpaved roads). Implement traffic management plans to avoid congestion within and around the site. Monitor air quality periodically and report findings to relevant environmental authorities. Use fuel-efficient driving practices and enhance drivers' capacity accordingly.	Low
		Streams of agricultural waste generate such as peeling	• Host communities • Ecosystem	Medium	OYS-SAPZ ATC Management shall:	Low

Table 0.1: Environmental Impact Mitigation Measures across the Project Phases						
Project Phase	Project Activity	Potential Impact	Receptor	Significance (Pre-mitigation)	Mitigation Measures	Significance (Post-mitigation)
		process, separations of raw materials and processed waste from production			Implement waste segregation at the source (separate organic, recyclable, and non-recyclable waste). Adopt waste-to-compost or waste-to-energy systems for organic waste. Install sedimentation tanks or filter screens in wastewater discharge points to trap solid waste. Establish agreements with local farmers for reuse of organic waste as animal feeds or soil conditioners, if certified safe. Regularly monitor effluent quality to ensure compliance with environmental standards. Provide staff training on proper waste handling and disposal management procedures.	
		Increase soil pollution potential due to spilled fuel, spent oil, lubricants, aluminium oxide paint etc. during routine maintenance of the operating machineries and equipment		Medium	OYS-SAPZ ATC Management shall: Create designated maintenance areas with impermeable flooring and oil interceptors to prevent soil infiltration. Implement spill prevention and response plans, including spill kits and trained personnel. Store fuels, lubricants, and chemicals in bunded (contained) storage facilities. Dispose of spent oil and hazardous waste through licensed waste management companies. Conduct regular inspection and maintenance of storage tanks, pipelines, and machinery. Use drip trays under parked or idle equipment to catch leaks.	Low

Table 0.1: Environmental Impact Mitigation Measures across the Project Phases						
Project Phase	Project Activity	Potential Impact	Receptor	Significance (Pre-mitigation)	Mitigation Measures	Significance (Post-mitigation)
					Prohibit direct disposal of any hazardous materials into the environment.	
	DECOMMISSIONING PHASE					
Decommissioning Phase	Demolition and Removal of camps, cabins, equipment etc.	Increase noise level and dust generation due to the demolition and removal of camps components and other structures	Contractor & Construction workers	Medium	OYS-SAPZ SPIU/DBOC shall ensure contractors and service providers compliance to: Restrict demolition works to daylight hours (11 am – 4pm) to minimize disturbance. Maintain and fit demolition machinery with effective silencers/mufflers Use controlled dismantling methods rather than high-impact demolition where possible. Install temporary noise barriers near sensitive receptors. Provide hearing protection to workers and monitor noise levels to comply with FMEnv standards (OHSP refers)	Low
		Increase noise and air quality pollution due to transfer of heavy-duty equipment and construction machineries	- Host communities - Construction worker and personnel	Medium	OYS-SAPZ SPIU/DBOC shall ensure contractors and service providers compliance to: Spray water on debris and demolition areas to suppress dust during operations. Cover trucks transporting debris with tarpaulins. Store demolition waste in enclosed or covered areas. Restrict vehicle speeds on unpaved surfaces to ≤ 20 km/h Require all workers in dusty areas to wear dust masks (P2 or N95) (OHSP refers).	Low

Table 0.1: Environmental Impact Mitigation Measures across the Project Phases						
Project Phase	Project Activity	Potential Impact	Receptor	Significance (Pre-mitigation)	Mitigation Measures	Significance (Post-mitigation)
		Solid waste generation and improper disposal waste facility		Medium	OYS-SAPZ SPIU/DBOC shall ensure contractors and service providers compliance to: Segregate demolition waste into recyclable (metal, timber) and non-recyclable fractions. Reuse or recycle materials where feasible (e.g., scrap metal to recycling plants). Store waste in designated, secure areas before disposal. Engage licensed waste disposal contractors for final disposal. Maintain waste tracking documentation for regulatory compliance.	Low
	Decommissioning traffic diverted roads for road users as alternative during construction	Dust emissions from temporary diversion dismantling or degradation	Ecosystem	Medium	OYS-SAPZ SPIU/DBOC shall ensure contractors and service providers compliance to: Water exposed surfaces during dismantling Clear debris promptly and dispose of it at approved sites. Re-vegetate disturbed areas immediately (within 75 days) Use erosion control structures where needed.	Low
		Soil compaction or damage during diversion closure		Medium	OYS-SAPZ SPIU/DBOC shall ensure contractors and service providers compliance to: Revegetate and re-grass affected areas with local species OYS PIU E&S Unit to supervise, monitor and ensure sustainability of the ecology of the ecosystem.	Low

Table 6.2: Social Impact Mitigation Measures across the Project Phases						
Project Phase	Project Activity	Potential Impact	Receptor	Significance (Pre-mitigation)	Mitigation Measures	Significance (Post-mitigation)
	PRE-CONSTRUCTION PHASE					
Pre-construction Phase	Land takeover (repossession) of land within the OYS SAPZ proposed area	Economic displacement of estimated 125 people across 21 households losing farmlands (to be compensated as detailed in the project RAP).	Host communities ♦ Eruwa	High	OYS SAPZ SPIU shall: Prepare and implement a Livelihood Restoration/ Enhancement Plan (LRP) which will aim at improving the PAPs' livelihood through agro-industrial productivity and earnings and subsequently integrate the identified tenant-farmers who currently use the 20.0 ha designated for the proposed ATC into the SAPZ Program.	Low
		Conflicts may emerge due to insufficient stakeholders' engagement and/ or perceived inadequate compensation for farmland and crops loss or perceived disparity in compensation calculation.		High	OYS SAPZ SPIU shall: Establish a transparent and inclusive stakeholder engagement plan. Disclose the eligibility and entitlement criteria of the LRP during stakeholder engagement workshop Deploy independent grievance redress mechanism (GRM) to the PAPs with community/ PAPs representative Promptly implement the LRP, GRM, & stakeholder engagement plan (SEP) and ensure transparency & accountability.	

Table 6.2: Social Impact Mitigation Measures across the Project Phases						
Project Phase	Project Activity	Potential Impact	Receptor	Significance (Pre-mitigation)	Mitigation Measures	Significance (Post-mitigation)
	Equipment and Personnel Mobilization				Work with community-appointed community liaison officers (CLO).	
		Population surge of about 100 workers leading to pressure on available resources (e.g, water, space etc.)	- Host Communities - Mobilised Individuals (construction workers)	Medium	OYS-SAPZ SPIU/DBOC shall ensure contractors and service providers compliance to: Provide separate project accommodation, water, and sanitation for workers. Coordinate with local authorities to manage resource use. Avoid reliance on community water supply systems.	Low
		Outbreaks of communicable diseases (e.g. Flu, Lassa fever, Tuberculosis, Ringworm)		Medium	OYS-SAPZ SPIU/DBOC shall ensure contractors and service providers compliance to: Conduct pre-employment health screening for workers. Maintain an on-site clinic with trained medical staff. Organize regular health awareness programs for workers and communities.	Low
		Risk of respiratory diseases in personnel and members of the community		Medium	OYS-SAPZ SPIU/DBOC shall ensure contractors and service providers compliance to:	Low

Table 6.2: Social Impact Mitigation Measures across the Project Phases						
Project Phase	Project Activity	Potential Impact	Receptor	Significance (Pre-mitigation)	Mitigation Measures	Significance (Post-mitigation)
					Provide workers with PPE such as N95 masks. Maintain dust suppression measures in work areas. Schedule dust-generating activities during low-wind periods.	
		Worsening anti-water and anti-sanitation practices;		Medium	OYS-SAPZ SPIU/DBOC shall ensure contractors and service providers compliance to: Install adequate and gender-segregated toilet facilities. Enforce daily cleaning and waste management procedures. Provide potable water for drinking and cooking.	Low
		Social interactions including sexual relations between workers and community members may lead to increased incidence of sexually transmitted infections (STI) including HIV/AIDS		Medium	OYS-SAPZ SPIU/DBOC (contractors and service providers) shall: Conduct sensitization, awareness and prevention campaigns. Provide free condoms and voluntary HIV testing. Partner with local health NGOs for outreach.	Low
		Temporal disturbance of the		Medium	OYS-SAPZ SPIU to ensure DBOC/ service providers shall:	Low

Table 6.2: Social Impact Mitigation Measures across the Project Phases						
Project Phase	Project Activity	Potential Impact	Receptor	Significance (Pre-mitigation)	Mitigation Measures	Significance (Post-mitigation)
		aesthetic value of the sub-project impacted area.			Screen camps and laydown areas with green fencing. Maintain cleanliness and landscaping in project areas.	
		Population surge of about 100 workers will increase water demand, and domestic waste generation by ~350 m ³ of solid waste leading to sanitation challenges.		Medium	OYS-SAPZ SPIU to ensure DBOC/ service providers shall: Use dedicated project water sources. Install rainwater harvesting systems for non-potable uses. Segregate waste and recycle where feasible. Engage licensed waste disposal contractors. Prohibit indiscriminate dumping.	Low
	Site Clearing	Increased earnings to local labourer from the clearing of vegetation and site preparation for ATC development.	Host communities		OYS-SAPZ SPIU to ensure DBOC/ service providers shall: Prioritize recruitment of local labour from host and neighbouring communities. Offer fair wages aligned with or above local market rates. Provide short-term contracts that allow multiple community members to benefit.	Low

Table 6.2: Social Impact Mitigation Measures across the Project Phases						
Project Phase	Project Activity	Potential Impact	Receptor	Significance (Pre-mitigation)	Mitigation Measures	Significance (Post-mitigation)
					Offer on-the-job skills training to improve employability beyond the project.	
		Improved standard of living through immediate engagement in ATC site preparation and service provision, increased sales of farm food items, and petty trading services.			OYS-SAPZ SPIU to ensure DBOC/ service providers shall: Facilitate prompt payment to workers to support household needs. Provide financial literacy sessions to help workers manage increased income. Support community infrastructure initiatives (e.g. water points, sanitation facilities) from project social investment funds. Encourage local procurement of goods and services to boost community economy.	Low
		Reduce crime and social vices due to various engagement through job opportunities			OYS-SAPZ SPIU/ DBOC/ service providers shall: Ensure job opportunities are widely publicized within the community to avoid favouritism perceptions. Engage unemployed youth and vulnerable groups in project employment. Combine employment with life skills and vocational training programs.	Low

Table 6.2: Social Impact Mitigation Measures across the Project Phases						
Project Phase	Project Activity	Potential Impact	Receptor	Significance (Pre-mitigation)	Mitigation Measures	Significance (Post-mitigation)
					Establish a transparent recruitment process to enhance trust and social cohesion.	
	CONSTRUCTION PHASE					
Construction Phase	Site Preparation through; Removal of vegetation and soil compaction of 20.0 hectares	Disruption of established social ties and support networks due to displacement of farming households	Host Communities	Medium	OYS-SAPZ SPIU/ DBOC/ service providers shall: Conduct early and inclusive stakeholder engagement sessions to understand community linkages before clearance. Stage clearing works to minimize prolonged disruption and ensure temporary connections remain open. Document and monitor social impacts, adjusting mitigation in collaboration with community leaders.	Low
	Civil and Construction activities through ground levelling, excavation and foundation	Destruction crops and farm lands due to excavation and grading of farmland		Medium	OYS-SAPZ SPIU/ DBOC/ shall: Carry out detailed asset and crop inventory with community representatives before works. Provide compensation at full replacement value before disturbance. Confine machinery to designated work areas to prevent accidental damage.	Low

Table 6.2: Social Impact Mitigation Measures across the Project Phases

Project Phase	Project Activity	Potential Impact	Receptor	Significance (Pre-mitigation)	Mitigation Measures	Significance (Post-mitigation)
		Respiratory illness from airborne dust due to earthwork activities could lead to common colds, flu, aggravate asthmatic conditions, etc.		Medium	OYS-SAPZ SPIU/ DBOC/ shall: Apply continuous dust suppression using water spraying or wetting method, especially during dry and windy periods. Provide high-grade PPE (N95 or equivalent) to all exposed workers. Limit earthworks during peak wind conditions and ensure material stockpiles are covered. Monitor ambient air quality and adjust suppression measures as needed.	Low
		Prolonged exposure to noise from earthwork activities can cause stress, hearing impairment, and, relaxation and sleep disturbance.		Medium	OYS-SAPZ SPIU/ DBOC/ shall: Restrict high-noise activities to 11 am –4 pm to reduce disturbance. Maintain equipment silencers/mufflers and replace defective components immediately. Install portable noise barriers near sensitive receptors such as schools and residences. Provide certified hearing protection to all workers in high-noise zones and rotate shifts to limit exposure duration.	Low

Table 6.2: Social Impact Mitigation Measures across the Project Phases						
Project Phase	Project Activity	Potential Impact	Receptor	Significance (Pre-mitigation)	Mitigation Measures	Significance (Post-mitigation)
	Hiring of construction personnel	Employment of community locals	Host Communities	Medium	OYS-SAPZ SPIU/ DBOC/ service providers shall: Implement a “Local First” hiring policy with clear targets for local workforce participation. Publicly advertise job openings in community meeting points and through local leaders. Provide on-the-job training to enhance transferable skills for post-project employment. Maintain transparent recruitment records to build trust.	Low
		Boost local economy and improvement of standard of living through job opportunities and high purchasing rate			OYS-SAPZ SPIU/ DBOC/ service providers shall: Source consumables, food supplies, and basic services from local businesses where feasible. Provide vendor development training to help local suppliers meet quality and safety requirements. Ensure prompt payment to contractors and suppliers to maintain cash flow in the community. Encourage the hiring of local transporters and service providers.	Low

Table 6.2: Social Impact Mitigation Measures across the Project Phases						
Project Phase	Project Activity	Potential Impact	Receptor	Significance (Pre-mitigation)	Mitigation Measures	Significance (Post-mitigation)
		Provision or improvement of local infrastructure and amenities			OYS-SAPZ SPIU/ DBOC/ service providers shall: Work with community representatives to identify priority infrastructure needs. Use durable, low-maintenance materials for any amenities provided. Employ local labour during construction to maximize community benefit. Commit to periodic maintenance during the project life.	Low
		Conflicts may emerge during site clearing and preparation activities due to insufficient consultations and/or perceived disparities in employment opportunities		Medium	OYS-SAPZ SPIU/ DBOC/ service providers shall: Establish a transparent and inclusive stakeholder engagement plan that ensured consultations before and during recruitment, ensuring participation of women, youth, and vulnerable groups. Clearly communicate job selection criteria, wage rates, and timelines. Operate a grievance redress mechanism accessible to all community members. Conduct regular social monitoring to detect and address tensions early	Low

Table 6.2: Social Impact Mitigation Measures across the Project Phases						
Project Phase	Project Activity	Potential Impact	Receptor	Significance (Pre-mitigation)	Mitigation Measures	Significance (Post-mitigation)
					through independent grievance redress mechanism (GRM). Work with community-appointed CLO.	
	Cement mixing, concrete batching and handling	Water-related health conditions due to water source contamination (including rashes, and skin itching).	Host communities Construction workers	Medium	OYS-SAPZ SPIU/ DBOC/ service providers shall: Locate batching plants at least 200m from community water sources. Install impermeable containment for wash water and cement residue. Treat all wastewater before discharge. Monitor water quality regularly during batching operations.	Low
		Occupational, health and safety (OHS) concerns for the workers due to potential skin and eye irritation, respiratory and allergic concerns.	Construction workers	High	OYS-SAPZ SPIU/ DBOC/ service providers shall: Provide full PPE (gloves, goggles, masks, protective clothing) for all cement handling operations. Conduct regular safety training on handling hazardous materials. Ensure availability of eye wash stations and emergency showers. Implement health monitoring for early detection of occupational illnesses.	Low

Table 6.2: Social Impact Mitigation Measures across the Project Phases

Project Phase	Project Activity	Potential Impact	Receptor	Significance (Pre-mitigation)	Mitigation Measures	Significance (Post-mitigation)
		Abrasive damage to the lung due to inhalation of airborne dust from cement and silica, and asbestos content materials.		High	OYS-SAPZ SPIU/ DBOC/ service providers shall: Use enclosed or covered systems for cement transfer and storage. Apply local exhaust ventilation in enclosed workspaces. Distribute high-efficiency particulate respirators to all workers in dusty areas. Minimize manual handling of dry cement and keep handling areas damp where and when possible.	Low
		Damage to the natural landscapes due to quarrying for raw materials.	Ecosystem	High	OYS-SAPZ SPIU/ DBOC/ service providers shall: Restrict quarrying strictly to approved and designated extraction zones as per environmental permits. Implement phased extraction to limit the exposed area at any one time. Undertake progressive reclamation by backfilling and re-vegetating quarried sections immediately after use. Preserve visual aesthetics by maintaining vegetative buffers and using natural landscaping techniques to screen disturbed areas from public view.	Low

Table 6.2: Social Impact Mitigation Measures across the Project Phases						
Project Phase	Project Activity	Potential Impact	Receptor	Significance (Pre-mitigation)	Mitigation Measures	Significance (Post-mitigation)
		Destruction of flora and fauna habitats and potentially disrupting ecological balance due to quarrying raw materials.		High	OYS-SAPZ SPIU/ DBOC/ service providers shall: Conduct baseline biodiversity surveys prior to extraction to map critical habitats (reference BMP for details). Establish and enforce ecological buffer zones where no quarrying is allowed. Schedule extraction activities to avoid sensitive breeding and nesting periods for wildlife. Implement habitat restoration programs, including replanting native species and creating alternative habitats to offset ecological losses.	Low
	Haulage construction of materials	Aggregates falling off and hitting and damaging third party windshields and causing other forms of injuries.	Road Users	Medium	OYS-SAPZ SPIU/ DBOC/ service providers shall: Require that all loads to be covered with tarpaulins before leaving the site Develop and enforce a project-specific Traffic Management Plan (as provided in Chapter 7). Enforce strict speed limits through speed governors and GPS tracking. Position traffic marshals at critical community crossings.	Low

Table 6.2: Social Impact Mitigation Measures across the Project Phases

Project Phase	Project Activity	Potential Impact	Receptor	Significance (Pre-mitigation)	Mitigation Measures	Significance (Post-mitigation)
		Deterioration of existing roads	Host Communities Road Users	Medium	OYS-SAPZ SPIU/ DBOC/ service providers shall: Require all loads to be covered with tarpaulins before leaving the site Use secure load restraint systems to prevent spillage. Conduct regular inspections of truck loading practices. Enforce penalties for non-compliance.	Low
		Increased accident rate due to increased movement of trucks and other earth-moving vehicles	Road Users Construction workers	Medium	OYS-SAPZ SPIU/ DBOC/ service providers shall: Use designated haulage routes agreed with local authorities. Schedule heavy loads to avoid peak traffic times. Repair any project-related road damage promptly. Monitor road conditions weekly and take corrective actions as required.	Low
	Extraction, processing, and transportation of quarried materials (such as laterite, sand, and stone)	Provide employment for the locals	Host Communities		OYS-SAPZ SPIU/ DBOC/ service providers shall: Award labour and transport contracts to local businesses and individuals. Offer job-specific training to improve quality and safety performance.	Low

Table 6.2: Social Impact Mitigation Measures across the Project Phases						
Project Phase	Project Activity	Potential Impact	Receptor	Significance (Pre-mitigation)	Mitigation Measures	Significance (Post-mitigation)
					Provide fair wages and good working conditions. Ensure transparent selection to avoid favouritism.	
		Large and unmanaged quarry pits pose safety risks to community members	Host Communities	Medium	OYS-SAPZ SPIU/ DBOC/ service providers shall: Erect fencing or barriers around active and inactive pits. Post clearing warning signage in local languages. Rehabilitate and backfill unused pits promptly. Conduct regular inspections to ensure safety measures remain intact.	Low
	Construction of fence, buildings and utilities.	Noise from the operations of engines, heavy duty construction machines and motors vehicles on site cause stress, hearing loss, and sleep disturbance.	Host Communities Construction workers Ecological system	Medium	OYS-SAPZ SPIU/ DBOC/ service providers shall: Limit noisy operations to daylight hours (11 am – 5 pm). Maintain silencers/mufflers on machinery. Provide hearing protection to all workers. Monitor noise at sensitive locations and adjust activities if limits are exceeded.	Low

Table 6.2: Social Impact Mitigation Measures across the Project Phases						
Project Phase	Project Activity	Potential Impact	Receptor	Significance (Pre-mitigation)	Mitigation Measures	Significance (Post-mitigation)
		Impact on water quality if hazardous wastes are discharged to watercourses or from runoff from inappropriately stored hazardous waste	Host Communities	Medium	OYS-SAPZ SPIU/ DBOC/ service providers shall: Construct bunded and covered hazardous waste storage areas with impermeable flooring located away from water bodies; Install spill containment and drainage interception systems Implement strict waste labelling and segregation protocols	Low
	OPERATIONAL PHASE					
Operational Phase	OYS SAPZ-ATC facilities and operations	Employment of local community members	Host Communities	Medium	OYS-SAPZ/DBOC shall: Develop and implement a transparent recruitment policy prioritising local labour Collaborate with community leaders to identify suitable candidates; Provide vocational and on-the-job training; Establish fair wages and safe working conditions to retain local workforce	High positive impact
		Boost local economy and improvement of standard of living through job creation opportunities and improved purchasing		Positive impact.	OYS-SAPZ/DBOC shall: Encourage local procurement of goods and services;	High positive impact.

Table 6.2: Social Impact Mitigation Measures across the Project Phases						
Project Phase	Project Activity	Potential Impact	Receptor	Significance (Pre-mitigation)	Mitigation Measures	Significance (Post-mitigation)
		power of the local community members as well as ATC work staff.		Impacts as of construction phase.	Provide business capacity-building workshops for local entrepreneurs; Facilitate microcredit or small loan schemes for community-based suppliers; Support the creation of cooperatives to meet project supply needs.	
		Provision or improvement of local infrastructure and amenities including healthcare, schools, roads, energy/electricity and water.			OYS-SAPZ/DBOC shall: Collaborate with local government to identify infrastructure gaps; Co-fund or contribute to road, water, and power upgrades; Maintain project-built infrastructure for community use; Ensure accessibility and sustainability of amenities post-project.	
		Reduction in crime and social vices through engagement of local youths and improvement in security system.			OYS-SAPZ/DBOC shall: Create targeted youths' employment programs; Partner with NGOs for vocational training and mentorship schemes; Integrate conflict resolution and life skills training into employment programs.	
		Enhance socio-economic potential			OYS-SAPZ/DBOC shall:	

Table 6.2: Social Impact Mitigation Measures across the Project Phases						
Project Phase	Project Activity	Potential Impact	Receptor	Significance (Pre-mitigation)	Mitigation Measures	Significance (Post-mitigation)
		of the locals and increase interaction beyond immediate localities			Promote local products through project-linked supply chains; Provide internet connectivity and ICT training to expand market access.	
		Pressure on local housing and other infrastructure due to influx of people seeking for job opportunities and those working in the existing industries in the area of project influence.			OYS-SAPZ/DBOC shall: Develop worker housing plans to minimise strain on community resources; Implement local recruitment to reduce external migration Coordinate with authorities to upgrade water, sanitation, and transport systems; Establish rent control measures in partnership with local government to prevent inflation.	Low
	DECOMMISSIONING PHASE					
Decommissioning Phase	Demolition and Removal of camps, cabins, and other construction equipment, etc.	Job opportunity for youths and other skilled decoupler workers to be engaged in the demolition exercise.	Host Communities		OYS-SAPZ/DBOC shall: Prioritize hiring from host and adjoining communities to maximize local benefit. Offer short-term training in demolition safety, waste handling, and equipment operation to improve skills for future employment.	

Table 6.2: Social Impact Mitigation Measures across the Project Phases						
Project Phase	Project Activity	Potential Impact	Receptor	Significance (Pre-mitigation)	Mitigation Measures	Significance (Post-mitigation)
					Maintain transparent recruitment processes with publicized criteria and timelines. Ensure fair wages and prompt payment to all workers engaged in decommissioning activities.	
		Positively improve living standard of the youths and other engaged workers.			OYS-SAPZ/DBOC shall: Facilitate prompt wage disbursement to support household income stability. Encourage local expenditure by sourcing goods and services from community businesses. Provide financial literacy sessions to help workers manage increased income effectively. Support local service providers (e.g., catering, transport) to supply the demolition workforce.	
		Reduction in crime and social vices through engagement of local youths			OYS-SAPZ/DBOC shall: Actively recruit unemployed youth for demolition-related roles. Pair work engagement with vocational and life-skills training to create post-project livelihood options.	

Table 6.2: Social Impact Mitigation Measures across the Project Phases						
Project Phase	Project Activity	Potential Impact	Receptor	Significance (Pre-mitigation)	Mitigation Measures	Significance (Post-mitigation)
					Partner with community leaders to identify at-risk individuals for priority hiring. Maintain worker engagement in structured activities to reduce idle time and the risk of anti-social behaviour.	
		Health and safety risks to workers from demolition activities	Construction workers	Medium	OYS-SAPZ/DBOC shall: Provide full PPE (hard hats, steel-toe boots, gloves, safety goggles, high-visibility vests, and dust masks) to all demolition workers. Conduct comprehensive safety briefings before starting demolition tasks. Use controlled demolition techniques to minimize collapse hazards and debris spread. Maintain clearly marked exclusion zones to protect workers and the public. Ensure first-aid facilities, trained medical personnel, and emergency response plans are in place and functional on-site (refer OHSP).	Low
		Health and safety risks to community members, especially		Medium	OYS-SAPZ/DBOC shall:	Low

Table 6.2: Social Impact Mitigation Measures across the Project Phases						
Project Phase	Project Activity	Potential Impact	Receptor	Significance (Pre-mitigation)	Mitigation Measures	Significance (Post-mitigation)
		women and youths that may engage in the collection of wastes and spoils (scraps) for income generation from demolition activities.			▪ Community Sensitization & Awareness Conduct community-wide sensitization and awareness creation for community members not to trespass construction sites all-through the construction timeline. ▪ Contractors' ESMP Guidelines Contractors' ESMP to contain measures to guide against unauthorised entry into construction zone. Maintain clearly marked exclusion zones to protect community members and other unauthorised visitors and the general public from trespass violation.	

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 Eruwa ATC Project in Ibarapa-East LGA, Oyo State.

The development of Environmental and Social Management Plan is a critical component of sustainable project development. Thus, the Environmental and Social Management Plan (ESMP) template serves as a practical tool to guide the implementation of mitigation and enhancement measures identified in the Environmental and Social Impact Assessment (ESIA). It ensures that potential adverse environmental and social impacts arising from the proposed project, are managed effectively, while positive impacts are enhanced and leveraged for community development. Essentially, a comprehensively articulated ESMP is indispensable to mitigate, off-set and or compensate for:

- Project-related environmental degradation,
- The promotion of community health and safety,
- The Enhancement of employment rules and regulation compliance, and livelihood benefits, and
- Ensure compliance with Nigerian environmental regulations and international environmental best practices.

To this extent, this chapter presents and discussed the framework for the mitigation measures taken to address the adverse impacts identified in chapter six. It also discusses the fundamentals of the environmental and social management plan, outlined the institutional responsibilities and accountabilities that will ensure that all provisions made are implemented under strict supervision. In addition, the cost implication of monitoring all the identified avenues was also outlined. More importantly, the mitigation measures outlined in this report are structured to curtail the potential adverse environmental and social impacts itemized in the previous chapters to ensure alignment with the principles of environmental sustainability and social equity.

7.2 Objectives of the ESMP

Within the context of this ESIA, the long-term objectives of the ESMP are to:

- Articulate and translate the ESIA findings into positive project development actions.
- Provide a structured approach for the prevention, minimization, and control of the potential environmental and social impacts generated by the project.
- Outline institutional arrangements and roles for implementing and supervising mitigation and monitoring actions.

- Ensure the participation of all stakeholders, including local communities, in the management of project impacts.
- Promote compliance with national environmental policies, state laws, and relevant international guidelines such as those from the AfDB, and the International Labour Organization (ILO).

7.3 Scope of the ESMP

To the extent that the ESIA comprehensively defines and regulate the Oyo State SAPZ E&S programme activities, the ESMP provides the regular guidelines to all parties involved in the implementation of the proposed sub-projects in fulfilment of its environmental and social requirements. To this end, the ESMP has the long-term scope of:

- Ensuring that environmental management conditions and requirements are implemented during the construction and post-construction phases of the sub-project development;
- Making sure that the interests of the general public and the primary stakeholders of the project are considered throughout the construction and operational phases of the sub-project development; and
- Ensuring that optimal socio-economic benefits accrue to the project communities and the entire country.

7.4 Institutional Arrangements and Responsibilities

To achieve project ownership, accountability and responsibility for project development actions taken, certain institutions and stakeholder responsibilities are identified and defined as follows, and itemized in Table 7.1.

Oyo State SAPZ SPIU: Responsible as the primary stakeholder for the overall ESMP implementation, monitoring oversight, and reporting.

- DBO Contractors: Daily implementation of mitigation measures and reporting incidents.
- Federal Ministry of Agriculture and Food Security (FMAFS): Interface with, and in coordination of the stakeholders representing the national program coordination unit (NPCU)
- Federal Ministry of Environment (FMEnv): Responsible for regulatory oversight, periodic audits, and ESIA approval.
- Oyo State Ministry of Environment: Monitoring of compliance with state-specific environmental standards.
- Community Liaison Officers (CLOs): third party engagement, grievance management, and feedback loop between project and host communities.
- Independent Environmental Consultant: Monitoring, reporting, and auditing of ESMP implementation.

Table 7.1: Institutional Arrangements and Responsibilities	
Institution/Entity	Responsibility
Oyo State SAPZ SPIU	ESMP oversight, policy enforcement, budgeting, inter-agency coordination, compliance reporting and grievance redress mechanism (GRM) implementation management.
Project Contractors/ Service Providers	Day-to-day ESMP implementation, incident reporting, corrective actions
Federal Ministry of Environment (FMEnv) & NESREA	ESIA approval, regulatory inspections, enforcement of national environmental regulations
Oyo State Ministry of Environment	State-level monitoring, local compliance checks, community engagement support
Community Liaison Officers (CLOs)	Local stakeholder engagement, conflict mediation, grievance logging
Independent Environmental Consultants	Periodic environmental monitoring and reporting to SPIU and primary stakeholders' regulators.
Third-Party Auditors (if required)	Independent verification of ESMP implementation and performance assessments

7.5 Environmental and Social Monitoring Plan

The Environmental and Social Monitoring Plan is a critical element of the ESMP, in that it is designed to ensure continuous assessment of the project's environmental and social performance over time. The cardinal objective and ultimate goal, is to track the effectiveness of mitigation measures, verify compliance with applicable laws and standards, and identify any emerging issues that require decision-making corrective actions.

Therefore, given the extent of the Oyo State SAPZ ATC sub-project and interaction with various environmental media, monitoring is indispensable. Monitoring leveraged on sub-project implementation data collection provides the basis for evaluating environmental trends, engaging stakeholders meaningfully, and making evidence-based decisions throughout the life-cycle of the project.

7.5.1 Objectives of the Environmental and Social Monitoring Plan

The main objectives of the Environmental and Social Monitoring Plan are to:

- Ensure that the proposed mitigation and enhancement measures are effectively implemented, tracked and documented for future reference.
- Detect in timely manner unanticipated adverse impacts and therefore provide early warning signals.
- Establish accountability by tracking environmental performance indicators.
- Ensure compliance with Nigerian environmental laws, sectoral guidelines, and international best practices (especially, AfDB's ISS, ISO 14001).
- Provide a feedback loop to improve future environmental and social management development programme.

7.5.2 Monitoring Parameters and Indicators

To effectively monitor the impacts and outcomes of the sub-projects, a wide range of environmental and social indicators have been identified as presented in Table 7.2. These are based on baseline data, predicted impacts, and regulatory requirements.

Table 7.2: Key Monitoring Indicators	
Environmental/Social Component	Monitoring Indicators
Environmental Component	
Air Quality	PM _{2.5} , PM ₁₀ , NO _x , SO ₂ , CO
Noise	Day and night-time sound levels in decibels (dB)
Surface and Groundwater Quality	pH, DO, BOD, COD, TDS, Heavy Metals (Pb, Cd, Hg), Oil and Grease
Soil Quality	Hydrocarbon contamination, heavy metal concentration, pH
Biodiversity	Species inventory, changes in vegetation cover, evidence of faunal movement
Social Component	
Waste Management	Volume/type of solid and hazardous waste generated, disposal method
Employment and Livelihoods	Number of local vs. non-local workers employed, skill acquisition training offered, percentage of women/youth employed vs percentage of men, Number of PAPs compensated on-time/ Delayed Compensation
Community Health and Safety	Frequency of disease outbreaks, accident rates, traffic incidents
Occupational Health & Safety	Lost Time Injury Frequency Rate (LTIFR), compliance with PPE usage
Social Cohesion	Number of grievances lodged/ resolved, community engagement frequency, number of GBV/SEA reported/resolved

7.5.3 Monitoring Approach and Methodology

In terms of the methodology, a combination of **qualitative** and **quantitative** methods will be used to collect accurate, replicable, and time sensitive environmental and social data indicators specified in sub-section 7.4.2. With regard to frequency of monitoring and data collection for decision-making, Table 7.3 indicate time series ranging from routine, weekly through monthly to quarterly trends.

Parameters for Monitoring and Methods include:

- Air and Noise Monitoring: Portable air quality samplers and dosimeters will be used in compliance with FMEnv and NESREA standards.
- Water and Soil Sampling: Samples will be collected quarterly and tested at certified laboratories according to WHO and NESREA protocols.
- Visual Inspections: Routine site assessments by the HSE team and environmental officers to evaluate compliance.
- Social Surveys and Interviews: Periodic household surveys, focus group discussions (FGDs), and key informant interviews (KIIs) to assess community perceptions in alignment with sub-project implementation.
- Occupational Safety Audits: Internal inspections and external audits to review adherence to OHS protocols.

7.5.4 Monitoring Frequency and Locations

Monitoring will be conducted at different frequencies depending on the project phase (pre-construction, construction, operation) and the sensitivity of the component involved as presented in Table 7.3.

Table 7.3: Proposed Monitoring Schedule			
Component	Location	Frequency	Responsibility
Air Quality	Power plant, processing facilities	Monthly	HSE Unit/Environmental Consultant
Noise	Nearby residential and project boundary	Monthly	Environmental Officer
Surface/groundwater	Nearby boreholes, estuary points	Quarterly	Water Analyst/Consultant
Soil Quality	Fuel storage, workshop areas and other spill-prone areas	Bi-annually	Environmental Consultant
Waste Management	Entire facility	Weekly	Waste Coordinator/Site Engineer
Employment Metrics	HR office, local community	Quarterly	HR Unit/CSR Officer
Community Health	Local health facilities, community	Quarterly	Public Health Consultant
Safety & Accidents	Entire project site	Monthly	Safety Officer
Biodiversity	Site & environs	Bi-annually	Ecologist
Grievance Redress	CLO office, project office	Monthly	CLO/Community Grievance Desk

7.5.5 Monitoring, Documentation, and Reporting

All environmental and social monitoring activities will be comprehensively documented and reported in a timely and transparent manner.

The Reporting Structure shall include:

- Daily Site Logs: (kept by Site Environmental and Safety Officers)
- Weekly Progress Reports (submitted to Oyo State SAPZ SPIU Program Management)
- Monthly Environmental and social Reports (reviewed by internal compliance team)
- ESMP Performance Reports (submitted to FMEnv quarterly, and monthly to AfDB)
- Annual Environmental and social Audit Reports (prepared by independent auditors)

All reports will include:

- Summary of findings,
- Analysis of trends,
- Comparison with baseline values and legal thresholds,
- Non-conformance and corrective actions taken,
- Lessons learned and continuous improvement recommendations.

7.5.6 Roles and Responsibilities

To ensure effective and accountable monitoring, clear roles and responsibilities are outlined for specific stakeholders' obligations to ensure efficient implementation of the monitoring plan as presented in Table 7.4.

Table 7.4: Roles in Monitoring plan	
Stakeholders	Role in Monitoring
Oyo State SAPZ (Project Proponent)	Budgetary provision, overall supervision, data compilation
Contractors/ Sub-contractors	Routine field monitoring, immediate reporting of incidents
Independent Environmental Consultants	Conduct specialized monitoring and laboratory analyses
FMEnv & Oyo State Ministry of Environment	Regulatory oversight, spot checks, legal enforcement
Community Liaison Officer (CLO)	Stakeholder interface, grievance resolution tracking
External Auditors (if required)	Third-party compliance verification

7.5.7 E&S Success Rating Using Key Performance Indicators (KPIs)

The underlisted KPIs amongst other factors shall be used to evaluate ESMP implementation success:

Environmental KPIs:

- Effluent Quality
- Ambient air level
- % increase of planted trees (re-vegetation)
- <5% deviation from baseline environmental conditions in the short-term measurement
- 100% waste segregation and proper disposal management using accredited agents.
- Surface and groundwater quality level improved, and maintained.

Social KPI

- 95% compliance with mitigation actions.
- 80% of community grievances resolved within 14 days.
- Zero fatality and <1 LTIFR (*Lost Time Injury Frequency Rate*) annually.
- >50% of workforce sourced locally.

7.6 Capacity Building and Training

Capacity building and training are essential components for the successful implementation of environmental and social safeguards mitigation and monitoring plans throughout the life cycle of the OYS SAPZ ATC sub-project. A well-structured capacity development strategy ensures that both project personnel and relevant stakeholders including contractors, host communities, and regulatory institutions possess the knowledge, skills, and tools necessary to ensure compliance with environmental standards, occupational health and safety protocols, and social engagement obligations.

The targets are to:

- Enhance technical and managerial capabilities of project staff for effective environmental and social management.
- Equip the workforce with knowledge and skills to ensure measurable implementation deliverance on health and safety, waste management, pollution control, and emergency, and security response project outcomes.

- Foster local community and primary stakeholders project programme ownership, participation in environmental stewardship, and project outcome benefit-sharing.
- Strengthen the institutional capacity of local authorities and project proponents to oversee and enforce environmental and social safeguards compliance measures.

7.6.1 Identified Training Needs

Given the project activities, and the responsible personnel to execute the implementation management, training needs were identified through a gap analysis of expected job functions, existing staff capacities, and stakeholder roles. The analytical findings gave rise to key thematic areas for capacity development as presented in Table 7.5.

Table 7.5: Key thematic areas for capacity building		
Training Theme	Topics Covered	Budget (N)
Environmental Management	ESMP implementation, pollution prevention, air and water quality management, biodiversity protection, ESIA compliance	5,000,000
Health and Safety (HSE)	Hazard identification, use of PPE, fire safety, confined space entry, first aid, occupational health, OS-4 community health/safety	1,800,000
Waste Management	Segregation, storage, transportation, treatment and disposal of general and hazardous waste,	
GRM, GBV/ SEA	GBV/SEA sensitization training for contractors and workers, OS-2 labour, OS-5 vulnerable groups	5,000,000
Social Safeguards	Stakeholder engagement, grievance redress mechanism, gender sensitivity, community relations	
Emergency Response	Spill response, fire drills, evacuation protocols, natural hazard response	2,000,000
Monitoring and Evaluation	Data collection, environmental audits, reporting procedures, corrective actions	2,000,000
Regulatory Compliance	Nigerian laws, AfDB's ISS, ISO 14001/45001 awareness	2,000,000
		17,800,000

7.6.2 Training Schedule and Facilitator

Depending on the level of education and professional knowledge of staff, contractors/ staff, and service providers, capacity building is very vital for ensuring that all personnel involved in project implementation understand their environmental and social responsibilities as indicated in Table 7.6. The source and acquisition of capacity building knowledge can be obtained through either individual specialist consultant, firm capacity building consultancy or through institutionalised capacity building management institutions.

Table 7.6: Training Schedule and Facilitator				
Training Topic	Target Audience	Frequency	Facilitator	Budget (N)
ESMP Implementation & HSE Protocols	Contractor Staff, Supervisors	Bi-Annually	HSE Consultant	3,000,000
Community Engagement & Conflict Management	CLOs and Community Representatives	Annually	Social Specialist	4,000,000
Emergency Response and Spill Control	Security, Staff, Maintenance Team	Quarterly	SEMA, Fire Department, FRSC / Environmental Firm	2,500,000
Environmental Standards and Regulations	Project Managers, Legal Advisors	Annually	FMEnv/OYS-MEnv, NESREA	2,000,000
Total				11,500,000

7.6.3 Budget for ESMP Implementation

To effectively implement the environmental and social safeguards management measures profiled in this ESIA, obligatory budgetary provisions have been made for this ESMP. The budget for the ESMP include the environmental and social management costs excluding the cost of good engineering practices, and cost of land acquisition resettlement plan. All administrative costs for implementing the ESMP shall be budgeted for as part of the project Annual Work Plan and Budget (AWPB) overhead costing.

Therefore, the total cost for ESMP implementation is N79,603,332.97 (Seventy-Nine Million, Six-Hundred and Three Thousand, Three Hundred and Thirty-Two Naira, Ninety-seven Kobo). This, at a conversion rate of N1,385 to \$1 USD, translate to \$57,475.33 (Fifty-Seven Thousand Four Hundred and Seventy-Five Dollar Thirty-Three Cents).

The cost of each measure has been estimated and included in the overall ESMP budget as indicated in Table 7.7.

Table 7.7: ESMP Implementation Budget Summary				
S/No	Element	Responsible Unit	NGN	USD
1	Mitigation Measures	SPIU, DBOC	14,366,666.67	
2	Special Initiatives for ESMP Implementation	OYS SAPZ	4,000,000.00	
3	Monitoring & Audit	SPIU, DBOC, ESIC	15,666,666.67	
4	Training & Capacity Building	SPIU, DBOC/HSE Officer, ESIC,	24,000,000.00	
5	Environmental Management plan all phases	SPIU, DBOC/HSE Officer, ESIC,	14,333,333.00	
Sub-total			72,366,666.34	52,250.30
	10% contingency		7,236,666.63	5,225.03
Grand total			79,603,332.97	57,475.33

7.6.4 Implementation Schedule

An implementation schedule gives a clear-cut direction on the timeline for the implementation of stipulated mitigation measures. It is anticipated that each of the stated measures should be time-based for suitable implementation and appropriate monitoring. Figure 7.1 documents the schedule for the mitigation measures with respective time lapse. The contractor is expected to prepare and submit a workplan action with details of how construction related environmental and social mitigation measures recommended in the ESMP will be implemented once a notice to proceed is acknowledged. The DBOC shall strictly follow the Workplan Action inclusive of the mitigation action required at the pre-construction phase. The key elements of the implementation schedule plan in Figure 7.1 are as listed below:

- Preparation and submission of the Action plan;
- Nominating Environmental Management Representative;
- Finalizing site and layout plans for construction camps/temporary yards incorporating environmental requirements;
- Preparation and submission of construction schedule;

- Implementation of mitigation and enhancement measures;
- Environmental auditing (SPIU, ESIC /FMEnv);
- Monitoring and reporting on ESMP implementation (SPIU, FMEnv &ESIC)

7.7 The ESMP

In this section, while Table 7.8 gives details of the ESMP Implementation Budget and Resource, the recommended environmental and social management measures required to mitigate the identified impacts of the proposed project activities during pre-construction, construction, decommissioning and operation phases for various components is presented in Table 7.9.

S/N	Mitigation measures for:	Mitigation Timeline (Monthly)																							
		1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	9 th	10 th	11 th	12 th	13 th	14 th	15 th	16 th	17 th	18 th	19 th	20 th	21 th	22 th	23 th	24 th
1.																									
2.																									
3.																									

Figure 7.1: Time-lapse schedule for implementation of mitigation measures

Table 7.8: ESMP Implementation Budget and Resource						
ESMP Activity	Description	Estimated Cost (NGN)	Estimated Cost (USD)	Responsible Party	Timeline	Remarks
Environmental Monitoring	Air, water, soil sampling, noise level checks	4,500,000	3,249.10	HSE Department /Consultant	Quarterly	Includes lab analysis fees
Waste Management	Collection, segregation, and disposal of hazardous and non-hazardous waste	8,250,000	5,956.68	HSE Team/Contractor	Monthly	Licensed disposal agents needed
Occupational Health and Safety (OHS)	PPE, training, emergency drills, medical support	6,500,000	4,693.14	HSE Unit	Bi-monthly	PPE for all categories of staff
Community Engagement and GRM	Meetings, grievance resolution, awareness programs	3,500,000	2,527.08	CLO/HR	Monthly	Community feedback sessions
Capacity Building and Training	Workers' orientation, environmental education, technical skills training	21,000,000	15,162.45	HR/HSE	Bi-annually	Targets local employment growth
Biodiversity and Ecosystem Management	Riparian forest protection, reforestation, and buffer zone maintenance	7,550,000	5,451.26	Environment Officer	As required	Linked to habitat conservation
Emergency Preparedness and Response Plan	Equipment, training, and mock drills	4,750,000	3,429.60	HSE/Operations	Quarterly	Align with ISO 45001 standards
ESMP Reporting and Documentation	Data collection, audits, and report preparation	15,000,000	10,830.32	HSE Manager	Quarterly	Submitted to FMEnv and sponsors
At current exchange rate of \$1/ N1,385		71,050,000	51,299.64			

Table 7.9: Environmental Management Plan for all Phases of the proposed Project									
Potential Impact	Mitigation Measures	Implementation			Monitoring			Estimated Cost (NGN)	Estimated Cost (USD)
		Responsibility for Implementation	Cost (NGN)	Cost (USD)	Monitoring Indicators	Responsibility for Supervision	Frequency of Monitoring		
Pre-Construction Phase									
Land Acquisition and potential physical/cultural heritage disturbance	Conduct chance-find procedure; avoid sensitive cultural/religious sites; compensate land-takers appropriately; buffer zones for sacred areas	OYS-SAPZ/ DBOC	333,333	215	Physical buffer zones for sacred areas, records of compensation	FMEnv / State Min. Env.		333,333	215
Traffic and community safety risks from mobilization of equipment	Traffic management plan; warning signage; community awareness; trained drivers	OYS-SAPZ/ DBOC	666,667	430	Installed signages, record of community awareness campaigns and drivers training	FMEnv / State Min. Env. FRSC	Quarterly	166,667	108
Greenhouse gas (GHG) emissions from site preparation activities	Energy-efficient machinery; limit unnecessary trips; tree planting offset program	OYS-SAPZ/ DBOC	666,667	430	Planted trees	FMEnv / State Min. Env.	During pre-construction	166,667	108
Noise pollution from heavy-duty trucks, equipment, and personnel movement	Restrict mobilization to daylight hours; maintain silencers; install temporary noise barriers; limit idling times	OYS-SAPZ/ DBOC	666,667	430	Noise level dB(A) at site boundary	FMEnv / State Min. Env.	Monthly	1,333,333	860
Air pollution from vehicle emissions (CO, NO ₂ , SPM, SO ₂)	Use low-emission trucks/equipment; conduct periodic emission testing; enforce “no idling” policy	OYS-SAPZ/ DBOC	333,333	215	Air quality readings (NO _x , PM)	FMEnv / NESREA	Monthly	166,667	108

Table 7.9: Environmental Management Plan for all Phases of the proposed Project									
Potential Impact	Mitigation Measures	Implementation			Monitoring			Estimated Cost (NGN)	Estimated Cost (USD)
		Responsibility for Implementation	Cost (NGN)	Cost (USD)	Monitoring Indicators	Responsibility for Supervision	Frequency of Monitoring		
Vegetation loss of about 37.94 ha and habitat disturbance of 12.5 ha	Restrict clearing to project footprint; replant native species; implement flood and erosion control plan	OYS-SAPZ/ DBOC	1,333,333	860	Area cleared vs. replanted; biodiversity survey	FMEEnv / State Min. Env.	Quarterly	333,333	215
Construction Phase			-	-					
Groundwater contamination from fuel storage, lubricants, chemicals	Bunded storage; drip trays; groundwater monitoring wells; spill response kits.		333,333	215				333,333	215
	Waste management issues (general solid waste, packaging, food waste)								
Dust generation from cleared land and stockpiles	Regularly spray water on exposed soil; cover stockpiles; restrict vehicle speeds; schedule high-dust activities during low wind	OYS-SAPZ/ DBOC	1,333,333	860	PM10/PM2.5 readings at site boundary	FMEEnv / NESREA	Weekly	166,667	108
Increased soil erosion potential; reduction in structural stability and percolation ability of soil	Strip and store topsoil separately; limit clearing; avoid machinery on wet soils; install erosion controls	OYS-SAPZ/ DBOC	3,333,333	2,151	Soil stability tests; erosion evidence	FMEEnv / NESREA	Quarterly	166,667	108
Noise from operations of engines and heavy-duty construction machines	Monitor noise levels; use temporary barriers; provide hearing protection; maintain machinery; restrict noisy operations to 07:00–18:00	OYS-SAPZ/ DBOC	333,333	215	Noise level dB(A)	FMEEnv / State Min. Env.	Monthly	166,667	108
Contamination of surface water from cement mixing,	Site batching plants ≥ 200 m from water; prevent discharge into drains;	OYS-SAPZ/ DBOC	833,333	538	Water quality (pH, turbidity, hydrocarbons)	FMEEnv / NESREA	Quarterly	166,667	108

Table 7.9: Environmental Management Plan for all Phases of the proposed Project									
Potential Impact	Mitigation Measures	Implementation			Monitoring			Estimated Cost (NGN)	Estimated Cost (USD)
		Responsibility for Implementation	Cost (NGN)	Cost (USD)	Monitoring Indicators	Responsibility for Supervision	Frequency of Monitoring		
concrete batching and handling	implement spill prevention and response								
Alteration of landscapes due to quarrying	Restrict quarrying to approved areas; maintain buffer zones; implement progressive rehabilitation; use visual screening	OYS-SAPZ/ DBOC	1,666,667	1,075	Quarry inspection reports; landscape restoration progress	FMEnv / State Min. Env.	Quarterly	333,333	215
Operational Phase			-	-					
Increase in noise level from the operations of various machines and equipment such as power plant	Install acoustic enclosures; schedule high-noise activities daytime; preventive maintenance; hearing protection; noise monitoring	OYS-SAPZ	333,333	215	Noise level dB(A) within facility and boundary	FMEnv / State Min. Env.	Quarterly	166,667	108
Daily release of nitrogen oxides (NOx), carbon monoxide (CO), hydrocarbons, and particulate matter (PM) from traffic directly affects local air quality	Maintain vehicles and machinery; encourage shuttle buses; dust suppression; traffic management plans; monitor air quality	OYS-SAPZ	333,333	215	Air quality (NOx, CO, PM)	FMEnv / NESREA	Quarterly	166,667	108
Streams of agricultural waste generated such as peeling process, separation of raw materials and	Implement waste segregation; adopt waste-to-compost or energy; install sedimentation tanks; agreements with farmers for	OYS-SAPZ	333,333	215	Waste volume; effluent quality	FMEnv / State Min. Env.	Quarterly	166,667	108

Table 7.9: Environmental Management Plan for all Phases of the proposed Project									
Potential Impact	Mitigation Measures	Implementation			Monitoring			Estimated Cost (NGN)	Estimated Cost (USD)
		Responsibility for Implementation	Cost (NGN)	Cost (USD)	Monitoring Indicators	Responsibility for Supervision	Frequency of Monitoring		
processed waste from production	reuse; effluent quality monitoring								
Increase in soil pollution potential due to spilled fuel, spent oil, lubricants, paints during routine maintenance of operating machineries and equipment	Designated maintenance areas; spill prevention; bunded fuel storage; licensed hazardous waste disposal; regular inspection	OYS-SAPZ	666,667	430	Soil contamination reports	FMEEnv / NESREA	Quarterly	333,333	215
Decommissioning Phase			-	-				-	-
Increase in noise level and dust generation due to demolition and removal of camps components and other structures	Restrict demolition works to daylight hours; maintain silencers; controlled dismantling; install noise barriers; provide hearing protection	OYS-SAPZ/ DBOC	333,333	215	Noise level dB(A); dust concentration	FMEEnv / State Min. Env.	Monthly	166,667	108
Increase in noise and air quality pollution due to transfer of heavy-duty equipment and construction machineries	Spray water on debris; cover trucks; store demolition waste enclosed; restrict vehicle speeds; require dust masks	OYS-SAPZ/ DBOC	333,333	215	Air quality; dust levels	FMEEnv / NESREA	Monthly	166,667	108
Solid waste generation and	Segregate demolition waste; reuse/recycle materials; store waste securely; engage	OYS-SAPZ/ DBOC	166,667	108	Waste audit records	FMEEnv / State Min. Env.	Quarterly	66,667	43

Table 7.9: Environmental Management Plan for all Phases of the proposed Project									
Potential Impact	Mitigation Measures	Implementation			Monitoring			Estimated Cost (NGN)	Estimated Cost (USD)
		Responsibility for Implementation	Cost (NGN)	Cost (USD)	Monitoring Indicators	Responsibility for Supervision	Frequency of Monitoring		
improper disposal waste facility	licensed contractors; maintain waste tracking								
			14,333,333	9,247				5,066,667	3,269

Table 7.10a: Social Management Plan for all Phases of the proposed Project									
Potential Impact	Mitigation Measures (Summary)	Implementation			Monitoring			Estimated Cost (NGN)	Estimated Cost (USD)
		Responsibility for Implementation	Cost (NGN)	Cost (USD)	Monitoring Indicators	Responsibility for Supervision	Frequency of Monitoring		
Pre-Construction Phase									
Economic displacement of 6 households losing farmlands and crops	Prepare and implement Livelihood Restoration Plan (LRP); integrate tenant farmers into SAPZ Program before land acquisition	OYS-SAPZ	6,666,667	4,301	% PAPs compensated; # of livelihood activities implemented	FMEnv / Independent RAP Consultant	Quarterly	1,666,667	1,075
Conflicts due to inadequate or unequal compensation	Establish transparent and inclusive stakeholder engagement; deploy independent grievance redress mechanism	OYS-SAPZ	1,666,667	1,075	# disputes resolved; stakeholder satisfaction surveys	FMEnv / Independent RAP Consultant	Quarterly	333,333	215

Table 7.10a: Social Management Plan for all Phases of the proposed Project									
Potential Impact	Mitigation Measures (Summary)	Implementation			Monitoring			Estimated Cost (NGN)	Estimated Cost (USD)
		Responsibility for Implementation	Cost (NGN)	Cost (USD)	Monitoring Indicators	Responsibility for Supervision	Frequency of Monitoring		
Exclusion of vulnerable groups in compensation and support	Conduct inclusive consultations with women, youth, tenant farmers; provide targeted livelihood support	OYS-SAPZ	1,333,333	860	% vulnerable PAPs included; # targeted supports delivered	FMEnv / State Min. Women Affairs	Bi-annually	333,333	215
Loss of access to communal resources (forests, grazing)	Provide alternative resource access and support community forest management programs	OYS-SAPZ	1,666,667	1,075	Records of alternative sites provided	State Min. Agriculture / Forestry	Annually	666,667	430
Loss of cultural heritage / sacred sites (if encountered during land take)	- Conduct a cultural heritage and archaeological survey before land clearing, implement a Chance-Find Procedure (CFP) aligned with AfDB OS-1 and Nigerian heritage regulations. - Engage traditional councils and elders to identify and protect sacred sites. Halt work immediately upon discovery of artefacts and notify relevant authorities.	OYS-SAPZ	333,333	215	Number of heritage screening reports prepared. • Evidence of CFP implementation. • Documentation of consultations with traditional leaders.	OYS-SAPZ SPIU / FMEnv / Ministry of Culture & Tourism	Pre-construction and as required	500,000	323
Poor stakeholder engagement and resentment	Establish CLO system; regular community meetings; information disclosure in local language	OYS-SAPZ/ Contractor CLO	1,333,333	860	# of meetings held; community satisfaction surveys	FMEnv / State Min. Env.	Quarterly	333,333	215

Table 7.10a: Social Management Plan for all Phases of the proposed Project									
Potential Impact	Mitigation Measures (Summary)	Implementation			Monitoring			Estimated Cost (NGN)	Estimated Cost (USD)
		Responsibility for Implementation	Cost (NGN)	Cost (USD)	Monitoring Indicators	Responsibility for Supervision	Frequency of Monitoring		
Mistrust and misinformation about project objectives	• Conduct proactive awareness and information campaigns. • Use local radio, town criers, and translated leaflets for communication. • Deploy Community Liaison Officers (CLOs) to sustain dialogue. • Establish feedback channels (notice boards, grievance registers).	OYS-SAPZ SPIU / CLO / Contractor	500,000	323	•Number of sensitization sessions held. •Level of community awareness. •Functioning grievance redress channels.	OYS-SAPZ SPIU / Ministry of Information / AfDB E&S Team	Monthly during pre-construction	266,667	172
Construction Phase									
Influx of migrant workers leading to social tension and pressure on housing	Enforce worker code of conduct; prioritize local hiring; provide separate worker housing through camps	OYS-SAPZ/ Contractor	1,000,000	645	Worker demographic records; local rental costs	FMEnv / State Min. Labour	Quarterly	333,333	215
Security risks (petty theft, crime)	Collaborate with local security agencies; issue worker ID cards; secure camps	OYS-SAPZ/ Contractor	666,667	430	# security incidents recorded	CLO / Police	Quarterly	333,333	215
Gender-based violence (GBV) and sexual exploitation/abuse (SEA)	Implement GBV Action Plan; awareness campaigns; zero-	OYS-SAPZ/ NGO partner	500,000	323	# GBV cases reported/resolved	FMEnv / State Min. Women Affairs	Quarterly	166,667	108

Table 7.10a: Social Management Plan for all Phases of the proposed Project									
Potential Impact	Mitigation Measures (Summary)	Implementation			Monitoring			Estimated Cost (NGN)	Estimated Cost (USD)
		Responsibility for Implementation	Cost (NGN)	Cost (USD)	Monitoring Indicators	Responsibility for Supervision	Frequency of Monitoring		
	tolerance policy; partner NGOs								
Child labour risks	Enforce Labour Act; monitor recruitment; contractor penalties for under-age workers	OYS-SAPZ/ Contractor	333,333	215	Worker age records; inspection reports	State Min. Labour	Continuous	166,667	108
Pressure on water/food resources	Provide boreholes for camps; regulate sourcing from local markets; coordinate with local councils	OYS-SAPZ/ Contractor	666,667	430	Water use records; community complaints	State Min. Water Resources	Monthly	166,667	108
Disruption to community transport and trade routes	Provide safe diversions; signage; consult traders before road closures	OYS-SAPZ/ Contractor	500,000	323	# of complaints; accident records	FRSC / State Min. Works	Monthly	166,667	108
Dust and noise impacts on sensitive receptors (schools, hospitals, markets)	Create buffer zones; wetting near receptors; schedule works off-peak hours	OYS-SAPZ/ Contractor	500,000	323	Health statistics; community complaints	State Min. Health / FMEnv	Quarterly	166,667	108
Operational Phase									
Strain on local infrastructure (schools, clinics, water supply) due to operational workforce	OYS SAPZ support to upgrade facilities; joint planning with LGAs	OYS-SAPZ	1,666,667	1,075	# of CSR projects implemented; capacity usage rates	State Govt / LGA	Annually	333,333	215
Occupational fatigue and psychosocial stress among workforce	Limit working hours; rest breaks; wellness checks and counselling	OYS-SAPZ	500,000	323	Worker OHS records; absenteeism	HSE Unit / FMEnv	Quarterly	166,667	108
Loss of social cohesion due to long-term influx of non-local workers	Promote cultural integration programs; respect local	OYS-SAPZ /CLO	333,333	215	Records of community events supported	Traditional Councils	Annually	166,667	108

Table 7.10a: Social Management Plan for all Phases of the proposed Project									
Potential Impact	Mitigation Measures (Summary)	Implementation			Monitoring			Estimated Cost (NGN)	Estimated Cost (USD)
		Responsibility for Implementation	Cost (NGN)	Cost (USD)	Monitoring Indicators	Responsibility for Supervision	Frequency of Monitoring		
	customs; support community events								
Occupational accidents and injuries (falls, machinery, electrocution, etc.)	• Develop and implement a comprehensive OHS Management Plan. • Enforce mandatory use of PPEs. • Conduct daily toolbox talks and periodic safety training. • Maintain on-site first aid stations and emergency response systems. • Display safety signage and restrict unauthorized access.	Contractor/ OYS-SAPZ SPIU / State Ministry of Labour	1,666,667	1,075	•Number of OHS trainings conducted. •PPE compliance rate. •Record of accidents/incidents and corrective actions.	OYS-SAPZ SPIU / AfDB Supervision Mission / FMEnv	Weekly and quarterly audits	333,333	215
Spread of communicable diseases (HIV/AIDS, STIs, COVID-19, malaria)	•Organize health awareness and sensitization programs. •Provide voluntary testing, counselling, and free PPE for workers.	Contractor / Local Health Centres / OYS-SAPZ SPIU	666,667	430	•Number of awareness campaigns held. •Number of workers tested and trained. •Health surveillance and incident reports.	OYS-SAPZ SPIU / Ministry of Health / FMEnv	Quarterly	166,667	108

Table 7.10a: Social Management Plan for all Phases of the proposed Project									
Potential Impact	Mitigation Measures (Summary)	Implementation			Monitoring			Estimated Cost (NGN)	Estimated Cost (USD)
		Responsibility for Implementation	Cost (NGN)	Cost (USD)	Monitoring Indicators	Responsibility for Supervision	Frequency of Monitoring		
	•Distribute condoms and promote good hygiene. •Collaborate with local health centres for periodic outreach. •Maintain sanitation and vector control in worker camps.								
Inflationary pressure on local goods and services (housing, food, transport)	•Promote local procurement to stabilize prices. •Create price-monitoring committees with community leaders. •Provide temporary staff accommodation to reduce pressure on local housing. •Liaise with local government to regulate rent increases.	OYS-SAPZ SPIU / Contractor / Local Government Council	333,333	215	•Evidence of local procurement policy implementation. •Periodic price trend monitoring reports. •Number of worker accommodations provided.	OYS-SAPZ SPIU / Local Government / FMEnv	Quarterly	166,667	108

Table 7.10a: Social Management Plan for all Phases of the proposed Project									
Potential Impact	Mitigation Measures (Summary)	Implementation			Monitoring			Estimated Cost (NGN)	Estimated Cost (USD)
		Responsibility for Implementation	Cost (NGN)	Cost (USD)	Monitoring Indicators	Responsibility for Supervision	Frequency of Monitoring		
Marginalization of women and youth in employment opportunities	•Implement gender- and youth-inclusive employment policy. •Provide training and skill-building programs for local women and youth. • Ensure equal pay and fair participation in project jobs. •Track participation data by gender and age.	Contractor / OYS-SAPZ SPIU / Ministry of Women Affairs	666,667	430	•Percentage of women/youth employed. •Training attendance records. •Employment database showing gender distribution.	OYS-SAPZ SPIU / Ministry of Women Affairs / AfDB E&S Team	Monthly during construction	333,333	215
Decommissioning Phase									
Loss of livelihoods for local workers after decommissioning	Prepare and implement workforce transition/exit plan; support retraining	OYS-SAPZ	5,000,000	3,226	# of workers retrained; post-exit employment rates	FMEnv / State Min. Labour	Annually	1,666,667	1,075
Community grievances during site closure	Maintain active grievance redress system throughout decommissioning; publicize closure schedule	OYS-SAPZ/ CLO	1,666,667	1,075	# grievances logged/resolved	FMEnv / State Min. Env.	Monthly	333,333	215
TOTAL	-	-	30,166,667	19,462				9,266,667	5,978

7.8 Specific E&S Management Plans (MPs)

Specific E&S management plans have been prepared, complementary to this ESIA document to comply with the nine AfDB's OSs triggered by the proposed OYS SAPZ ATC development programme as presented in Table 7.10, and in the sections following. The SEP, LRP and PMP have been prepared as stand-alone E&S instruments; as such only SEP is discussed here in details as the most relevant instrument with complementary information to this ESIA in general, and particularly the ESMP section.

Table 7.10b: Specific E&S Management Plans	
AfDB Operational Safeguards	E&S Management Plans
Environmental and Social Operational Safeguard 1: Assessment and Management of Environmental and Social Risk and Impact	Environment & Social Mgt Plan (ESMP)
Environmental and Social Operational Safeguard 2: Labour and Working Conditions	Labour Mgt. Plan
Environmental and Social Operational Safeguard 3: Resources Efficiency and Pollution Prevention and Management	Waste Mgt Plan
	Pest Mgt Plan
Environmental and Social Operational Safeguard 4: Community Health, Safety and Security	OHSP
	Traffic Mgt Plan
Environmental and Social Operational Safeguard 5: Land Acquisition, Restrictions on Access to Land and Land Use, and Involuntary Resettlement	Livelihood Restoration Plan
Environmental and Social Operational Safeguard 6: Habitat and Biodiversity Conservation, and Sustainable Management of Living Natural Resources	Biodiversity Mgt Plan
	Climate Change Mgt Plan
	Flood & Erosion Control Plan
Environmental and Social Operational Safeguard 8: Cultural Heritage	Cultural Heritage Mgt Plan
Environmental and Social Operational Safeguard 10: Stakeholder Engagement and Information Disclosure	Stakeholder Engagement Plan
All these E&S management plans are discussed in details in Annex 1 – 9 in the Appendix	

7.9 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.

7.9.1 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.

7.9.2 Objectives

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

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

7.9.3 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 96% 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.

7.9.4 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:

- 5.1.1.6 Identification of relevant stakeholders
- 5.1.1.7 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:

- 5.1.1.8 Farmers and settlers' associations.
- 5.1.1.9 Local community leaders.
- 5.1.1.10 Community members, including vulnerable groups such as women, youth, and the elderly.
- 5.1.1.11 Community-based organizations/associations
- 5.1.1.12 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 7.11: 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.

Stages/Procedure	Goals	Objectives
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 7.12: 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		
Staff of Adeseun Ogundoyin Polytechnic	Mr Soji Adewumi			✓	Intention of Oyo State Government to build Eruwa ATC	✓
OYSADA	Mr Popoola			✓	Intention of Oyo State Government to build Eruwa ATC	✓
OYSADA	Mr. Ajetunmobi			✓	Intention of Oyo State Government to build Eruwa ATC	✓
OYSADA	Dr. Peter			✓	Intention of Oyo State Government to	✓

Stakeholder Group and Interest in the proposed project	Stakeholder Name	Stakeholder Level			Connection to the Proposed Project	Meeting
		National	Regional	Local		
					build Eruwa ATC	
Farm settlement	Mr. Falowo Kayode, Chairman			✓	Intention of Oyo State Government to build Eruwa ATC	✓
Farm settlement	Adesegun Felix, Vice-Chairman			✓	Intention of Oyo State Government to build Eruwa ATC	✓
Farm Settlement	Mr. Okedere Sunday			✓	Intention of Oyo State Government to build Eruwa ATC	
Farm Settlement	Mr. Akinyode Akinlolu			✓	Intention of Oyo State Government to build Eruwa ATC	✓
Farm Settlement	Chief Olajire Egbedokun			✓	Intention of Oyo State Government to build Eruwa ATC	✓

7.9.5 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.

7.9.6 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:

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

The stakeholders' engagement meetings for the proposed Eruwa Agricultural Transformation Centre (ATC) were conducted between March 24 and 26, 2020, and April 15, 2020, covering the initial project scoping and consultation phase. Additional stakeholder consultations and data collection exercises were subsequently undertaken between 8 and 13 October 2025 at the respective offices and locations of the identified stakeholders.

The consultations provided relevant stakeholders with the opportunity to participate actively in the Environmental and Social Impact Assessment (ESIA) process by expressing their views, concerns, expectations, and recommendations regarding the proposed Project. Stakeholders engaged included government institutions, regulatory agencies, traditional authorities, community leaders, farmers' groups, women's associations, youth representatives, local residents, and other interested and affected parties.

Stakeholder engagement materials utilized during the consultations included a Background Information Document (BID) and other information-sharing materials designed to facilitate understanding of the Project objectives, proposed activities, potential impacts, and mitigation measures.

Sample photographs of the stakeholder consultation meetings are presented in Plates 4.17 to 4.19 (see Annex 2), while the key issues identified during the scoping and consultation process are summarized in Table 7.13. These consultations provided valuable baseline information and contributed significantly to the identification of environmental and social concerns, stakeholder expectations, and project-specific mitigation requirements.

The initial scoping findings are presented in Table 7.13.

Table 7.13: Initial scoping consultation findings.

Stakeholder Group	Priority Issues	Conditions	Project response / mitigation measures 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.	Chapter s 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.	Chapter s 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 - There is a dam and stream within the area from which farmers and the community get water for irrigation	- Agricultural extension officers in Oyo State will be trained on how to combat <i>Tuta Absoluta</i> and any other disease. - Oyo State Government will also carry out its farming activities in line with best environmental practice. - 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.	Has been integrated in SEP
Oyo State Ministry of Water Resources	EIA process and stakeholder consultation	- Best available technology should be adopted for the proposed irrigation system. - They should also devise practical measures to minimise water usage in their processes.	-	Chapter s 3, 5, 6 and 7
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 proponet has plans to build ATC that will assist farmers and community members - The team responded that employment of labour from the local communities would be recommended to the project proponet.	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 7.14.

EIA Public Disclosure

As part of the formal regulatory process, OYMEEnv 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 7.14.

Table 7.14: Summary of stakeholder engagement activities in communities within the Project's Aol.

S/N	Full Name / Group Met	Gender	Phone Number	Issues Discussed
1	Falowo Kayode, Chairman Settlers	M	08089417903	Developmental discussion on the intention of Oyo State Government to build Eruwa ATC centre at Eruwa comprising cultivation and processing of farm produce
2	Adesegun Felix, Vice-Chairman, Settlers	M	07039799666	Developmental discussion on the intention of Oyo State Government to build Eruwa ATC centre at Eruwa comprising cultivation and processing of farm produce
3	Adelakun D. J. I.	M	07087693125	Developmental discussion on the intention of Oyo State Government to build Eruwa ATC centre at Eruwa comprising cultivation and processing of farm produce
4	Jire Fatoba	M	070986505210	Developmental discussion on the intention of Oyo State Government to build Eruwa ATC centre at Eruwa comprising cultivation and processing of farm produce
5	Dr. Sodeyimi T	M	080764390507	Developmental discussion on the intention of Oyo State Government to build Eruwa ATC centre at Eruwa comprising cultivation and processing of farm produce
6	Adekunle Kehinde	M	08051738564	Developmental discussion on the intention of Oyo State Government to build Eruwa ATC centre at Eruwa comprising cultivation and processing of farm produce
7	Gbade Goodie	M	08133616637	Developmental discussion on the intention of Oyo State Government to build Eruwa ATC centre at Eruwa comprising cultivation and processing of farm produce

8	Hon. Yemi Oju	M	08077334498	Developmental discussion on the intention of Oyo State Government to build Eruwa ATC centre at Eruwa comprising cultivation and processing of farm produce
9	Dr. Ajayi O. D.	M	08024201513	Developmental discussion on the intention of Oyo State Government to build Eruwa ATC centre at Eruwa comprising cultivation and processing of farm produce
10	Oludare Idowu	M	08059288638	Developmental discussion on the intention of Oyo State Government to build Eruwa ATC centre at Eruwa comprising cultivation and processing of farm produce
11	Hon. Adeyemo O.	M	07051552296	Developmental discussion on the intention of Oyo State Government to build Eruwa ATC centre at Eruwa comprising cultivation and processing of farm produce
12	Ogunwale E. O.	M	08054188466	Developmental discussion on the intention of Oyo State Government to build Eruwa ATC centre at Eruwa comprising cultivation and processing of farm produce
13	Komolafe Joseph O.	M	08027875696	Developmental discussion on the intention of Oyo State Government to build Eruwa ATC centre at Eruwa comprising cultivation and processing of farm produce
14	Ajayi Rachael A.	F	07055459241	Developmental discussion on the intention of Oyo State Government to build Eruwa ATC centre at Eruwa comprising cultivation and processing of farm produce
15	Mr. James Toko	M	0809561996	Developmental discussion on the intention of Oyo State Government to build Eruwa ATC centre at Eruwa comprising cultivation and processing of farm produce
16	Taibat Alimi	F	08087403199	Developmental discussion on the intention of Oyo State Government to build Eruwa ATC centre at Eruwa comprising cultivation and processing of farm produce
17	Alimi Kareem	M	08050461609	Developmental discussion on the intention of Oyo State Government to build Eruwa ATC centre at Eruwa comprising cultivation and processing of farm produce
18	Okedara Gbade	M	08182991041	Developmental discussion on the intention of Oyo State Government to build Eruwa ATC centre at Eruwa comprising cultivation and processing of farm produce
19	Adejumo Samad	M	08024418881	Developmental discussion on the intention of Oyo State Government to build Eruwa ATC centre at Eruwa comprising cultivation and processing of farm produce
20	Adeola Adedoyin	M	08056165658	Developmental discussion on the intention of Oyo State Government to build Eruwa ATC centre at Eruwa comprising cultivation and processing of farm produce
21	Pelumi Toluwa	M	08054594747	Developmental discussion on the intention of Oyo State Government to build Eruwa ATC centre at Eruwa comprising cultivation and processing of farm produce
22	Bankole Peter	M	0705076787	Developmental discussion on the intention of Oyo State Government to build Eruwa ATC centre at Eruwa comprising cultivation and processing of farm produce
23	Salami Abudu	M	07037166804	Developmental discussion on the intention of Oyo State Government to build Eruwa ATC centre at Eruwa comprising cultivation and processing of farm produce
24	Simon Abdu	M	07047252250	Developmental discussion on the intention of Oyo State Government to build Eruwa ATC centre at Eruwa comprising cultivation and processing of farm produce
25	Ajani Tolu	M	08167092133	Developmental discussion on the intention of Oyo State Government to build Eruwa ATC centre at Eruwa comprising cultivation and processing of farm produce
26	Azeez Dauda	M	0802763780	Developmental discussion on the intention of Oyo State Government to build Eruwa ATC centre at Eruwa comprising cultivation and processing of farm produce

27	Okeleve Eniola	M	09069776088	Developmental discussion on the intention of Oyo State Government to build Eruwa ATC centre at Eruwa comprising cultivation and processing of farm produce
28	Chief Olajire Egbedokun Farmer and Settler	M	07052944769	Developmental discussion on the intention of Oyo State Government to build Eruwa ATC centre at Eruwa comprising cultivation and processing of farm produce
29	Mr. Soji Adewumi Staff of Adeseun Ogundoyin Polytechnic, Eruwa	M	09068937314	Developmental discussion on the intention of Oyo State Government to build Eruwa ATC centre at Eruwa comprising cultivation and processing of farm produce
30	Mr. Akinyode Akinlolu	M	08021227730	Developmental discussion on the intention of Oyo State Government to build Eruwa ATC centre at Eruwa comprising cultivation and processing of farm produce
31	Mr. Okedere Sunday	M	08157124309	Developmental discussion on the intention of Oyo State Government to build Eruwa ATC centre at Eruwa comprising cultivation and processing of farm produce

Field Survey, 2020 and 2025

7.10 Grievance Redress Mechanism

A grievance is any concern, complaint, or dispute raised by an individual or group of stakeholders in relation to the planning, implementation, or operation of the Oyo State Special Agro-Industrial Processing Zone (SAPZ). In line with the African Development Bank (AfDB) Integrated Safeguards System (ISS) and applicable national regulations, a Grievance Redress Mechanism (GRM) has been established to systematically receive, assess, and resolve grievances in a timely, transparent, and culturally appropriate manner.

The GRM is designed as a formal, accessible, and responsive system for addressing stakeholder concerns before they escalate into conflicts or litigation. It applies to all project phases and is available to Project-Affected Persons (PAPs), host communities, workers, vulnerable groups, civil society organizations, media, and other interested parties. The mechanism will be communicated through dedicated information materials, including GRM brochures, posters, and community sensitization activities, to ensure that stakeholders are adequately informed about grievance channels, procedures, and timelines.

Stakeholders may submit grievances, feedback, queries, suggestions, or compliments at any time through the GRM, including through anonymous channels where confidentiality is required. The overall objectives of the GRM are to:

- provide stakeholders with a clear, reliable, and accessible process for submitting comments and grievances, including anonymously;
- ensure structured documentation, review, response, and monitoring of grievances; and
- promote fair, transparent, timely, and culturally appropriate resolution of concerns related to the Oyo SAPZ.

❖ Guiding Principles of the GRM

The GRM for Oyo State SAPZ is guided by the following principles, consistent with AfDB standards and international good practice:

- **Legitimacy:** The mechanism is trusted by stakeholders and operates independently in a manner that ensures fairness, impartiality, and accountability throughout the grievance resolution process.
- **Accessibility:** The GRM is widely publicized and accessible to all stakeholders, including women, persons with disabilities, elderly persons, and other vulnerable groups, with appropriate assistance provided to address language, literacy, mobility, or cost barriers.
- **Predictability:** Clear procedures, defined timelines, and well-communicated escalation pathways are established for each stage of grievance handling.
- **Equitability:** Complainants are provided with adequate access to information and assistance to enable informed participation in the grievance process on fair and respectful terms.
- **Transparency:** Complainants are kept informed of the status and outcome of their grievances, while aggregated information on GRM performance is disclosed in project reports.
- **Rights compatibility:** Grievance outcomes are consistent with applicable Nigerian laws and internationally recognized human rights standards.
- **Continuous learning:** Lessons from grievances are systematically reviewed to improve project design, implementation, and risk mitigation.
- **Dialogue-based resolution:** Emphasis is placed on engagement, mediation, and consensual problem-solving rather than adversarial approaches.

❖ **GRM Access Channels and Escalation Process**

The GRM is accessible through multiple formal and informal channels to ensure broad stakeholder uptake. These include dedicated help lines or hotlines, suggestion and complaint boxes at project and community locations, written submissions, secure email platforms, web-based portals, and direct engagement with designated project representatives. Anonymous submissions are permitted to protect complainants from retaliation where necessary.

Grievances will be addressed through a tiered resolution structure. Initial efforts to resolve complaints will be undertaken at the project and community level by the relevant implementing institution or site-level grievance committee. Unresolved grievances will be escalated sequentially to the Oyo State SAPZ Project Implementation Unit (PIU) Grievance Committee, and subsequently to the SAPZ National Coordination Office if required. Where grievances remain unresolved after exhaustion of administrative remedies, complainants retain the right to seek redress through the formal judicial system.

The grievance resolution process is designed to ensure that cases are addressed efficiently and, where feasible, resolved within a cumulative period not exceeding three months, depending on the nature and complexity of the grievance.

❖ Grievance Categories

Grievances under the Oyo SAPZ are broadly categorized to facilitate systematic tracking and resolution, as summarized in Table 7.15.

Table 7.15: Grievance Redress Categories for Oyo SAPZ Stakeholders

Category	Examples of Issues
Land and Property	Land acquisition, valuation, compensation for land, crops, and structures, access restrictions
Employment and Labour	Wages, working hours, occupational health and safety, discrimination, sexual harassment, unfair dismissal
Community Relations and Engagement	Inadequate consultation, exclusion from decision-making, information disclosure gaps
Infrastructure and Service Delivery	Access to roads, water, electricity, sanitation, and social services
Financial and Economic	Disputes relating to benefit sharing, incentives, credit facilities, or support programs
Safety and Security	Trespassing, vandalism, theft, community safety, worker or site security concerns
Environmental, Social and Resettlement	Environmental impacts, nuisance, pollution, resettlement and livelihood restoration issues

7.10.1 Grievance Resolution Framework

Information on Grievance Redress Mechanism (GRM) for the Oyo State SAPZ will be disclosed from project inception and continuously reinforced throughout implementation. Awareness will be created during consultations, sensitization meetings, and disclosure activities across all implementing institutions, the Project Implementation Unit (PIU), and host communities. Communication will utilize multiple formats to ensure broad accessibility, including brochures distributed during consultations, posters displayed at strategic public locations (PIU offices, MDAs, local government secretariats, and community notice boards), and electronic dissemination through official SAPZ platforms and social media channels.

The objective is to ensure that all Project-Affected Persons (PAPs) and stakeholders—irrespective of literacy level, language, gender, disability, or geographic location—are fully informed of their right to raise grievances and understand the procedures for doing so without fear of retaliation.

The grievance resolution framework comprises six sequential and interlinked steps, designed to ensure transparency, fairness, timeliness, and clear escalation pathways.

Step 1: Grievance Uptake

Stakeholders may submit grievances through multiple accessible channels, including:

- standardized grievance forms available at SPIU office and implementing institutions;
- written submissions deposited in designated grievance boxes located within communities and institutional facilities;
- electronic submissions via official SAPZ email addresses and designated web-based platforms; and
- direct verbal reporting to designated project staff or Community Liaison Officers.

This multi-channel approach promotes inclusiveness, particularly for vulnerable groups and stakeholders with literacy constraints.

Step 2: Sorting and Processing

All grievances received will be formally logged into a standardized grievance register. Initial screening and categorization will be undertaken to identify the nature and urgency of each grievance (e.g., land and resettlement, labor, environmental, community relations, or security-related). Grievances will then be assigned to the appropriate officer or unit for action, with special attention to urgent or sensitive cases requiring expedited handling.

Step 3: Acknowledgement and Follow-up

All grievances will be acknowledged within seven (7) working days of receipt. Acknowledgement will include information on the responsible officer, the estimated timeframe for resolution, and available escalation options if the complainant is dissatisfied. Where a grievance requires referral to another entity or higher authority, this will be clearly communicated to the complainant.

Step 4: Verification, Investigation, and Resolution

The responsible unit will investigate the grievance through fact-finding, stakeholder consultation, and review of project records. Investigations will, where feasible, be completed within thirty (30) working days. Based on findings, a proposed resolution will be communicated to the complainant.

Where the complainant is dissatisfied, an appeal may be lodged within fourteen (14) days, triggering escalation to the Oyo State PIU Grievance Committee. Appeals at this level will be reviewed and responded to within twenty-one (21) days. If the grievance remains unresolved, the complainant will be informed of further escalation options, including referral to the SAPZ National Coordinating Office, the AfDB Independent Recourse Mechanism, or a court of competent jurisdiction.

Step 5: Monitoring and Evaluation

Each implementing unit/ institution will maintain an up-to-date grievance register documenting the nature of grievances, actions taken, timelines, and outcomes. The SPIU will consolidate grievance data and prepare quarterly summaries for submission to the National Coordinating Office and AfDB.

Beyond record-keeping, grievance trends will be periodically analyzed to identify systemic issues or procedural gaps. Recurring grievances will trigger corrective actions and adaptive management measures within the Oyo State SAPZ.

Step 6: Feedback and Disclosure

Complainants will be informed of resolutions both in writing and verbally, where appropriate. Where grievances are rejected or unresolved, complainants will be guided on subsequent escalation steps. Anonymized summaries of grievances and resolutions will be disclosed during community meetings, through notice boards, and in periodic project reports to enhance accountability and transparency.

7.10.2 Grievance Redress Committee (GRC)

A Grievance Redress Committee (GRC) will be established across key Oyo State SAPZ implementing institutions to manage and resolve grievances efficiently and transparently.

GRCs will operate at the institutional and state PIU levels and will serve as the first formal platform for grievance resolution.

❖ **Key Functions of the GRC**

- **Receipt and Acknowledgement:** Ensure multiple grievance intake channels and timely acknowledgment of complaints.
- **Assessment and Categorization:** Classify grievances by type, severity, and urgency.
- **Investigation:** Conduct impartial fact-finding and engage concerned parties.
- **Resolution:** Facilitate resolution of grievances within defined timelines at the lowest appropriate level.
- **Escalation:** Refer unresolved or complex cases to the Oyo State PIU.

❖ **Composition of the GRC**

Table 7.16: Composition of the Oyo State SAPZ Grievance Redress Committee	
Stakeholder Group	Role
Project Management / PIU	Oversight and policy alignment
Community Representatives / Traditional Leaders	Community interface and legitimacy
Farmers' and Producer Associations	Representation of agricultural stakeholders
Private Sector / Investors	Business and operational perspective
Environmental and Social Specialists	Safeguards assessment
Civil Society / NGOs	Social accountability and rights protection
Independent Mediator (where required)	Neutral dispute resolution

7.10.3 Oyo State SAPZ Grievance Escalation Process

The Oyo State SAPZ grievance escalation mechanism ensures resolution at the lowest appropriate level, with clearly defined timeframes and escalation thresholds.

Stage One – Implementing Institution Level

- Resolution timeframe: within 30 calendar days
- Appeals: lodged within 14 days and escalated to PIU if unresolved

Stage Two – Oyo State PIU Level

- Resolution timeframe: within 30 calendar days
- Appeals: lodged within 14 days and escalated to National level

Stage Three – SAPZ National Coordination Level

- Resolution timeframe: within 45 calendar days
- Final recourse: AfDB Independent Recourse Mechanism or judicial process

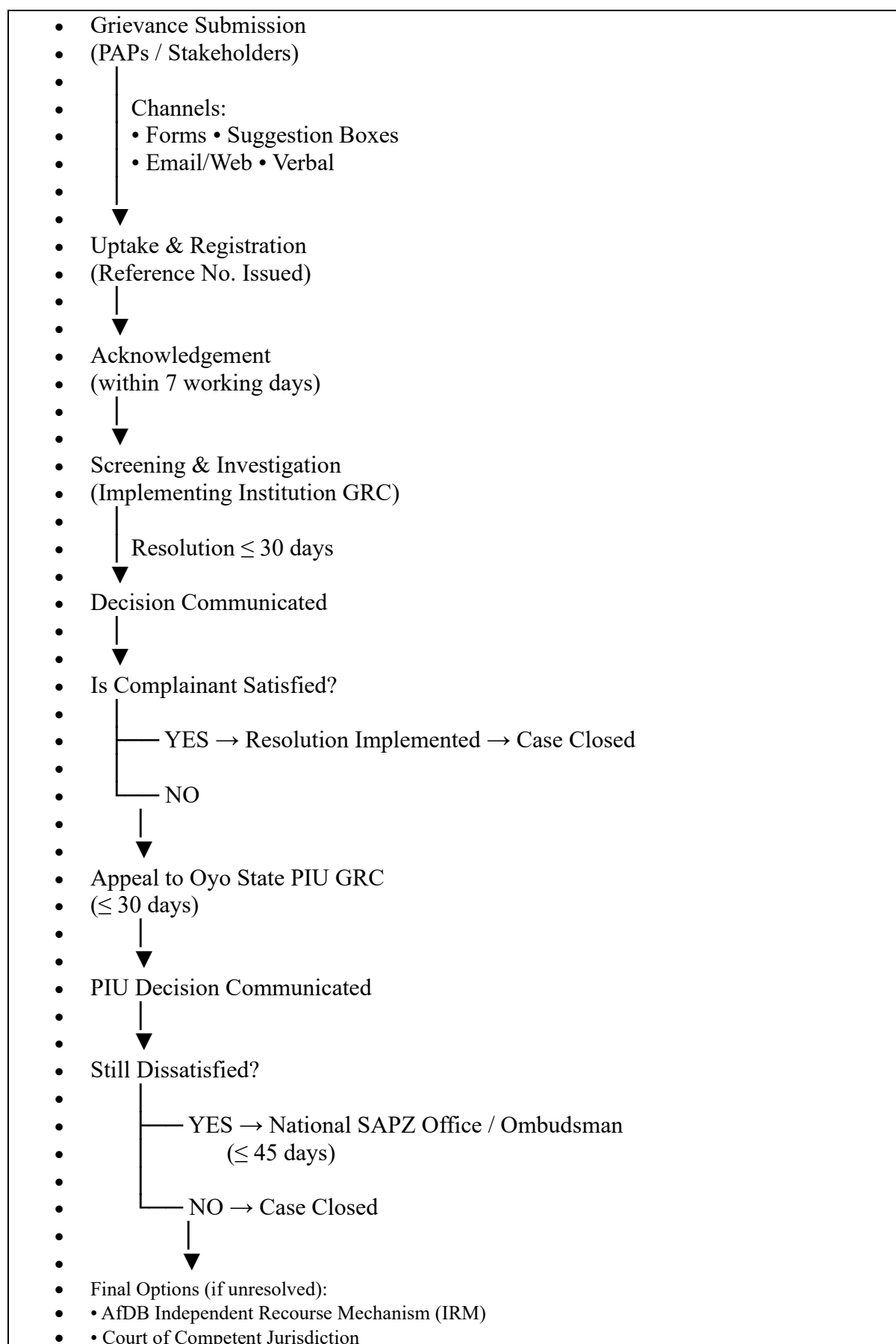


Figure 7.2: GRM Flow chat for OYSAPZ

7.10.4 Grievance LOYS and Prioritization

Each implementing institution shall maintain a grievance log capturing with priority level categorization. At the minimum, the following details shall be documented:

- unique grievance reference number;
- complainant details (unless anonymous);
- description and location of grievance;
- dates of receipt and response;
- responsible officers;
- resolution actions and timelines;
- complainant satisfaction and closure status;
- escalation details (if any).

Table 7.17: Grievance Priority Classification		
Priority Level	Description	Examples
High	Legal non-compliance, human rights concerns, risks to project continuity	Land disputes, GBV, environmental harm
Medium	Issues affecting reputation or medium-term performance	Employment disputes
Low	Information gaps or minor concerns	Requests for clarification

7.11 Institutional Roles and Responsibilities

Effective implementation depends on clear roles across community, project, state, and federal levels. Table 7.18 presents the details of the institutional roles and responsibilities for the effective implementation of the GRM system.

Table 7.18: Institutional Roles and Responsibilities	
Institution/Actor	Roles and Responsibilities
Community Liaison Officers (CLOs)	- First point of contact for grievances. - Register complaints in logbook. - Conduct initial screening and categorization. - Facilitate informal resolution with community leaders. - Provide feedback to complainants.
Community Grievance Committees (CGCs)	- Comprised of elders, women, youth, vulnerable group representatives. - Support CLOs in verifying complaints. - Provide culturally sensitive advice on resolutions.
Contractors (HSE/Social Officers)	- Implement corrective actions for environmental, health, and safety grievances. - Report incidents and accidents. - Maintain grievance database at project level.
Project Grievance Redress Committee (PGRC)	- Chaired by OYS-SAPZ Social Specialist. - Includes CLOs, Contractor HSE, PAP representatives, NGO observer. - Reviews unresolved grievances. - Provides binding resolutions at project level.
Oyo State SAPZ SPIU	- Ensure financing and oversight of GRM. - Integrate grievance reports into ESMP/RAP monitoring.
Federal Ministry of Environment (FMEnv)	- Provides regulatory oversight. - Monitors implementation of grievance resolutions.

Table 7.18: Institutional Roles and Responsibilities	
Institution/Actor	Roles and Responsibilities
	- Reviews quarterly reports.
NESREA	- Ensures environmental grievances (pollution, waste, emissions) comply with national standards. - Enforces sanctions where necessary.
State Ministries (Environment, Lands, Labour, Women Affairs, Health)	- Provide oversight of land, compensation, labour rights, gender issues. - Step in for state-level grievance resolution.
NGOs/CSOs (e.g., Women's groups, health NGOs)	- Act as independent observers. - Provide safe channels for GBV/SEA reporting Support vulnerable groups in accessing grievance channels.
Independent Consultant/Auditor	- Conduct periodic audits of GRM effectiveness. - Verify records, timeframes, and outcomes.

7.11.1 Monitoring and Reporting on Grievances

The day-to-day GRM implementation will be overseen by the Oyo State SAPZ PIU, while the SAPZ National Coordinating Office will provide oversight, quality assurance, and reporting to the AfDB. Grievance performance will be included in quarterly and annual safeguards reports. To effectively monitor, capture and collate data for reporting, the following indicators are essential.

Monitoring Indicators

1. Input Indicators

- Number of CLOs trained.
- Budget allocated for GRM operations.

2. Process Indicators

- Number of grievances received by category (land, environment, health, GBV, etc.).
- % of grievances acknowledged within 48 hours.
- % of grievances investigated within 14 days.

3. Output Indicators

- % of grievances resolved at community level (Level 1).
- % of grievances escalated to PGRC or FMEnv.
- Average time taken to resolve grievances.

4. Outcome Indicators

- Stakeholder satisfaction rate (measured via surveys).
- Reduction in conflict incidents (land disputes, protests).
- Number of GBV/SEA cases referred to service providers.

Reporting Mechanism

- Monthly Reports: CLOs submit IOYS of complaints received, resolved, or pending.
- Quarterly Reports: Contractors compile grievance statistics and outcomes, submitted to OYS-SAPZ and FMEnv/NESREA.
- Annual Public Report: Summary of grievances, resolutions, and trends disclosed to stakeholders in simple, non-technical formats (e.g., pamphlets, community meetings).

- Independent Audits: Annual third-party verification of GRM effectiveness.

7.11.2 Budget for GRM Establishment

Implementing a functional GRM requires dedicated financial resources. Without a budget, the system risks becoming a “paper mechanism” lacking operational capacity. For ATC, the budget covers institutional set-up, capacity building, communication tools, monitoring, and independent audits, ensuring that grievances are handled professionally, transparently, and in line with national, international, and especially with AfDB ISS safeguards protocols. Table 7.19 presents the details of the GRM budget.

Table 7.19: Budget for GRM			
Activity	Description	Estimated Cost (₦)	Responsible Party
Establishment of GRM Committees	Formation of CGRCs in all host communities; set-up of PGRC at project level	3,000,000	OYS-SAPZ/DBOC
Training of CLOs, CGRCs, Contractors, PGRC	Initial training + annual refresher on grievance handling, mediation, GBV response	5,000,000	FMEEnv / Independent Consultants
Awareness Campaigns	Radio jingles, posters, flyers, community theatre, info boards on GRM	2,500,000	CLOs / NGOs
IT & Data Management System	Digital grievance register, SMS hotline, database management	2,000,000	OYS-SAPZ/DBOC
GBV/SEA Confidential Mechanisms	Female focal persons, safe houses, referral support, NGO partnerships	5,000,000	DBOC/ NGO
Independent Audits & Evaluations	Annual third-party audits of GRM effectiveness	5,000,000	Independent Consultant
TOTAL BUDGET		22,500,000	\$16,245.49 USD

Conclusion

The expanded Grievance Redress Mechanism (GRM) provides a structured, multi-level system that ensures timely, fair, and transparent handling of complaints across ATC project. With clearly defined roles, robust monitoring, tailored capacity building, and adequate budgetary provisions, the GRM strengthens the project’s social license to operate and reduces risks of conflict, litigation, and reputational damage.

7.11.3 Capacity Building for GRM

The effectiveness of the GRM for SAPZ ATC sub-projects depends on the competence, preparedness, and awareness of all actors involved. Given that the project cuts across multiple states and involves communities with varying literacy levels, traditional governance systems, and social dynamics, a comprehensive capacity-building programme is required.

This programme will ensure that:

- CLOs, contractors, and grievance committees are skilled in handling complaints.
- Regulators and ministries are prepared to supervise and provide technical backstopping.
- Communities and PAPs are aware of their rights, know how to access the GRM, and trust it to deliver fair outcomes.

- Sensitive grievances (e.g., GBV/SEA) are addressed in a survivor-centered and confidential manner.

Capacity building will therefore combine formal training, awareness-raising, mentoring, and periodic refreshers across all levels of the GRM structure.

Capacity Building Objectives

The key objectives are to:

- Build the technical capacity of GRM actors to manage grievances fairly, efficiently, and transparently.
- Strengthen conflict resolution and mediation skills at community and project levels.
- Develop confidential and sensitive handling skills for GBV/SEA grievances.
- Enhance the capacity of PAPs and communities to understand their rights and use the GRM effectively.
- Institutionalize monitoring and reporting practices so grievance data can inform project decisions.
- Ensure long-term sustainability of the GRM by embedding skills in both formal institutions (ministries, regulators) and informal ones (traditional leaders, CGCs).

Target Groups and Training Focus

The GRM for ATC project involves a diverse set of actors operating at different levels from community representatives who are the first point of contact, to contractors and project committees that manage day-to-day operations, to state and federal ministries responsible for oversight and enforcement. Each group requires tailored training that matches its specific roles, responsibilities, and level of influence within the grievance process.

Capacity-building efforts must therefore be differentiated in respect to:

- Community actors (CLOs, CGCs, PAPs) need training in communication, grievance intake, and mediation, with strong emphasis on local language and cultural sensitivity.
- Project actors (Contractors, PGRC) require technical and procedural training to ensure grievances are investigated, documented, and resolved fairly.
- Institutional actors (State Ministries, OYS PIU-SAPZ, FMEnv, NESREA) need higher-level training on policy, oversight, and systemic monitoring of grievance data.
- Specialized actors (NGOs, GBV/SEA focal points) must be prepared to handle sensitive cases confidentially and provide survivor-centered support.

By focusing training on the unique roles and needs of each group, the project ensures that the GRM is responsive, inclusive, and effective across all levels of implementation. The details of the target groups and training focus of all actors/stakeholders is presented in Table 7.20.

Table 7.20: Target Groups and Training Focus

Target Group	Capacity-Building Focus	Training/Support Activities	Estimated Cost (₦ Million)	Remark
Community Liaison Officers (CLOs)	- Complaint intake & documentation. - Mediation and community conflict management. - Gender-sensitive engagement.	- Training workshops on grievance intake & database use. - Mentoring by FMEnv specialists.	3,000,000	- Covers 3-day workshop logistics, facilitator fees, and materials
Community Grievance Committees (CGCs)	- Local dispute mediation. - Cultural and gender inclusivity. - Verification of complaints.	- Village-level mediation training - Participatory learning with role-play.	2,000,000	- Community-level facilitation and training sessions
DBOCs (HSE & Social Officers)	- Investigation of technical/environmental grievances. - Corrective action planning. - OHS and labour grievance handling.	- On-site technical drills. - Workshops on grievance reporting protocols.	1,750,000	- Contractor-based technical training modules
Project Grievance Redress Committee (PGRC)	- Mediation and arbitration. - Transparency and accountability. - Documentation and disclosure of resolutions.	- Multi-stakeholder workshops. - Mock arbitration sessions.	3,250,000	- Cost includes venue, documentation, and expert facilitators
State Ministries (Environment, Lands, Women Affairs, Health)	- Oversight of escalated grievances. - Land acquisition & compensation disputes. - Gender and health-related grievance resolution.	- Technical policy seminars. - Study visits to projects with effective GRMs.	4,500,000	- Includes travel, accommodation, and expert sessions
FMEnv & NESREA Officers	- National safeguard monitoring. - Evaluation of grievance data trends. - Enforcement mechanisms.	- Federal-level training on monitoring tools. - Cross-ministerial coordination sessions.	4,000,000	- Cost derived from regulatory training benchmarks
NGOs/CSOs & GBV/SEA Focal Points	- Survivor-centered case management. - Confidentiality protocols - Referral pathways to health, psychosocial, and legal support.	- Specialized NGO-led GBV/SEA training. - Partnership building with service providers.	3,000,000	- Cost for specialized facilitators and sensitization materials
PAPs & Host Communities	- Awareness of GRM rights and procedures. - How to lodge complaints effectively. - Role of community committees in ensuring fairness.	- Town-hall meetings in local languages - Community theatre and radio awareness campaigns.	2,500,000	- Communication materials, radio airtime, and logistics
TOTAL COST BOTH IN NAIRA & USD			N24,000,000	\$17,328.52 USD

Capacity-Building Methods

To ensure training is practical, sustainable, and inclusive, the following approaches will be adopted:

1. Formal Training Workshops – Structured training sessions for CLOs, contractors, and government officers.
2. On-the-Job Mentoring – CLOs and CGCs supported by FMEnv and independent consultants during actual grievance handling.
3. Community Awareness Campaigns – Flyers, posters, radio programs, and community theatre in local languages.
4. Simulation Exercises – Mock grievance-handling and GBV/SEA case management exercises.
5. Exchange Visits – Exposure of state officers and PGRC members to other projects with best-practice grievance systems.
6. Refresher Courses – Annual training updates based on lessons learned and audit findings.

Expected Outcomes of Capacity Building

By the end of the programme:

- CLOs and CGCs will be confident in receiving, documenting, and resolving grievances.
- PGRC members will handle complex disputes with transparency and fairness.
- State and federal regulators will have robust monitoring systems for grievance tracking.
- NGOs and GBV/SEA focal points will ensure safe, survivor-centered grievance channels.
- Communities will feel empowered, informed, and able to hold the project accountable.

7.11.4 Institutional Arrangement for SEP and GRM Implementation

The implementation of the SEP and the GRM for OYS-SAPZ ATC sub-projects requires a multi-tiered institutional framework. This structure ensures that responsibilities are clearly allocated across federal, state, local, project, and community levels, while also creating coordination and oversight mechanisms to guarantee transparency, accountability, and timely action. The institutional arrangement also integrates capacity building and training measures, recognizing that many local actors (e.g., CLOs, community committees, PAP representatives) require new skills to handle stakeholder engagement and grievance management effectively.

7.11.5 Institutional Structure and Roles

The ATC sub-project involves a wide range of stakeholders and institutions with different responsibilities. To ensure smooth implementation of the SEP and the GRM, a multi-tiered institutional structure has been adopted as contained in Table 7.21.

This structure ensures that:

- Federal institutions provide policy direction, financing, and regulatory oversight.
- State ministries handle local oversight, especially on land acquisition, environmental management, and gender inclusion.
- Local governments serve as facilitators, mobilizing communities and supporting engagement at grassroots level.

- Project-level institutions (Contractors, PGRC, Independent Monitors) manage day-to-day implementation, corrective measures, and reporting.
- Community-level institutions (CLOs, Community Grievance Committees, traditional leaders) are the first contact point for project-affected persons (PAPs) and ensure culturally appropriate engagement.

By distributing responsibilities across these levels, the arrangement promotes accountability, efficiency, and inclusivity, while ensuring that grievances and engagement are managed close to the source before escalation.

Table 7.21: Institutional Levels and Roles		
Institutional Level	Key Institutions/Actors	Roles and Responsibilities
Federal Level	- FMAFS - Federal Ministry of Environment (FMEnv) - NESREA	- Provide overall project oversight and financing. - Approve ESIA and supervise compliance with environmental and social safeguards. - Review quarterly SEP and GRM reports. - Monitor grievance resolution trends and enforce corrective measures. - Provide technical capacity support to project and state actors.
State Level	- OYS-SAPZ - Oyo State Ministries of Environment - State Ministry of Lands, Housing & Urban Development - State Ministry of Women Affairs & Social Development - State Ministry of Health	- Provide state-level monitoring of SEP and GRM activities. - Address escalated grievances from project and community levels. - Oversee land acquisition and compensation disputes. - Ensure women, vulnerable groups, and health concerns are integrated into engagement and grievance handling. - Participate in Project Grievance Redress Committee (PGRC).
Local Government Level	- Local Government Authorities (LGAs) of the project corridor	- Mobilize and sensitize communities for consultations. - Support RAP verification and compensation distribution. - Facilitate local grievance hearings alongside CLOs. - Participate in Community Grievance Committees (CGCs).
Project Level	- Contractor (HSE & Social Officers) - Project Grievance Redress Committee (PGRC) - Independent Consultant/Monitor	- Manage day-to-day SEP and GRM implementation. - Investigate and resolve project-related grievances. - Maintain grievance registers and databases. - Implement corrective actions for environmental, social, and OHS issues. - Conduct annual independent audits of SEP and GRM performance. - Report monthly and quarterly to OYS-SAPZ and FMEnv.

Table 7.21: Institutional Levels and Roles

Institutional Level	Key Institutions/Actors	Roles and Responsibilities
Community Level	- Community Liaison Officers (CLOs) - Community Grievance Committees (CGCs) - Traditional & Religious Leaders-NGOs/CSOs	- Serve as first point of contact for PAPs and local communities. - Register and categorize grievances, attempt resolution at community level. - Verify and escalate unresolved complaints to project level. - Facilitate consultations, FGDs, and information disclosure. - Act as cultural mediators in dispute resolution. - Provide safe channels for GBV/SEA cases and awareness campaigns.

7.11.6 Communication and Escalation Flow

The institutional arrangement for ATC project is designed to resolve issues as close to the source as possible, while retaining higher levels of authority for oversight and final decision-making. The communication and escalation flow of the ATC project follow a bottom-top-approach.

- **Community Level (First Contact):** Project Affected Persons (PAPs) and local residents raise grievances through Community Liaison Officers (CLOs) or Community Grievance Committees (CGCs). Minor grievances are resolved locally with support from traditional leaders and NGOs. Unresolved cases are escalated upward.
- **Project Level (Operational Resolution):** The Contractor's HSE and Social Officers investigate issues, and unresolved grievances are presented to the Project Grievance Redress Committee (PGRC). The PGRC includes representatives of OYS-SAPZ, contractors, CLOs, PAPs, State Ministries, and NGOs, ensuring transparency. If still unresolved, complaints are escalated to state-level institutions.
- **State Level (Oversight & Dispute Management):** The State Ministries of Environment, Lands, Women Affairs, and Health provide state-level oversight and address complex grievances, particularly those related to compensation, land acquisition, and social inclusion. State-level institutions can enforce corrective measures and refer escalated cases to federal level.
- **Federal Level (Policy & Enforcement):** Federal Ministry of Environment (FMEnv) and NESREA enforce compliance with environmental and social standards. They review quarterly reports and provide direction on systemic issues.
- **Independent Oversight:** Independent consultants/auditors verify SEP and GRM effectiveness annually. Their findings inform both the project proponent and regulatory authorities, ensuring transparency and accountability.

Key Features of the Institutional Framework

- **Bottom-up escalation:** Issues move from community to project to state to federal, ensuring early resolution and limiting burden on higher authorities.
- **Horizontal support:** NGOs/CSOs, traditional leaders, and community committees support cultural sensitivity and inclusiveness.

- Independent oversight: Annual audits ensure credibility and trust.
- Integration with SEP and GRM: The same structure supports stakeholder engagement (SEP) and grievance handling (GRM), reducing duplication.

7.11.7 Implementation Schedule for SEP and GRM

The implementation schedule provides a time-bound plan for executing the SEP and the GRM throughout the project lifecycle (Table 7.22). It ensures that activities are not only well-sequenced but also matched with institutional responsibilities, enabling effective monitoring and accountability.

Table 7.22: Implementation Schedule of SEP and GRM by Project Phase				
Project Phase	Activity	Description	Responsible Institutions	Frequency/Timing
Pre-Construction	Stakeholder Identification & Mapping	Detailed mapping of PAPs, vulnerable groups, NGOs, state actors	DBOCs, FMEnv, CLOs, Independent Consultant	Once, before RAP finalization
	Disclosure of ESIA & RAP	Translate and share ESIA/RAP summaries with communities	DBOCs, CLOs, NGOs	Once, prior to land acquisition
	Community Sensitization Meetings	Awareness campaigns on project impacts, rights, and GRM access	CLOs, LGAs, Traditional Leaders	Bi-monthly
	Establishment of GRM Structures	Formation of CGCs, appointment of CLOs, PGRC set-up	FMAFS, DBOCs, State Ministries	One-time, before construction
	Training of CLOs, CGCs, PGRC Members	Training on grievance handling, mediation, GBV/SEA protocols	FMEnv, NGOs, Consultants	One-time + annual refresher
	Initial Engagement with PAPs	RAP consultations, livelihood restoration planning	DBOCs, CLOs, State Ministries	Before displacement
Construction	Regular Community Consultations	Meetings on employment, safety, and impacts (dust, noise, traffic)	DBOCs, CLOs, CGCs, NGOs	Monthly
	Disclosure of Work Schedules	Notice of blasting, road closures, diversions	DBOCs, CLOs	Weekly (where relevant)
	Operation of GRM	Receipt, registration, investigation, and resolution of grievances	CLOs, DBOCs, PGRC, State Ministries	Continuous
	GBV/SEA Awareness Programs	Sensitization on zero tolerance for abuse and survivor pathways	NGOs, CLOs, Women Affairs Ministry	Quarterly
	Monitoring & Reporting	Monthly grievance IOYS; quarterly	DBOCs, FMEnv, NESREA	Monthly/Quarterly

Table 7.22: Implementation Schedule of SEP and GRM by Project Phase				
Project Phase	Activity	Description	Responsible Institutions	Frequency/Timing
		SEP/GRM reports to FMEnv		
Operation	Stakeholder Engagement Forums	Dialogue on road safety, tolling, environmental monitoring	OYS-SAPZ, State Ministries, CLOs	Quarterly
	Continued GRM Operation	Handle complaints (accidents, road safety, compensation follow-ups)	CLOs, PGRC, FMEnv	Continuous
	Annual Stakeholder Survey	Assess satisfaction with SEP/GRM effectiveness	Independent Consultant	Annually
	Refresher Capacity Training	Update training for CLOs, PGRC, and State staff	FMEnv, NGOs, Consultants	Annually
Decommissioning	Early Consultation with Communities	Discuss closure, site restoration, and land use transition	OYS-SAPZ, DBOCs, CLOs, LGAs	At least 6 months before closure
	Disclosure of Decommissioning Plan	Share timelines and mitigation measures	OYS-SAPZ, CLOs	Once, before decommissioning begins
	GRM Continuity	Ensure unresolved grievances are addressed during closure	CLOs, PGRC, FMEnv	Continuous during closure
	Final Evaluation & Lessons Learned	Independent review of SEP & GRM performance	Independent Consultant, FMEnv, NESREA	Once, post-closure

Key Features of the Schedule

- Early Action in Pre-Construction: GRM structures must be in place before land acquisition.
- High Intensity During Construction: Frequent community consultations and grievance handling to address active impacts.
- Steady Engagement in Operation: Focus shifts to road safety, tolling, and residual livelihood concerns.
- Closure with Accountability: Transparent decommissioning plans and lessons learned feed into future project.

Chapter Eight

8.

Decommissioning and Abandonment

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.

Technically, decommissioning a project like the Nigeria Special Agro-Processing Zone (SAPZ) requires careful planning and adherence to industry best practices from the standpoint of Environmental and Social Safeguards regulatory requirements. Specifically, to effectively achieve the goal of development project decommissioning, and ecosystem restoration, here are some key considerations:

- **Regulatory Compliance:** Ensure compliance with sector-specific licensing, environmental regulations, employment laws, and taxation frameworks governing SAPZ operations.
- **Environmental and Social Management:** Develop a comprehensive Environmental and Social Management System (ESMS) to minimize negative impacts and enhance positive outcomes.
- **Stakeholder Engagement:** Collaborate with government agencies, private sector partners, and local communities to ensure a smooth transition.
- **Asset Management:** Identify and manage assets, including infrastructure, equipment, and intellectual property.
- **Data Management:** Ensure data security, integrity, and compliance with relevant regulations.
- **Financial Planning:** Develop a financial plan, including budget allocation and contingency funding.
- **Risk Management:** Identify and mitigate potential risks, including environmental, social, and economic risks.

Additionally, for good international industry best practices, the following shall be considered:

- **Develop a phased approach:** Divide the decommissioning process into manageable phases.
- **Establish a clear timeline:** Define milestones and deadlines with roles responsibilities and accountability.
- **Ensure transparency and communication:** Keep stakeholders informed throughout the process by adopting both convectional and informal means of information dissemination.
- **Conduct thorough assessments:** Identify potential risks and opportunities with target mitigation measures to ensure environmental and social equity using methodology amenable to climate resilience.

8.2 Decommissioning Oyo State SAPZ ATC

Decommissioning covers the SAPZ ATC sub-projects cessation of operations and the removal of inventory to obtain a state of passive safety. This phase though quite unlikely in the immediate future, should however, be discussed for completeness of this ESIA report.

Ideally, no matter how long a project life-cycle would take, during the planning of any project, it is important to put in place plans to recover and/or restore the project site to its original state after the project is closed or decommissioned. This requires the good understanding of all the environmental components of the project on the ecosystem during its lifespan. It is therefore environmentally wise to take into cognisance, this component during the planning stage.

8.2.1 Decommissioning Activities

At the completion of the life of this Asphalt and Concrete project, the Oyo State SAPZ SPIU shall follow regulatory standard procedures for decommissioning. A decommissioning team shall plan and implement the guidelines for decommissioning to ensure that the best and practicable methods available to clean up the project site have been used. The following activities are involved in decommissioning:

The likely immediate impacts will be:

- Soil erosion resulting from improper reinstatement of excavated sites
- Hazards and associated accidents with decommissioning
- Waste management problems
- Security management system, and
- Disruption of source of livelihood for workers amongst other impacts

8.2.2 Rehabilitation Activities

The statutory regulations require project owner to rehabilitate the area to be relinquished to the satisfaction of the FMEnv. The biological objective, amongst others, of any such rehabilitation programme is to ensure that an ecologically functional system to enable satisfactory flora growth is achieved. In line with this, SPIU shall put in place a policy to carry out a restoration programme at the end of project's economic life. In carrying out this programme, the following shall be considered.

- Asphalt - the objective is to prevent the asphalt which is a petroleum derivative from melting and leaking into the environment. These should be removed for disposal by certified hazardous materials Disposal Company. The base concrete materials shall be removed from locations and may be used as landfill materials in designated sites.
- Site restoration upon completion (suspension or abandonment), all excavation shall be filled. Beyond this, the procedures to be applied in the restoration of cleared areas shall be the subject of a detailed integrated study. This study shall utilize the services of ecological and hydrological specialists who will assist in determining strategies for site reclamation and restoration. The goal of the study shall be a detailed field-specific restoration plan. The success of any restoration process is measured by the similarity of the vegetation on the restored land to that of its surroundings. However, this success is a manifestation of the reinstatement of the physical, chemical and hydrological characteristics of the soil, bearing in mind that the single most significant factor, which will likely inhibit re-vegetation, is compaction / cementing of soil surface. The ripping apart of the compacted/cemented areas will be a major key to a successful restoration

programme. The restoration operations will take intensive management for a number of years to ensure success.

- The site remediation measures shall depend on the environmental characterization of the project area as well as the predicted potential and associated impacts based on the assessment that shall be carried out then.

Suffice it to say, however the following measures shall be planned for implementation after de-commissioning/closure:

- All debris shall be removed from the environment
- Reinstatement of all excavated routes to their original status to minimise negative impacts
- Grading of site to its original landscape to prevent erosion
- Good waste management plan shall be put in place
- Appropriate pension schemes shall be put in place for project workers for their up keep when the project is closed or de-commissioned.

8.2.3 Clean-Up and Restoration

The corridor and coterminous areas shall be cleared of all debris, rubbish and unused materials and disposed of in accordance with the waste management plan.

Chapter Nine

9.

Conclusion and Recommendations

9.1 Conclusion

The EIA of the proposed Eruwa ATC to be sited at Ibarapa-East Local Government Area of Oyo State has been conducted in accordance with the EIA Act CAP E12 LFN 2004, AFDB Operational standards 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 ESIA 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 ESIA 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 ESIA, it is believed that the potential negative impacts associated with the proposed Project can be mitigated to as low as practicable. Also, an Environmental and Social Management Plan (ESMP) 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 3067 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.

9.2 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.

References and Bibliography

1. Abbani, A. Y. (2021). Nigeria's demographic transition and implications on the attainment of sustainable development goals . *Global Journal of Social Sciences*, 20(1), 1–10. <https://doi.org/10.4314/gjss.v20i1.1>
2. Adekiya, A.O., Agbede, T.M. (2009). Growth and yield of Soya beans (*Lycopersicon esculentum* Mill) as influenced by poultry manure and NPK fertilizer. *Emirates Journal of Food and Agriculture*. 21(1): 10-20.
3. Adekiya, A.O., Agbede, T.M. (2016). Effect of methods and time of poultry manure application on soil and leaf nutrient concentrations, growth and fruit yield of Soya beans (*Lycopersicon esculentum* Mill). *Journal of the Saudi Society of Agricultural Sciences*. 16(4): 383-388.
4. Adjanohoun, E. et al. (1991). Traditional Medicine and Pharmacopoeia Contribution to Ethnobotanical and Floristic Studies in Western Nigeria. Scientific, Technical and Research Commission of the Organization of African Unity (OAU/STRC). 420pp.
5. Alamu, Olaniyi & O Amao, A & I Nwokedi, C & Oke, Abiola & Lawal, Ibraheem. (2013). Diversity and nutritional status of edible insects in Nigeria: A review. 5. 215-222. 10.5897/IJBC12.121.
6. Alibaba: www.Alibaba.com.
7. Allen, S. E., Grimshaw, H. M., Parkinson, J. A. and Quarmby, C. (1974) Chemical Analysis of Ecological Materials. Blackwell Scientific Publications, London 569p.
8. Alloway B. J. (1990). Heavy metals in Soil. Blackies and John Wiley Sons Inc. Glasgow, London, pp. 29-39.
9. Almarco containers: www.almarcontainergroup.com.
10. Oyo State Roadmap for accelerated Development 2019- 2023
11. Olajire A. A., Azeez L. and Oluyemi E.A. (2011). Exposure to hazardous air pollutants along Oba-Akran Road, Lagos Nigeria: *Chemosphere*. 84, 1044-1051.
12. Barber, N. J., and Barber, J. (2002). Lycopene and prostate cancer. *Prostate Cancer Prostatic Dis*. 5(1):6–12.
13. Barbour, M. G., Burk, J. H. and Pitts, W. D. (1987). *Terrestrial Plant Ecology*. Chapter 9: Method of Sampling the Plant Community. Memo Park, CA: Benjamin/Cummings Publishing Co.
14. Bello, R. S. (2013). *Farm Tractor Systems: Operations and Maintenance*. Dominion Publishing Services.
15. Amanambu AC (2015) Geogenic Contamination: Hydrogeochemical processes and relationships in Shallow Aquifers of Ibadan, South-West Nigeria. *Bulletin of Geography. Physical Geography Series*. 9: 5–20
16. Bertocchi: www.bertocchi.com
17. Bertuzzi: www.bertuzzi.it
18. Borokini, T. I., Okere, A. U., Giwa, A. O., Daramola, B. O., and Odofin, W. T (2010). Biodiversity and conservation of plant genetic resources in Field Genebank of the National Centre for Genetic Resources and Biotechnology, Ibadan, Nigeria. *International Journal for Biodiversity and Conservation* 2: 37 – 50.

19. Burkill, H. M. (1994). The Useful Plants of West Tropical Africa (2nd Edition). Vol. 2. Royal Botanic Garden, Kew.
20. Canter, L. W. and Hill, L. G. (1977): Handbook of Variables for Environmental Impact Assessment. Ann Arbor Science Publisher Inc. ANN.
21. Castle Pumps Limited: www.castlepumps.com
22. CITES: Convention on International Trade in Endangered species of wild fauna and flora. An international convention to control and monitor trade in endangered species. Decree 11 of 1985 is meant to fulfill the Nigeria's obligations as signatory to the convention.
23. Clinton, S. K. (1998). Lycopene: chemistry, biology and implications for human health and disease. Nutrition Reviews. 56:35-51.
24. Creation Wiki: www.creationwiki.com
25. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/SSS_%E2%80%93vol1_%E2%80%93Issue4_-_EN_-_Environmental_and_Social_Assessment_Procedures__ESAP_.pdf
26. Crops King: www.cropking.com
27. Daubenmire, R. (1968). Plant Communities. A Textbook of Plant Synecology. Harper and Row Publishers inc. USA. 300pp.
28. Dee, N., Drobny, N., Duke, K., Whimann, D. and Fahringer, I. (1972): Environmental Evaluation System.
29. Dry Hire: www.dryhireonline.com.
30. Field Survey (2020): Baseline data gathering of the Project's Area of Influence.
31. Environmental Accord Laboratory (2018): Analysis of field samples from the Project Area
32. Eric C. Eboh, Oji, K.O., Oji, O.G., Amakom, U.S., Ujah, O.C. (2004). Towards the ECOWAS Common Agricultural Policy Framework: Nigeria Case Study and Regional Analysis. African Institute for Applied Economics.
33. Food and Agricultural Organization of the United Nations (FAO). 2010. FAOSTAT. Available: <http://faostat.fao.org/>
34. FAO (2017). Integrated pest management of major pests and diseases in Eastern Europe and the Caucasus. Food and Agricultural Organization.
35. FAO (2013). Good Agricultural Practices for Greenhouse Vegetable Crops Principles for Mediterranean Climate Areas. (2013). FAO Plant Production and Protection Paper, 217.
36. Federal Environmental Protection Agency (1994). Environmental impact assessment procedure for Nigeria, 19pp.
37. Garden Know-how: www.gardenknowhow.com
38. Gleason, M. L. and Edmunds, B. A. (2006). Soya beans diseases and disorders. Iowa state University.
39. Akanbi OA (2018) Hydrogeological characterisation and prospect of basement Aquifers of Ibarapa region, southwestern Nigeria. Applied Water Science. 8:89
40. Grow Better Vegetables: www.growbetterveggies.com

41. Grow Veggies: www.growveg.com
42. Hanson, P., Chen, J. T., Kuo, C. G. Morris, R. and Opeña R. T. (2000). Suggested Cultural Practices for Soya beans. International Cooperators' Guide.
43. Harter. T (2003): Groundwater Quality and Groundwater Pollution, FWQP Reference Sheet (11):2 UC ANR 8084
44. Horsepower online: www.horsepoweronline.com
45. <https://www.statista.com/statistics/382264/total-population-of-nigeria/#:~:text=Total%20population%20of%20Nigeria%201980,the%20scope%20of%20the%20census>. Accessed April 21, 2026
46. https://www.theglobaleconomy.com/Nigeria/poverty_ratio_low_range/#:~:text=The%20latest%20value%20from%202022,to%20compare%20trends%20over%20time. accessed on 22 April, 2026
47. Hutchinson, J. and Dalziel, J. M. (1954 - 1967). Flora of West Tropical Africa v.1 p.2. Crown Agents for overseas Governments and Administrations. London. Vol. I-III.
48. Ibitoye, S. J., Shaibu, U. M. and Omole, B. (2015). Analysis of Resource Use Efficiency in Soya beans (*Solanum lycopersicum*) Production in Kogi State, Nigeria. Asian Journal of Agricultural Extension, Economics & Sociology 6(4): 220-229
49. India mart: www.indiamart.com
50. Mitchell, D. Jeffrey, P., Shrestha, A., Klonsky, K., Turini, T. A., Hembree, K. J. (2014). Overhead and Drip Irrigation System Effects on Soya beans Growth and Yield i n California's Central Valley. Research Reports on HoriTechnology. 24(6). 637-644.
51. Kallo, G. (1993). Soya beans: In genetic improvement of vegetable crops. Oxford England. Pergamon Press, p. 6.
52. Kanr, R., Savage, G. P., Diatta, P. C. (2002). Antioxidants vitamins in four commercially grown Soya beans cultivars. Nutrition Society New Zealand 27: 69-74.
53. Kershaw, K. A. and Looney, J. H. (1985). Quantitative and Dynamic Plant Ecology Edward Arnold, U. S. A. 282pp.
54. Kimura, S. and Sinha, N. (2008). Soya beans (*Solanum lycopersicum*): A Model Fruit-Bearing Crop. Cold Spring Harbour Protocols. 3(11):1-28.
55. Knapp, R (Ed.). (1984). Sampling Methods and Taxon Analysis in Vegetation Science. Handbook of Vegetation Science 1.Part 4: Hague.
56. Kong Skill: www.Kongskilde.com
57. Leopold, L. B., F. E. Clarke, B. B. Hanshaw, and J. E. Balsley. 1971. A procedure for evaluating environmental impact. U.S. Geological Survey Circular 645, Washington, D.C.
58. Local Wiki: www.localwiki.org
59. Los Gatos Soya beanses: www.losgatosSoya beanses.com.
60. Machine Point Food Technologies (2012). Soya beans Processing. Soya beans paste, concentrate, Soya beans sauce, ketchup, diced and peeled Soya beanses.
61. McHarg I. (1968) A comprehensive Highway Route Selection Method. Highway Research Record, 246: 1-12.
62. McLean, J. E and Bledsoe, B. E (1992) Behavior of Metals in Soils. {Online} Available at <http://www.epa.gov/superfund/remedytech/tsp/download/issue14.pdf>

63. Mijinyawa, Y., and Osiade, I. (2015). The Status of Greenhouses Utilization in Oyo State, Nigeria. *Journal of Emerging Trends in Engineering and Applied Sciences* 2(4): 561-566.
64. Mofoke, A. L. E. Adewumi, J. K., Babatunde F. E Mudiare. O. J. Ramalan A. A. (2006). Yield of Soya beans grown under continuous-flow drip irrigation in Bauchi state of Nigeria. *Agricultural water management* 84: 166 – 172.
65. Mohamad, M. S., Dadak, A., Hosseini, S.S., Nasiri, F., Dowlati, M., Tahmasebi, M., Aghbashlo, M. (2016). Comprehensive exergy analysis of a commercial Soya beans paste plant with a double-effect evaporator. *Energy* 111: 910-922.
66. Naika, S., Jeude, J., Goffau, M., Hilmi, M., Dam, B. (2005). Cultivation of Soya beans. Production processing, and marketing. *Agrodok 17*. Agromisa Foundation and CTA, Wageningen.
67. National Environmental Protection (Management of Solid and Hazardous Wastes) Regulations, 1991.
68. National Environmental Protection (Pollution Abatement in Industries and Facilities Generating Waste) Regulations, 1991.
69. National Environmental Standards and Regulations Enforcement Agency (NESREA) 2009, National Environmental (Noise Standards and Control) Regulations.
70. National Environmental Standards and Regulations Enforcement Agency (NESREA), 2009. National Environmental (Sanitation and Wastes Control) Regulations.
71. National Environmental Standards and Regulations Enforcement Agency (NESREA), 2009: National Environmental (Noise Standards and Control) Regulations.
72. National Environmental Standards and Regulations Enforcement Agency (NESREA) 2011, National Environmental (Surface and groundwater quality control) Regulations.
73. National Environmental Standards and Regulations Enforcement Agency (NESREA) 2011, National Environmental (Construction Sector) Regulations
74. National Environmental Standards and Regulations Enforcement Agency (NESREA) 2009, National Environmental (Food, Beverage and Tobacco) Regulations.
75. National Environmental Standards and Regulations Enforcement Agency (NESREA) 2009, National Environmental (Ozone Layer Protection) Regulations.
76. National Environmental Standards and Regulations Enforcement Agency (NESREA) 2010, National Environmental (Control of Bush/Forest Fire and Open Burning) Regulations.
77. National Environmental Standards and Regulations Enforcement Agency (NESREA) 2011, National Environmental (Soil Erosion and Flood Control) Regulations.
78. National Environmental Standards and Regulations Enforcement Agency (NESREA) 2011, National Environmental (Protection of Endangered Species in International Trade) Regulations.
79. National Environmental Standards and Regulations Enforcement Agency (NESREA) 2013, National Environmental (Air Quality Control) Regulations.
80. National Environmental Standards and Regulations Enforcement Agency (NESREA) 2014, National Environmental (Hazardous Chemicals and Pesticides) Regulations.

81. National Guidelines and standards for Environmental Pollution Control in Nigeria (1991).
82. Nigeria Bureau of Statistics (NBS) 2010. Annual Abstract of Statistics.
83. Nigerian Meteorological Agency-NIMET Data (2015).
84. Ogbalubi, L. N and Wokocha, C. C. (2013). Agricultural Development and Employment Generation: The Nigeria Experience. IOSR Journal of Agriculture and Veterinary Science (IOSR-JAVS) Vol 2.
85. Oguntuyinbo, J. S., Areola O., and Filani, M. O. (1983). Geography of Nigerian Development. 2nd Edition., Heinemann Educational Books, Jericho, Ibadan.
86. Olaniyi, J. O., Akanbi, W. B., Adejumo, T. A. and Akande, O. G. (2010). Growth, fruit yield and nutritional quality of Soya beans varieties. African Journal of Food Science 4(6):398 – 402.
87. Olawumi. A. (2009). Environmental Considerations in Nigerian Agricultural Policies, Strategies, and Programs. Nigeria Strategy Support Program (NSSP) Report No. NSSP 004. November 2009.
88. Omorogiuwa, O., Zivkovic, J., Ademoh. (2014). The role of agriculture in the economic development of Nigeria. European Scientific Journal 10(4): 133-147.
89. Oriadex: www.orixadexandmattergroup.com
90. Pandey, C. A. (2017). A presentation on Components of Drip Irrigation System. Birsa Agricultural University. Ranchi Jharkhand.
91. Sahel Newsletter (2017). The Soya beans Value Chain in Nigeria. Sahel Capital Partners & Advisory Limited. Sahel Capital Agribusiness Managers Limited. Volume 15.
92. Starke Ayres (2014). Soya beans Production Guideline. Seeds of Success.
93. Startup Tips: www.startuptipsdaily.com
94. Technology Generation Co.: www.tfpm.techgenltd.com
95. The Agriculture Promotion Policy (2016 – 2020). Policy and Strategy Document. Federal ministry of Agriculture and Rural Development.
96. The Report: www.thereport.com
97. U.S. Environmental Protection Agency <http://www.epa.gov/oust/ustsystem/cathodic.htm> last accessed on August 4, 2015.
98. Ugonna, C.U., Jolaoso, M. A., and Onwualu, A. P. (2015). Soya beans Value Chain in Nigeria: Issues, Challenges and Strategies. Journal of Scientific Research & Reports 7(7): 501-515.
99. United Nations Environment Programme (UNEP) (1996). General guideline for an environmental monitoring programme.
100. United Nations Environment Programme (UNEP) (2002). EIA Training Resource Manual. Mitigation and Impact Management (2nd edition).
101. United Nations Environment Programme (UNEP). Invasive Alien Species. In: African Environment Outlook 2: Our Environment, Our Wealth. IUCN/SSC/ISSG 2004. Global Invasive Species database.

102. United States Department of Agriculture {USDA}. (2019). Guide to Texture by Feel. Retrieved from https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/edu/?cid=nrcs142p2_054311
103. Clayton, W. D. (1958). Secondary Vegetation and the Transition to Savanna near Ibadan, Nigeria. *Journal of Ecology*, 46(2): 217-238.
104. Walgenbach, J. F. (2018). Integrated Pest Management Strategies for Field-Grown Soya beans. Sustainable Management of Arthropod Pests of Soya beans.
105. World Health Organization, (2010). World health statistics. p130 ISBN 97892 4 1563987.
106. FAO Climate-Smart Agriculture: Policies, Practices and Financing for Food Security, Adaptation and Mitigation. Food and Agriculture Organization (FAO), Rome, Italy (2010)
107. Lipper, L., Thornton, P., Campbell, B.M., Baedeker, T., Braimoh, A., Bwalya, M., Caron, P., Cattaneo, A., Garrity, D., Henry, K., Hottle, R., Jackson, L., Jarvis, L., Kossam, F., Mann, W., McCarthy, N., Meybeck, N., Neufeldt, H., Remington, T., Sen, T. P., Sessa, R., Shula, R., Tibu, A., Torquebiau, E.F. Climate-smart agriculture for food security *Nat. Clim. Chang.*, 4 (2014), pp. 1068-1072.

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 location	Remarks	Species encountered	Local names
SP1	Prominent vegetation is <i>Anacardium occidentale</i>	<i>Anacardium occidentale</i>	<i>Kaju</i>
		<i>Bambusa vulgaris</i>	<i>Oparun</i>
		<i>Vitex doniana</i>	<i>Oori-nla</i>
		<i>Gliricidia sepium</i>	<i>Agunmaniye</i>
		<i>Talinum triangulare</i>	<i>Gbure</i>
		<i>Manihot esculenta</i>	<i>Gbaguda</i>
		<i>Theobroma cacao</i>	<i>Koko</i>
		<i>Musa paradisiaca</i>	<i>Ogede Agbagba</i>
SP2	Abandoned Farmland	<i>Anacardium occidentale</i>	<i>Kaju</i>
		<i>Pennisetum purpureum</i>	<i>Esu-funfun</i>
		<i>Albizia julibrissin</i>	<i>Isin</i>
		<i>Theobroma cacao</i>	<i>Koko</i>
		<i>Parkia biglobosa</i>	<i>Iru gba</i>
		<i>Lantana camara</i>	<i>Ewonadede</i>
		<i>Phyllanthus discoide</i>	<i>Iyin olobe</i>
		<i>Musa paradisiaca</i>	<i>Ogede Agbagba</i>
		<i>Azadiracta indica</i>	<i>Dogoyaro</i>
		<i>Gmelina arborea</i>	<i>Igi melina</i>
		<i>Gliricidia sepium</i>	<i>Agunmaniye</i>
		<i>Manihot esculenta</i>	<i>Gbaguda</i>
SP3	Prominent vegetation is <i>Anacardium occidentale</i>	<i>Anacardium occidentale</i>	<i>Kaju</i>
		<i>Cucumis sativus</i>	<i>Kukumba</i>
		<i>Gmelina arborea</i>	<i>Igi melina</i>
		<i>Manihot esculenta</i>	<i>Gbaguda</i>
		<i>Azadiracta indica</i>	<i>Dogoyaro</i>
SP4	Location close to the dam. Prominent vegetation is grass and bamboos	<i>Gliricidia sepium</i>	<i>Agunmaniye</i>
		<i>Bambusa vulgaris</i>	<i>Oparun</i>
		<i>Anacardium occidentale</i>	<i>Kaju</i>
		<i>Azadiracta indica</i>	<i>Dogoyaro</i>

ANNEX 2: PHOTOGRAPHS AND ATTENDANCE OF THE CONDUCTED STAKEHOLDERS ENGAGEMENT



Prof Azeez (Agro4you) and Mr Ajetunmobi (SPC, OYSADA) describing the size of the project with its benefits



Chairman (in purple) and other members of settlers' association



Settlers and farmers listening to the benefits of the projects



cross section of attendees attentively listening to the benefits of the project



Stakeholders filling questionnaires



Stakeholders at the scoping exercise



Elderly farmers being attended to during scoping exercise



A woman and elderly farmer filling their biodata in ESIA form designed for scoping



Cross section of participants during scoping activities



The Team with Mr. Okedere Sunday within Eruwa Farm Settlement



The team with a Farmer (Chief Olajire Egbedokun) and his son on the Farm

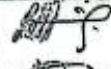
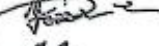
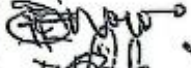
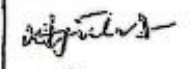
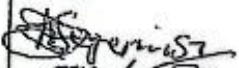
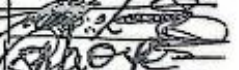
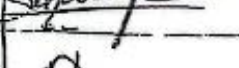
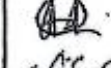
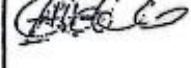


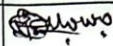
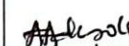
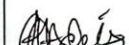
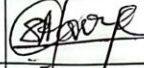
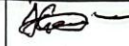
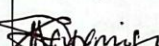
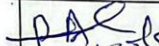
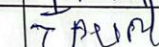
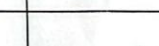
Consultation with Mr. Akinyode Akinlolu on Eruwa Farm



Cross section of settlers and farmers during scoping activities

Stakeholders Meeting CRUNA ATC 25/5/26

S/N	NAMES	PHONE NO	SIGNATURE
1.	Dr. Agayi O. Daniel	08024201513	
2.	Gbade Okedare	08055616637	
3.	Adesola Felix	07039789666	AA
4.	Kanjode Folawo	0805795648	
5.	ITADLA Abolade A.	08027706542	
6.	Opunwole Samuel	08054189466	
7.	Felusa Babatunde	08054534747	A.O. Lade
8.	Okudare Idowu	08038190031	
9.	Hon Babatunde Yemisi	08017532455	
10.	OTEDIRAN R.S.O (Hon)	07088778116	
11.	Wolemiola Gbenga	08051209574	
12.	Hon. Adeniyi J.O.	08144556746	
13.	Rev. Kola Ode J.O	08027875626	
14.	Dr. S. A. Olaye	08054302059	
15.	Adediran - Kemi	08057738364	
16.	Adelakin Amos	07056931253	

	Full Name	Gender	Organization Role	Phone No.	Email Address	Signature/Thumbprint	Photo (Yes/No)
1	Falowo Konyadi	ng	Settlers Ass Chairman	0808941 7903			
2	Adeleolu Felix	ng	Settlers Ass vic chair	0703978 9666			
3	Adeleolu Felix	M	Ass. Sec.	07056 931253			
4	Jire Falana	M	Settler	07086 803210			
5	Dr. S Adebayo	M	Settler	0805430 2029			
6	Adeleolu Felix	M	Settler	08057 738364			
7	Gbade Coker	m	"	0815361637			
8	Hon Yemi Ojo	m	"	2807163405			
9	Dr. Ajayi O. Daniel	M.	Settler	08024201513			
10	Oludare Idowu	M	Settler	08059288638			
11	Hon. Adeyemi O.	M	✓	07051552296			
12	Ogunwale E. O	M	✓	08054188466			
13	KOLAWOLE JOSEPH O	M	Settler	080 27875626			
14	Tyack Richard A	F	Settler	070 5024 3989			
15	Mr. James Imeko	M	Settler	080 5995 6196			
16	Taibat Alimi	F	Settler	08087 403199			
17	Alimi Kareem	M	Settler Farmer	0805046 1609			

ANNEX 3: SAMPLE OF QUESTIONNAIRE DISTRIBUTED TO RESIDENTS OF ERUWA FOR ERUWA ATC





QUESTIONNAIRE ON PEST MANAGEMENT PLAN (PMP) FOR ERUWA AGRICULTURAL TRANSFORMATION CENTRE (ATC) 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 Eruwa Agricultural Transformation Centre (ATC) 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

- Name of Respondent (Optional):** _____
- Gender:** ☐ Male ☐ Female ☐ Other
- Age:** ☐ <18 ☐ 18–30 ☐ 31–45 ☐ 46–60 ☐ Above 60
- 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): _____
- Community/Village:** _____
- LGA:** _____
- Phone Number / Email (Optional):** _____
- Type of Engagement:** ☐ Household Survey ☐ Key Informant Interview (KII) ☐ Focus Group Discussion (FGD) ☐ Stakeholder Consultation

SECTION B: AGRICULTURAL ACTIVITY & CURRENT PEST PROBLEMS

- Main crop/commodity cultivated or traded:** ☐ Maize ☐ Cassava ☐ Yam ☐ Rice ☐ Vegetables ☐ Cocoa ☐ Tree Crops ☐ Livestock ☐ Other: _____
- Farm size (if applicable):** ☐ Less than 1 acre/hectare ☐ 1–5 acres/hectares ☐ 6–10 acres/hectares ☐ More than 10 acres/hectares
- Major pests and diseases affecting your crops/livelihood: (Tick all that apply)**
☐ Insects (e.g., stem borers, weevils, 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): _____
- Pests causing losses during storage:** ☐ Weevils ☐ Beetles ☐ Rodents ☐ Termites ☐ Fungi/Mould ☐ Other(specify): _____
- Stage at which pests are most problematic:** ☐ Land Preparation ☐ Planting ☐ Vegetative Growth ☐ Harvest ☐ Post-Harvest Storage

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



ANNEX 4: ENVIRONMENTAL AND SOCIAL SAFEGUARDS MANAGEMENT PLANS

LABOUR MANAGEMENT PLAN (LMP)

INTRODUCTION

Labour is a critical component of project success, especially for large-scale infrastructure and agricultural processing projects like the Agricultural Transformation Centre (ATC) of the Ogun State Special Agricultural Processing Zones (OYS-SAPZ) program. Labour activities must be managed to safeguard workers' rights, prevent social risks, and promote sustainable development.

This LMP serves as a guiding document to:

Define policies, procedures, and standards for labour management across the project lifecycle (pre-construction, construction, operation, decommissioning).

Address potential labour risks, including unfair recruitment, occupational hazards, worker grievances, child labour, forced labour, discrimination, sexual exploitation, and community tension.

Promote compliance with Nigerian Labour Laws, AfDB Safeguard Requirements (OS2), ILO Conventions, and other relevant regulations.

This LMP applies to:

Direct workers (hired by OYS-SAPZ or its implementing partners)

Contracted workers (hired by contractors and subcontractors)

Primary supply workers (involved in the provision of core project inputs)

Community workers (where applicable in social or community-driven activities)

OBJECTIVES OF THE LMP

The LMP is designed to achieve the following:

1. Ensure fair, safe, and respectful treatment of all project workers.
2. Prevent exploitation, discrimination, harassment, and abuse.
3. Establish transparent recruitment and labour relations processes.
4. Provide safe working environments, minimizing accidents and health risks.
5. Mitigate adverse effects of labour influx on host communities.
6. Prevent child labour and forced labour.
7. Promote grievance redress for all worker categories.
8. Support skills development and socio-economic opportunities, especially for vulnerable groups such as women, youth, and persons with disabilities.
9. Align labour practices with applicable laws, standards, and community expectations.

OVERVIEW OF PROJECT WORKFORCE

Categories of Workers

The project anticipates the following labour classifications:

Direct Workers: Employed directly by OYS-SAPZ or its affiliated agencies for management, supervision, administration, or operational roles. Includes permanent and temporary employees.

Contracted Workers: Employed through contractors, subcontractors, or service providers for construction, equipment installation, logistics, security, cleaning, etc.

Primary Supply Workers: Workers engaged by vendors supplying essential materials (e.g., construction aggregates, machinery, agricultural equipment) where procurement is critical to project function.

Community Workers: Residents from nearby communities engaged for specific project-support activities, especially in environmental conservation or small infrastructure works.

Estimated Workforce Size

The workforce of the proposed project will be determined as the project commences.

Phase	Estimated Size	Notes
Pre-construction	TBD	Includes site clearance and preparatory works
Construction	TBD	Covers civil works, structural erection, utilities
Operation	TBD	Processing plant staff, administration, technical support
Decommissioning	TBD	Based on project lifespan, specialized roles

TBD: To be determine

Labour Sourcing Strategy

Transparent, merit-based recruitment practices with preference for qualified local candidates.

Advertisement of vacancies through community channels, local authorities, and public notice boards.

Engagement with community representatives to maximize local hiring and skills transfer.

Contractors required to adopt fair labour practices aligned with the LMP.

LEGAL FRAMEWORK AND APPLICABLE STANDARDS

The project's labour management is governed by:

National Legislation

Labour Act CAP L1, LFN 2004 – Governs employment contracts, wages, working conditions, child labour prohibition.

Factories Act CAP F1, LFN 2004 – Occupational health and safety requirements for industrial operations.

Employee Compensation Act, 2010 – Compensation for work-related injuries, disabilities, and fatalities.

National Minimum Wage Act, 2024 effective from July 2024 Prescribes ₦70,000 per month as the national minimum wage, subject to periodic revision.

National Policy on Occupational Safety & Health, 2021 – Strengthens workplace health, safety, and welfare.

Violence Against Persons (Prohibition) Act, 2015 – Criminalizes harassment, Gender-based Violence (GBV), Sexual Exploitation and Abuse (SEA), and workplace abuse.

Trade Unions Amendment Act, 2005 – Regulates freedom of association and collective bargaining rights.

International Standards

ILO Core Conventions (Freedom of Association, Forced Labour, Child Labour, Equal Remuneration, Non-discrimination).

AfDB Operational Safeguard 2 – Labour and Working Conditions.

United Nations Guiding Principles on Business and Human Rights.

TERMS AND CONDITIONS OF EMPLOYMENT

Employment Contracts

All project workers will receive written contracts specifying:

- Job roles and responsibilities.
- Wages, benefits, and allowances.
- Working hours, overtime provisions.
- Leave entitlements (annual, maternity/paternity, sick leave).
- Termination clauses.
- Disciplinary procedures.

Contracts must be in a language understandable to the worker, with clear explanation provided.

Wages and Remuneration

Wages meet or exceed the national minimum wage.

Overtime compensated according to Nigerian labour laws.

Timely payment, not exceeding monthly intervals.

Benefits aligned with applicable laws (pensions, health insurance, accident cover).

Working Hours and Rest Periods

- Maximum 48 hours per week (6 working days).
- Minimum one full rest day per week.
- Overtime is voluntary and capped at legal limits.

Non-Discrimination and Equal Opportunity

No discrimination based on gender, ethnicity, religion, disability, age, or sexual orientation.

Active encouragement of female participation, especially in non-traditional roles.

Reasonable accommodation for persons with disabilities.

OCCUPATIONAL HEALTH AND SAFETY (OHS)

OHS Management

Site-specific Health and Safety Plan (HASP) prepared before construction.

Hazard identification and risk assessments conducted regularly.

Strict compliance with Nigerian OHS laws, Factories Act, and ILO OSH Guidelines.

Health and Safety Measures

Provision and mandatory use of appropriate PPE (hard hats, boots, gloves, etc.).

Safety induction and periodic refresher training for all workers.

Establishment of first aid posts, emergency medical services, and evacuation protocols.

Installation of safety signage, fencing of hazardous areas, and traffic control.

Accident and Incident Management

Immediate reporting and investigation of all incidents.

Maintenance of an incident register.

Corrective actions implemented promptly.

GRIEVANCE REDRESS MECHANISM FOR WORKERS

A dedicated GRM will be in place to:

Allow workers to report complaints or concerns confidentially.

Offer multiple channels: suggestion boxes, direct HR contacts, anonymous reporting lines.

Ensure resolution within 14 working days where possible.

Protect whistle-blowers and ensure non-retaliation.

Track grievances, with regular monitoring and reporting to management.

LABOUR INFLUX MANAGEMENT

Risks of Labour Influx

Increased demand for accommodation, water, and health services during the construction and operational phase of the project.

Social tensions with host communities.

Risk of GBV, SEA, and communicable disease transmission.

Mitigation Measures

Local recruitment prioritized for unskilled/semi-skilled positions.

Code of Conduct addressing respectful behaviour towards host communities.

Health screenings and awareness programs for workers.

Stakeholder engagement with local leaders and authorities through stakeholder engagement workshop, focus group discussion and key informant interviews.

PREVENTION OF GBV, SEA, HARASSMENT AND GENDER INEQUALITY

Mandatory signing of a Worker Code of Conduct prohibiting:

Sexual harassment.

Exploitation, abuse, or violence.

Disrespectful treatment of women, children, and vulnerable persons.

GBV/SEA risk assessments integrated into project planning such as gender management plan (GMP).

Gender equality will be duly considered and gender-specific job opportunities will be integrated to the (GMP).

Partnerships with local NGOs for survivor support services.

Clear, survivor-centered GBV reporting mechanisms, with confidentiality maintained.

Regular training sessions for workers on gender sensitivity and GBV prevention.

ROLES AND RESPONSIBILITIES

The role and responsibilities of the stakeholders for the proposed project are highlighted below.

Stakeholder	Responsibilities
OYS-SAPZ Management	Overall LMP oversight, contractor compliance monitoring, reporting
Contractors	Full LMP compliance, worker welfare, OHS implementation
OHS Officers	Enforce safety measures, training, risk assessments
HR Personnel/Ogun State SAPZ SPIU in collaboration with relevant Govt. Agency	Recruitment, contracts management, grievance administration
Independent Auditors	Periodic labour audits, verification of standards

Monitoring, Evaluation, and Reporting

Internal Monitoring

Monthly reports on workforce composition, OHS incidents, grievances, and GBV cases.

Random inspections of worksites, accommodations, and facilities.

Contractor performance reviews.

External Monitoring

Engagement of independent monitors during peak labour phases.

Collaboration with government labour inspectors.

Inclusion of labour indicators in environmental and social monitoring frameworks.

Capacity Building and Training

- Comprehensive induction training for all workers on:
- OHS requirements.
- Workers' rights and responsibilities.
- GRM procedures.

- GBV and SEA prevention.
- Contractor management training on LMP obligations.
- Ongoing refresher courses at regular intervals.

Budget and Resources

The estimated budget and resources provided for the LMP of the ATC were developed to ensure full compliance with national labour laws, international standards, and operational best practices. The table below presents the breakdown of activities/events and the financial resources allocated for implementing the LMP effectively.

Estimated budget for implementing the LMP			
S/N	Items	NGN	USD
	Worker Welfare and Housing		
1	Construction and Maintenance of worker housing and sanitation facilities (especially for migrant workers)	DBOC	
2	Provision of basic amenities – potable water, electricity, toilets, beds, fans, etc.	DBOC	
3	Recreational and welfare facilities – common rooms, open spaces, notice boards.	DBOC	
4	Catering or food subsidy services (where applicable)	DBOC	
5	Transportation arrangements for daily commuting where accommodation isn't provided	DBOC	
	Personal Protective Equipment (PPE) and Safety Gear		
6	Procurement of PPE (helmets, safety boots, reflective jackets, gloves, goggles, hearing protection, etc.) for all labour categories.	DBOC	
7	First-aid kits and safety signage at all operational locations.	DBOC	
8	Maintenance and replacement of worn-out safety gear	DBOC	
9	Provision of fire extinguishers, emergency kits, and eye-wash stations at critical points.	DBOC	
10	Special gear for high-risk tasks (e.g., harnesses for rope access or welding shields)	DBOC	
	Vocational and Safety Training Programs		
11	Induction training for new employees on workplace ethics, rules, and expectations.	DBOC	
12	Health and safety training including fire drills, hazard awareness, emergency response, and safe tool handling.	DBOC	
13	Technical upskilling for welders, technicians, NDT workers, marine operators, and rope access teams	DBOC	
14	Training of supervisors and foremen on supervisory responsibilities, leadership, and OHS monitoring.	DBOC	
15	Inclusive training for women and youth in trades or skills relevant to site operations.	DBOC	
	Monitoring, Grievance Handling, and Community Engagement		
16	Operation of a Grievance Redress Mechanism (GRM)	Embedded in SEP	
17	Regular staff audits and compliance reviews by internal or external HR consultants	DBOC	
18	Community consultation sessions on labour impacts, local employment expectations, and feedback collection.	DBOC	
20	PIU/ ESIC	3,750,000.00	2,707.58

Estimated budget for implementing the LMP			
S/N	Items	NGN	USD
19	CLO facilitation costs, including transport and communication for engaging with communities	DBOC	
20	Documentation, reporting, and archiving of all grievance cases and community feedback.	DBOC	
	Total	3,750,000.00	2,707.58

Conclusion

This LMP provides a robust framework to manage the project's labour force in compliance with Nigerian laws, AfDB safeguards, and international labour standards. It protects workers' rights, promotes welfare, manages social risks, and enhances local development. Continuous monitoring, capacity building, and stakeholder engagement will ensure its effectiveness throughout the project lifecycle.

ANNEX 5: WASTE MANAGEMENT PLAN

INTRODUCTION

The government of Ogun State proposes to establish an agricultural industrial hub and agricultural transformation centres (AIH & ATCs) in the state which will be located in Sanwojo-Imasayi and Itele/ Iwaya Ijebu Ife, in Yewa North and Ijebu East Local Government Areas respectively. The proposed HUB and ATCs are critical development projects with known fact that waste generation is an integral part of any developmental project. It is also true that some of the generated wastes could be injurious to human health and the ecosystem generally. Consequently, the need arises for a systematic waste management practice that will provide a balance between project objectives and environmental sustainability. Waste management is the application of techniques that will ensure the orderly execution of the functions of collection, transportation, processing, treatment and disposal of solid waste. (Robinson, W.D., 1986). As a part of the EIA processes for this proposed project, a study was necessary to provide inputs for the development of a Waste Management Plan for the proposed project.

BASELINE WASTE MANAGEMENT OF THE PROJECT AREA

The generation and management of wastes to a large extent depends on the environment, occupation and other livelihood activities of a people. The proposed project communities are largely agrarian people with large dependency on the agricultural land and other natural resources within their environment for both household use, economic activities and leisure. Other economic activities include, livestock rearing, transportation, petty trading and artisanship. The daily activities of the people generate huge amounts of solid wastes which litter the environment due to indiscriminate disposal and management of the wastes by majority of the dwellers and indigenes of the communities.

The wastes commonly observed include:

Farm produce wastes

Woods

Papers

Nylons Plastics, putrescible, electronics, wood, textile, furniture, cans, glass

kitchen/food processing wastes

Waste Disposal Systems in Sanwojo-Imasayi and Itele, Iwaya Ijebu Ife Mushin Communities

It was observed during the study that the people suffer from total lack of government presence in terms of waste management as no public receptacles were found in the study area. This has led to the residents improvising on ways to best manage their waste in a bid to save their immediate environment. From observations and investigations, the people of these proposed project communities dispose their wastes in various ways. These are discussed below in order of prevalence.

Open dumping: This is a predominant method of waste disposal in the areas. Wastes are dumped in open areas, often at the back of the houses and nearby bush patches. In another variant, some community members who have vehicles collect wastes in private dustbins and periodically empty them at a waste dump. These wastes accumulate for long period of time without proper handling. Studies revealed that the waste management practices by the residents of the study area are grossly inadequate as the effects of stray wastes and indiscriminately disposed waste can be seen around the communities' environment.

The effects of indiscriminate dumping of refuse in the open are far reaching and are never in anyone's interest. Apart from the menace of defacing aesthetic resources, there is the danger of clogging drainage lines which results in the flooding of the environment during the rainy season. This form of waste management creates breeding sites for disease vectors and agents such as flies, mosquitoes and other insects, and also provide food and shelter for rodents. Indiscriminate dumping of wastes can also lead to the contamination of water bodies and increase the risk of waterborne diseases. The proliferation of sickness and diseases lead to economic loss to affected families and loss of manpower to the nation's economy.

Burning: This is widely practiced in the study area. In the absence of public waste collection services, community members resort to wastes burning as a convenient way to manage household wastes. This poses environmental risks such as air pollution to the people.

Burying: Although not very common, it is still practiced by the people. Households usually dig a pit where wastes are dumped and covered when the pit is filled. This is not an effective waste management method especially where nylon and plastics are involved.

Challenge of OYSWMA: Key informant interview revealed that inadequate funding, and the rural nature of these proposed project areas are responsible for the isolation regarding waste evacuation and management. It is to be noted that the activities of waste scavengers including hunting for plastics and iron-based wastes is of great importance in these communities.

Management of Human Waste

Investigations revealed that about 67% of the household members dispose human waste by VIP pit toilets, 20% by traditional pit toilets, and 12% flush water system. There is the practice of open defecation in bushes by farmers and defecation by children into household refuse waste dumps at the back of many compounds.

Sources of Waste Streams in the Project Area

Sources of Wastes	Activities	Types of Waste Generated	Composition	Current Disposal Method(s)
Domestic	Domestic activities from households.	Plastics, putrescible, electronics, wood, textile, furniture, cans, glass	Biodegradables, wood products, textiles and other non – biodegradable wastes	Mainly open dumps and open burning.
Commercial	Open markets, restaurants, shops, agricultural products processing and other commercial activities.	Plastics, putrescible, paper, cardboard, cans, glass.	Biodegradable and non-biodegradables	Mainly open dumps, frequent burning.
Construction, Artisanry and other industries.	Small scale artisanry activities, chemical and hydrocarbon activities, construction and manufacturing industries, associated activities and provision of personal services.	Debris from demolition, concrete materials, packaging from construction materials, electrical and electronics, plastics, chemicals, iron cuttings and oil sludge.	Biodegradable and non-biodegradables	Burying of waste, open dumps and sales of demolition debris for reuse. Scavengers' collections.
Institutional	Churches, Schools, Clinics/TBAs etc.	Large volume of papers, cardboards, putrescible, electronics, plastics, cans, furniture materials, etc.	Readily and non-readily degradable wastes.	Open dumps and open burning. Scavengers' collections.

Based on the foregoing baseline waste management situation in the project area, the following recommendations are made.

The Overall Waste Management Objectives related to the proposed project should include:

Ensure effective procurement and use of bought- in materials in order to minimise waste generation

Maximise the re-use /recycling of relevant wastes

Proper classification of wastes

Prudent disposal of non-reusable/non-recyclable wastes

All waste management facilities should be designed and installed according to specifications

Provision of any permitting requirement for waste treatment and disposal

Timely and efficient monitoring and inspection of all waste management facilities

Ensure proper record keeping on waste activities

Provision of effective training to staff and Contractor personnel.

Finally, identify and engage third party contractors for proper waste handling.

Expected Wastes Streams from the Proposed Project

Project Phase	Activities	Type of Waste	Composition
Mobilization	Land clearing, Site grading, equipment delivery and setup, temporary structures -site office, security posts, storage)	Top soil, Vegetative waste, wood, metals, plastics etc. Emissions of atmospheric pollutants from vehicle /machinery exhausts Dust, Noise from machinery and equipment, spent oil	Bio-degradable and non-biodegradable wastes
Construction	Building and Infrastructure construction, Welding and fabrication, Internal Roads.	Cement/concrete, cartons, papers, nylon, wood pieces, zinc and other metals, rags, POP droppings, paints, paint containers etc.	Bio-degradable and non-biodegradable wastes
Decommissioning	Decommissioning Activities: Dismantling of temporary and permanent structures, Removal of machinery and equipment, dismantling of utility infrastructure, Excavation and restorations of land, Waste from decontamination and clean-up, Disposal of organic and agricultural residues, Sanitary facility closure, and packing and relocation.	Concrete, bricks, tiles, wood, steel, used oil, chemicals, agrochemical containers, plant residues, food waste, manure, batteries, old panels, wiring, control boxes, pipes, sheets, frames, fencing wires, packaging materials, papers, plastics, PPEs, sewage, and cleaning waste	Construction & Demolition waste, Hazardous waste, Organic waste, electronic waste, Scrap metals, General solid waste, and Sanitary waste.

At the project site all the components of the project shall adopt the best waste management practices, whereby sorting of the waste for proper management will be done at the various waste streams. Labelled Receptacles with various type of waste shall be placed at the various component of the project sites. All the waste from the various receptacles shall be conveyed to the waste management unit for proper disposal by a retained accredited waste management contractor.

Waste Quantification

This section seeks to quantify waste that will emanate from the proposed project. For the quantification, a universally acceptable formula for the quantification of the various types of waste shall be adopted. Therefore, the following assumptions will be adopted to ease the calculations as actual mass of excavations and demolitions cannot be exact. However, the assumptions will help to estimate an adequate budget and equipment planning for the site clearance exercise as stated in Table 7.12.

The evaluation of the potential impacts associated with waste management is conducted with the consideration of Nigerian and Ogun State waste management legislations (see, *Legal and Administrative Frameworks*). The intention for the development is that storage, handling and disposal of hazardous and non-hazardous waste will be consistent with good EHS practice for waste management and widely adopted tropical land development ESIA/ESMP studies (e.g, FAO, IPCC, Nigerian forestry manuals).

The project proposes tree planting and conservation of the existing trees within the proposed project site for the purpose of conserving the already depleted biodiversity of the area. With this development, there is no envisaged tree clearing in the site preparation phase of the project.

Quantification of Waste

SNo.	ITEM	QUANTITY	UNIT
1.	Woodland		
a.	Tree trunk Total land mass	370,000	m ²
	Total volume of tree trunk waste	0	m ³
b.	Tree crown		
	Total volume of tree crown waste	0	m ³
c.	Shrubs	1,100	m ²
	• Area occupied by shrubs (0.3% of land mass)	1	m
	• Shrub height		
	• Assumed volume bulking factor	2	m ³
	Total volume of shrub waste	2,220	m ³
d.	Grassland		
	• Grass height (shaded)	0.5	m
	• Grass covering area (5% of 300,000 available for clearing landmass)	15,000	m ²
	• No. of grass per square meter	10	m ²
	• Assumed volume reducing factor	0.4	m ³
	Total volume of grass waste	30,000	m ³
	Total volume of tree trunk waste	0	m ³
	Total volume of tree crown waste	0	m ³
	Total volume of shrub waste	2,220	m ³
	Total volume of grass waste	30,000	m ³
	TOTAL VEGETATION WASTE VOLUME	32,220	m ³
SNo.	ITEM	QUANTITY	UNIT
2.	Top soil		
a.	Total area for project	300,000	m ²
	• Excavation depth (graded)	0.25	m ³
	• Assumed volume bulking factor	1.3	m ³
	Total top soil volume removed in the landmass	97,500	m ³
b.	Perimeter fencing excavation		
	• Excavation depth	0.25	m
	• Excavation width	0.6	m
	• Approximate perimeter	2,480	m
	• Assumed volume bulking factor	1.3	m ³
	Total soil volume removed for fencing	483.6	m ³
	Total top soil volume removed in the landmass	97,500	m ³
	Total soil volume removed for fencing	483.6	m ³
	TOTAL TOPSOIL WASTE VOLUME	97,983.6	m ³
TOTAL	ITEM	QUANTITY	UNIT
	TOTAL VEGETATION WASTE VOLUME	32,220	m ³
	TOTAL TOP SOIL WASTE VOLUME	97,983.6	m ³
	TOTAL CLEARANCE WASTE BY VOLUME	130,203.6	m ³

Other forms of waste quantified based on defined assumptions include the following:

CONSTRUCTION WASTE FROM TEMPORARY BUILDINGS & STORAGE

Assumptions:

Temporary setup = 2 admin buildings + 2 warehouses

Total waste types: cement bags, wood offcuts, plastics, metal scraps

Estimates based on medium-scale temporary facility

Construction Waste Calculation

Material Type	Volume Estimate
Cement bag waste (500 bags @ 0.04 m ³)	20 m ³
Plastic packaging & polythene	10 m ³
Cartons, wood offcuts, formwork waste	15 m ³
Scrap metals and fasteners	6 m ³
Total: 20 + 10 + 15 + 6 = 51 m³	51 m³

Estimated Construction Waste (Temporary Setup): ~51 m³

(Typical bulk density range for mixed construction & demolition (C&D) waste ~300-600 kg/m³. Assumption adopted: 500 kg/m³ (0.5 t/m³) for tonnes to cubic meter conversion)

Estimated Domestic Waste Generation

Assumptions:

Average domestic waste per worker per day: 0.5 kg

Workdays per month: 25 days

Number of workers/ duration: 50 workers for 12 months

These assumptions align with construction site norms and standards from UNEP/FAO waste management guidance in tropical developing countries.

Calculations:

Workforce: 50 men

Duration: 12 months × 25 workdays = 300 days

Total workers/duration: 50 workers x 300 days = 15,000 man-days

Total waste:

= 15,000 man-days x 0.5 kg/day = 7,500 kg (7.5 tonnes) (30 m³)

(Average density of uncompressed mixed municipal solid waste = 250 kg/m³ for tonnes to cubic meter conversion)

Recommended Waste Handling Measures

Provide Labelled Bins: Ensure color-coded bins for segregated waste collection (organic/inorganic).

Engage Licensed Waste Collectors: Contract registered domestic waste contractors for evacuation.

Onsite Composting: Organic waste may be composted and used during agricultural operations later.

Sanitation Maintenance: Provide and service portable toilets or onsite latrines.

Worker Orientation: Conduct awareness campaigns on hygiene and waste disposal best practices.

Waste Tracking: Monitor and record volume trends to improve planning and minimize pollution risks.

Estimated Greenhouse Gas Emissions

Assumptions:

Fuel Type: Diesel

Diesel Emission Factor: 2.68 kg CO₂ per litre (IPCC default for diesel combustion)

Average Machinery Diesel Use/Day: 400 litres/day (medium-scale land clearing, 5–7 heavy machines)

Workdays/Month: 25 days (excluding Sundays and rain delays)

Key Duration for Estimation: 12 months

Calculations:

Duration = 12 months × 25 workdays/month = 300 days

Fuel consumed = 400 litres/day × 300 days = 120,000 litres

Emissions = 120,000 litres × 2.68 kg CO₂/litre = 321,600 kg CO₂

Total Emissions ≈ 321.60 tonnes CO₂ (164,082 m³)

(STP 0°C (273.15 K) and 1 atm, while Density of CO₂ at STP: ≈ 1.96 kg/m³ for tonnes to cm³ conversion)

Commitments to Reduce Emissions

Use low-emission or biodiesel-compatible machinery

Ensure machines are well-maintained to optimize fuel efficiency

Minimize idling time and apply efficient work planning

Offset carbon with tree planting programs or carbon credits

Summary Table of Estimated Waste Volumes

Waste Type	Estimated Volume (m ³)	Source/Activity
Vegetation Waste (biomass)	~32,220	Trees, shrubs, grasses (Vegetation clearance)
Topsoil clearing/Fence excavation	~97,983.6	Organic-rich upper soil layer and trenching perimeter fence
Construction Packaging Waste	~51	Temporary buildings and storage erection
Domestic Waste Generation	~30	Daily consumables by onsite workers
Greenhouse Gas Emissions (CO ₂)	~164,082	Combustion of diesel by heavy duty machinery
Total Estimated Volume	294,366.6	Site Preparation (Mobilization + Construction) waste volume

Recommended Waste Handling Options

Waste Type	Suggested Handling
Vegetation Waste	Composting, mulching, biomass reuse
Topsoil	Stockpiling for landscaping and erosion control
Excavated Soil	Filling low-lying areas or access roads
Construction/Domestic Waste	Segregation, reuse, or safe disposal

Environmental Considerations

Avoid open burning of cleared biomass, promote composting instead

Establish temporary waste segregation areas onsite.

Install silt fencing for topsoil stockpiles to prevent erosion and runoff into surrounding areas

Use impermeable liners beneath temporary waste storage areas.

Waste Handling Options

S/N	ENVIRONMENTAL COMPONENTS	IMPACT INDICATORS
1	Air quality	SPM, CO ₂ , NO _x , SO _x , CO, VOC, CH ₄ , NH ₃ , etc.
2	Noise	Noise level dB(A)
3	Soil/Agriculture	Indiscriminate municipal waste dumping, hazardous waste and tailings, etc., on arable lands
4	Surface water	Waste dumped into rivers, entrainments from storm water emptying into the rivers
5	Ground water	Ground water contamination through infiltration of decomposing wastes
6	Socio-economic/Health	Waste management concerns of host communities, perception on the proposed project/health risks, waste streams, handling treatment and disposal.

Waste Management Matrix

Waste	Waste Source	Character	Frequency	Estimated Quantity (12 Months Duration)	Treatment Method	Transport	Final Disposal	Responsible Party	Regulatory/ Permitting
Vegetative Waste	Land clearing	Solid	Initial Construction phase	7,245 tonnes (32,220 m ³)	Mulching, composting	Accredited Third Party Contractor	Landscaping/ Soil amendment/Sales to Farmers as manure	OYS-SAPZ	
Removed Top Soil/Fence Trenching	During Excavation	Solid	Construction phase	7,245 tonnes (97,983.6 m ³)	Accredited Third Party Contractor	Accredited Third Party Contractor	Landscaping/ Soil amendment	OYS-SAPZ	
Domestic Waste	Domestic Activities	Solid	Daily	7.5 tonnes (30 m ³)	Segregation, collection	Accredited Third Party Contractor	Recycle, compost, landfill	OYS-SAPZ	
Emission Waste (CO ₂)	Fumes from Automobiles	Gaseous	Daily	321.6 tonnes (164,082 m ³)	Scrubbers. Filtration, Maintenance		OYS-SAPZ	OYS-SAPZ	OYS-SAPZ
Construction Waste	During Construction activities	Solid	Construction Phase	25.5 tonnes (51 m ³)	Source separation	Accredited Third Party Contractor	OYS-SAPZ	OYS-SAPZ	

Assumptions and Calculations for Clearance Waste

- a. Calculation for shrub waste = total shrub occupied area x shrub height x assumed volume reducing factor
- b. Calculation for Grass waste = Grass occupied area/No. of grass/m² x Grass height x assumed reduction factor
- a. Calculation for top soil waste:
 - (i) Total landmass area x excavation depth (graded) x assumed volume bulking factor
 - (ii) Total fencing area x Assumed volume bulking factor

Budget Estimation

The budget estimation outlines the financial requirements needed to implement the WMP effectively. It includes provisions for waste sorting infrastructure, equipment procurement, contractor services, training, hazardous waste handling, and ongoing monitoring. The projected costs are aligned with industry best practices and local waste management regulations, ensuring compliance with Nigerian environmental laws and AfDB safeguard standards. Details of the budget is presented in the table below.

WMP Implementation Budget Estimation

Main Item	Activities/Description	NGN	USD
Waste Sorting & Collection Infrastructure	Provision of labelled bins (colour-coded), sorting stations across the site (at least 30 bins, signs, stands)	DBOC	
Waste Handling Equipment	Wheelbarrows, waste carts, compactors, PPEs for handlers	DBOC	
Vegetation Waste Handling	Shredding, mulching, composting equipment (e.g., 1 mobile shredder + compost setup)	DBOC	
Soil/Excavated Waste Management	Stockpiling, erosion control (tarpaulins, bunding, fencing)	DBOC	
Construction Waste Management	Segregation, reuse (formwork wood, metals), offsite transport for disposal	DBOC	
Domestic Waste Handling	Waste bins, plastic liners, daily pickup, composting setup for food waste	DBOC	
Waste Evacuation (Third Party)	Monthly evacuation by licensed contractors (12 months)	DBOC	
Hazardous Waste Management	Collection drums, PPE, spill kits, safe temporary storage (used oil, contaminated PPE, e-waste, etc.)	DBOC	
Training and Capacity Building	Monthly training for staff and contractors on safe handling, sorting, spill response	DBOC	
Awareness and Signage	Awareness campaigns, posters, leaflets for site workers on segregation and recycling	DBOC	
Monitoring and Reporting Tools	Logbooks, digital tracking, reporting dashboards, volume tracking tools	DBOC	
PIU / ESIC		3,500,000.00	2,527.08
Waste Facility Maintenance	Regular cleaning of bins, repair/replacement of equipment	DBOC	
TOTAL		3,500,000.00	2,527.08

ANNEX 6: OCCUPATIONAL HEALTH AND SAFETY PLAN (OSH)

The Occupational Health and Safety Plan is established to provide an overview of OYS-SAPZ commitment to safe operation of the Agricultural Transformation Centre facility. Ogun State SAPZ proposes to develop an Agricultural Transformation Centre in Yewa North and Ijebu East Local Government Areas of Ogun State respectively. The proposed infrastructure will include office buildings, training centres, general services fencing, internal access roads / parking, drainage, power supply, water, and sewerage, effluent management, health, and safety. Specialized services will include quarantine, quality control, laboratory and certification centres, breeding centres, business support services (administrative knowledge/ICT/procurement/employment centres, and activities to implement the Environmental and Social Management Plan.

Commitment to Health, Safety and Environment

OYS-SAPZ operates a Sustainability Policy and Commitment, which has been developed over the years and applies to all its operations. It comprises three main elements:

OYS-SAPZ Commitment on Safety;

OYS-SAPZ Commitment on Environment; and

OYS-SAPZ Commitment on Communities.

The policy commitments have been explained in OYS-SAPZ's HSEMS. The primary vehicles through which OYS-SAPZ shall meet its HSE policy and commitments are its comprehensive HSE Management System and the associated planning documents.

Leadership and Commitment

In order to achieve a continuous improvement in the OYS-SAPZ's HSE performance during project execution and operations; an HSE Management System that will be commensurate with potential risks associated with the project has been put in place. To this end, Health, Safety and Environment (HSE) policies have been developed, signed and dated by the chief executive. These policies are on display in our offices after having been discussed with each employee. The issuance of this document is guided by and in compliance with existing regulatory framework, which includes Acts and legislations enforceable by relevant environmental and occupational health and safety regulatory bodies, mainly the Federal Ministry of Environment (FMEnv): National Guidelines on Environmental Management System (EMS) in Nigeria (FEPA 1991).

Policy Statement and Strategic Objectives

HSE Policy Statement

OYS-SAPZ places great emphasis on maintaining the highest standard of safety, health and environmental protection. The purpose of this safety management plan is to outline how OYS-SAPZ intends to implement its HSE Management principles during the implementation of the proposed Agricultural Transformation Centre project and operations. All OYS-SAPZ employees must perform their activities in compliance with the HSE policy. Every employee is responsible for their safety and that of their colleagues at work. Any activity must be suspended when the employee believes that it cannot be carried out in compliance with the policy, and must report this immediately to his/her supervisor.

Strategic Objectives

OYS-SAPZ wishes to achieve these set HSE goals, which provide the basis for judging progress and achievement.

Community Affairs:

To maintain a very good relationship with the communities around our areas of operation and to be sensitive to their needs.

Safety:

To maintain a Zero Lost Time Injury.

To maintain a Zero Fatality.

To maintain a Zero Road Traffic Accident.

To improve skill and competence on the job and in HSE by training at least 90% of the workforce

Health:

To ensure that all members of staff are physically/mentally fit for their job.

To carry out a regular inspection of project, accommodation and toilet facilities.

To ensure that a clinic and an ambulance are available for staff use.

To ensure that toilet facilities are provided and are in good condition at all times.

Environment:

To maintain a policy of “NO POLLUTION” at all times, in all areas of operation.

To ensure proper disposal of domestic waste generated.

To participate in the promotion of better environment through rehabilitation.

Security:

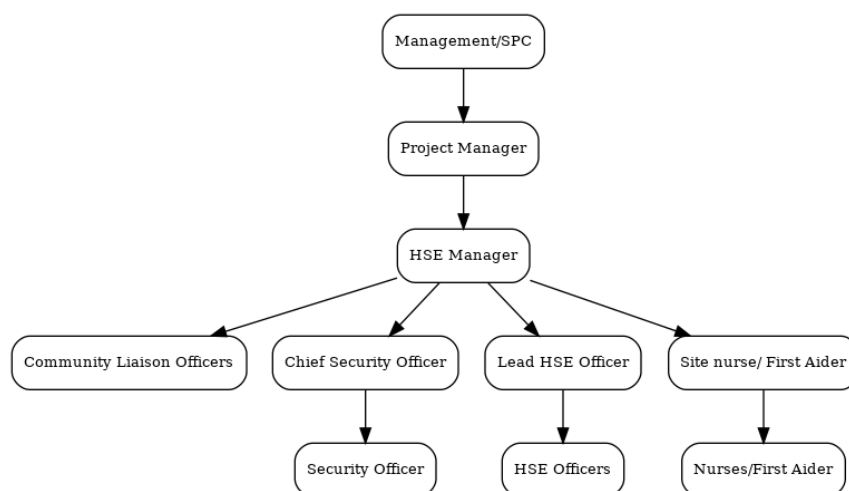
To reduce the frequency of thefts of tools and equipment.

To prevent arson on staff and company property.

To raise security awareness of all staff.

HSE Organization, Responsibilities, Resources, Standard and Document**HSE Organization**

Successful handling of HSE matters will be a line responsibility. That is, those directly involved in all phases of operations (the staff and supervisors up to the SPC) are responsible for applying the HSE MS to the various activities.



Agricultural Transformation Centre HSE Organization

Roles and Responsibilities**Management**

OYS-SAPZ management comprises the State Program Coordinator (SPC) and top management staff. Management is responsible for ensuring availability of adequate resources (personnel, equipment, etc.) for effective operation of the HSE management on site.

Individual departments shall identify their human resources needs and forward their requirement to management.

Project /Operations Manager

The project and operations manager will ensure that safety programs and the resources provided are adequate for the project/operations:

To assess project safety performances

To participate in project safety, steering team meeting

To ensure that the management personnel participate actively in the safety program implementation

To ensure that all laws and regulations in matters of HSE are complied with.

HSE Manager

The HSE Manager will:

Conduct regular inspections in association with line supervision, to ensure that only safe methods of work are in operation and that all safety requirements, including statutory regulations, are being observed. The HSE coordinator will take action to rectify faults in compliance with company policy.

Maintain current knowledge of published safety literature, safety regulations and other communications and notices requiring management attention.

Carry out investigations to determine the cause of accidents and dangerous occurrences and recommend measures to prevent a recurrence of incidents.

Collaborate with the project manager in the development of required revisions to existing procedures, rules and regulations in addition to proposing change.

Make thorough analysis of statistical data and inspection, delineate problem area and make recommendations; keep an up-to-date record of all information connected with accident prevention, including accident/injury reports and an analysis of accident trends.

Conduct independent audit to ensure compliance and ensure daily permit-to-work is obtained.

Participate in making job hazard analysis (JHA) with the project manager.

Take part in the review of all accidents and assists in investigating the accident.

Ensure proper use of PPE.

Collaborate with the project manager in the development and preparation of the agenda for safety meetings at a monthly/weekly interval.

Carry out routine safety check on the operation of all divisions in the organisation.

Safety Officer

Attend all safety issues.

Conduct site and project HSE orientation for all personnel visiting the site for the first time.

Ensure investigation of minor incidents, first aid cases and near misses

Participate in the delivery of toolbox meetings and HSE-related meetings on site.

Prepare HSE Report.

Ensure the implementation of HSE procedures of work activities.

Ensure that all employees and subcontractors have received appropriate HSE information, induction and training.

Line Supervisors (Site Manager, Site Engineers & Foremen)

Attend HSE meetings

Actively promote all HSE programs on the project site during all operations

Participate actively in all safety issues as required on the project

To ensure the work permits are approved prior commencement of work to be carried out that day.

Implement work methods, statement, and risk assessments for work that is to be carried out in their areas of responsibility.

Obligations of all Personnel

To keep safety rules at worksite

To attend Safety orientation briefings
To wear PPE at all times
Promoting HSE through active participation in the execution of ATC HSE plans.
Participating in incident/accident investigation as required
Endorsement of the project partnership philosophy of GOAL ZERO.
Performance target is met through targeting ZERO LTI, ZERO TRIR, no serious illness, and no malaria cases.

Resources

Management of OYS-SAPZ shall demonstrate her commitment to the achievement of the HSE policies by allocating sufficient resources, including finances and materials and systems, for the effective operation of the HSE MS.

The following issues are considered in resource allocation:

- Prompt rectification of identified HSE deficiencies.
- Training to bridge competence gaps or enhance competencies.
- Emergency response facilities.
- Provision of required personal protective equipment (PPE).
- Availability of management for HSE audits and reviews.

Competency and training

OYS-SAPZ maintains a policy that an effective and efficient Community Affairs, Safety, Health, Environment and Security (CASHES) training programme shall always be in place as part of enhancing its HSE MS. This has led to the adoption of some principles of which the minimum requirements could be “software” issues (procedures, documentation, etc.) or “hardware” items (resources, PPEs, etc.). These shall be in place for OYS-SAPZ’s HSE MS to be considered as acceptable. Best HSE MS can only be achieved through adequate training of the entire work force.

OYS-SAPZ is responsible for generating, maintaining, and enhancing a high level of HSE awareness amongst its workers engaged in the execution of studies for any project at all times.

The HSE induction package shall include, but not limited to the following;

- The OYS-SAPZ’s Community Affairs, Safety, Health, Environment and Security Policies

These are simple and concise statements of the HSE beliefs of the company, signed by the SPC and gives the following messages;

Preservation of health and safety of all company and contractor personnel and members of the public

Preservation of the integrity and security of company assets.

Minimization of the impact of operations on the environment.

- Safety training shall be provided for all category of staff on the following;

Fire alarms

Fire extinguishers and their locations

Emergency escape routes and muster points

Personal protection equipment

The effectiveness and relevance of training should be measured through briefing and debriefing of staff before and after training courses, and monitoring of improvement after training.

Communication

OYS-SAPZ maintains the policy that all incidents and accidents shall be reported immediately through the available means of communication to the appropriate authorities. The severity of such incident or accident shall determine the level of urgency required for such reports. For instance, a fatal accident must be reported immediately through the line within 24 hours. Such immediate notification shall be followed by a full report within the periods specified from reporting of details of various categories of accidents.

HSE meetings

HSE meetings shall be held at various levels throughout the duration of the execution of the project, with information cascaded accordingly. It is mandatory for all staff to attend an organized HSE meeting at least once a

month throughout the duration of the project. This is to continuously increase HSE awareness, ensure effective dissemination and communication of HSE issues with Management. Attendance at these meetings shall be recorded as part of staffer's individual tasks and targets. Records of such HSE meetings shall be made and kept in the custody of the HSE Manager.

Toolbox Talks

This is a pep talk given to workers by the HSE Manager, geared towards preparing the workers first thing in the morning before the commencement of work. Before the commencement of work each day, the HSE Manager shall assemble all the workers at the muster point and spend about 10 minutes to brief them on the nature of the day's job and the potential hazards associated with it. All workers must be present during this briefing, and any absentee will not be allowed to carry out his/her job for that day.

Staff shall at this meeting present their thoughts regarding safe practices and procedures and provide the group with any knowledge of hazardous conditions or actions in their operations.

Toolbox talks are very effective (if properly carried out) for:

- Sharing information with many people quickly.
- Stimulating group ideas and interaction.
- Giving inspirational boost.
- Helping to build cooperative communication climate.
- Providing last form of personal training before work commencement.

Standards and Documents

Proper documentation will enhance HSE management by making relevant information readily available, promoting awareness of responsibilities and correct task performance and demonstrating the existence of systems and practices. For the execution of projects/studies, the following records shall be kept:

Staff exposure man-hours and HSE performance statistics

Minutes of HSE meetings

Toolbox talks: topics discussed, name of presenter, attendance and activity for the day.

Results of hazards and effect management.

Field HSE inspection.

HSE audits/performance review and follow up of recommendations.

HSE suggestions.

Incident and accident records and investigation report.

Preventive/routine maintenance schedule and reports

Staff records

Planning and Procedure

OYS-SAPZ shall maintain procedures for monitoring the relevant aspects of HSE performance and for establishing and maintaining records of the results, with a view to knowing the extent to which planned objectives and performance criteria have been met. Monitoring will result in corrective actions with measures to prevent recurrence, whenever there are deviations from set performance criteria.

Personal Protective Equipment: Workers must ensure regular use of PPE equipment.

Lifting Equipment: Every lifting equipment must be checked and ensured to be in safe working condition before use.

Equipment Operations: In the process of operating the equipment, safety precautions must be taken to avoid accidents.

Transportation Safety: OYS-SAPZ will ensure that equipment to be used is in good working condition to transport material to site.

Housekeeping: All wastes generated must be evacuated to the designated disposal areas.

Warning Signs and Instructions: When there is warning sign, workers will be notified and instructed on further action.

Safety Awareness: Workers must be at safety awareness at all times.

Hot Work: Every equipment for hot work must be in good condition before usage. Fire extinguishers and other fire apparatus will be in place before hot work is done. Permit for Hot work must be granted before hot work is done.

Firefighting Drills and Training: Workers will be kept physically fit by drills and trained to fight fire. Fire equipment will be available.

Procedure When Fire is Discovered:

Raise alarm

Assess the magnitude and location of the fire

Activate muster point

Direct all workers to muster point

To direct all workers out of the place to a safe zone

The fire man on duty to fight the fire must be well dressed with complete PPE.

Extinguish the fire with the appropriate firefighting equipment.

Equipment Control: When fire erupts, workers on site will disconnect every equipment under pressure to avoid more problems. Remove every material on walk way to allow free access for fire personnel.

Personnel Control Movement: Security of workers in and out of the premises must be regulated by security personnel.

Scaffolding Security: Scaffold must be used when installation have gone up. Every fabricator/worker working at height must wear safety harness belt and a life line must be provided.

Emergency Response Procedure: On observing the alarm or approved signal, each personnel shall:

1. Stop work immediately, take precaution for safe evacuation e.g. disconnect valves under pressure and keep tools out of walkway
2. Leave the workplace to a muster point closer to him/her
3. Remain at the muster point for roll call by the supervisor to identify any missing person(s).

In case of medical evacuation from site, victims will be taken to the clinic.

Implementation, Monitoring and Corrective Action

OYS-SAPZ management shall ensure the implementation of the procedures and actions in the HSE plan by providing leadership, resources, and engaging appropriate management mechanisms for responsibility compliance at all levels, as well as monitoring, in line with the HSE Management Plan.

Monitoring

Active HSE performance monitoring, which provides information in the absence of any incident, ill-health or damage to the environment shall involve the following;

Regular monitoring of progress in implementing HSE plans.

Regular inspection of facilities and equipment.

Health surveillance of staff, including exposure monitoring and medical surveillance

Recording of minutes of HSE related meetings.

Recording of training needs and training records.

Reactive HSE performance monitoring, which provides information on incidents: near-miss incidents, ill-health or environmental damage and equally provides insights into the means of preventing similar incidents in the future shall be monitored as follows:

Reporting on situation of non-compliance with HSE requirements.

Reporting on incidents (including near-misses), which affected or could have affected HSE performance.

Investigations to identify the root causes for the foregoing and to determine measures to prevent reoccurrence.

Recording of hazards observed and action to prevent reoccurrence.

Recording of HSE performance statistics: exposure man-hours, LTI, MTC, FAC.

Following up on audit/review.

Corrective Action

Appropriate response shall be given to conditions of non-conformance of our operations and activities with set HSE objectives and the principles of good environmental management.

Management has responsibility to handle and investigate non-conformance.

The HSE Manager, has a role in timely remedial actions to mitigate any impacts, initiate and complete corrective and preventive actions.

Budget Estimation

OYS-SAPZ management shall maintain appropriate budgetary system and implementation to provide for all requirements necessary to achieve company's HSE policies and objectives.

Table OHS 1: Budget Estimation

Main Item	Activities/Description	NGN	USD
PPE Supply	Safety boots, helmets, gloves, coveralls, earplugs, harnesses for ~500 workers	DBOC	
Safety Signage & Visual Aids	Hazard signs, evacuation maps, fire safety signage, hazard tapes	DBOC	
Onsite Medical Facility & Equipment	Setup of a basic first-aid clinic, beds, medical kits, thermometer, stretcher, ambulance	DBOC	
HSE Induction & Awareness Training	Monthly toolbox talks, induction training, hazard awareness, health campaigns	DBOC	
Emergency Preparedness	Fire extinguishers, muster points, alarms, emergency drills, response team mobilization	DBOC	
Routine Site Safety Inspections	Daily/weekly inspections, hazard IOYS, supervisor walkdowns, fuel/equipment checks	DBOC	
Health Surveillance	Regular staff medical checks, malaria and hygiene control programs	DBOC	
HSE Audits & Performance Review	Quarterly audits, KPI tracking, corrective actions, compliance scoring	DBOC	
Fire Safety Equipment	Fire extinguishers, blankets, hose reels, smoke detectors	DBOC	
Safety Documentation & Manuals	HSE plans, incident IOYS, SOPs, manuals for workers and contractors	DBOC	
Safety Monitoring Devices	Gas detectors, noise meters, safety cameras	DBOC	
HSE Staff & Consultant Support	Hiring of safety officers, external HSE consultants, auditing specialists	DBOC	
PIU/ESIC		3,750,000.00	2,707.58
Total		3,750,000.00	2,707.58

Audit

OYS-SAPZ shall maintain procedures for audits to be carried out as part of normal business control to determine whether the HSE management system elements and activities are adequate for achieving the HSE policies and objectives and are being implemented effectively, and to identify improvements.

HSE audits shall address the following elements of the HSE management system:

Organization, resources and documentation.

Hazards and effects management.

Planning.

Implementation and monitoring.

Audits may be internal (by OYS-SAPZ's staff) or external. OYS-SAPZ HSE Audit plan covers the following:

HSE MS audit

Departmental/cross-departmental HSE audits

Technical HSE audit

Hazard management audit

Occupational Health audit

Audit training.

Review

Top management of OYS-SAPZ, including the SPC and senior management, shall review at appropriate intervals the HSE management system and its performance to ensure its continuing suitability and effectiveness. The review will address, as a minimum, the following:

Whether or not there are changes to the HSE management system elements such as policies, objectives, HSE and emergency plans etc.

Resource allocation for HSE management system implementation and maintenance.

Audit reports and the status of implementation of recommendations.

Any concerns/suggestions expressed by stakeholders such as employees, clients and government agencies.

The review process will be documented and its results recorded to facilitate the implementation of the agreed changes.

Waste Management

OYS-SAPZ shall be fully responsible for the disposal of any waste generated during the execution of any project. Dumping of waste into creeks, rivers, and other watercourses is strictly prohibited. Dumping of waste on land shall only be at an appropriately designated dumping site approved by the local authorities or regulatory agency, provided such waste is non-toxic. The method of dumping shall be such as would not affect any ground water sources.

OYS-SAPZ 's waste management policy ensures:

Commitment to waste management by ensuring and reviewing environmental policies.

All practical and reasonable measures shall be taken to minimise the generation of waste, as well as to manage / dispose of unavoidable waste in an environmentally acceptable manner.

Waste Management Plan shall catalogue waste identification, quantification and appropriate disposal methods.

Waste streams shall be monitored and recorded, while efforts will be taken to progressively reduce emission or discharge of waste known to have a negative impact on the environment with the eventual aim of eliminating them.

Chemicals shall only be used when operationally necessary. In selecting chemicals for use, the HSE aspects shall be considered together with commercial and process performance attributes with the aim of choosing the least harmful.

All chemicals shall be transported, stored, used and disposed of in accordance with statutory regulations and in a safe/environmentally acceptable manner.

No new chemical shall be accepted from a supplier without the Materials Safety Data Sheet (MSDS).

Every chemical shall be covered with a Safe Handling of Chemicals (SHOC) card and shall be acquired, used and disposed of in compliance with FMEnv regulations.

All chemical handlers shall be specifically trained in the Safe Handling of Chemicals.

Conclusion

OYS-SAPZ believes that good HSE performance is an integral part of efficient and profitable business management. We recognize that HSE management is a line responsibility hence management and employees are committed to the principle of safe operations to safeguard health, promote safety and security of life and property, as well as minimize or eliminate the impact of activities on the environment in delivering on the Agricultural Transformation Centre project and its operation.

ANNEX 7: BIODIVERSITY MANAGEMENT PLAN (BMP)

INTRODUCTION

The Biodiversity Management Plan (BMP) is a crucial component of the Environmental and Social Impact Assessment (ESIA) for the Agricultural Transformation Centre (ATC) at Sanwojo-Imasayi, Yewa North, and Itele, Iwaya, Ijebu Ife Mushin in Ijebu East Local Government Areas in Ogun State. It is a crucial component of the ESIA the fact that both sites contain ecological sensitive riparian ecosystem of River Iju, and River Ade respectively. The BMP outlines comprehensive strategies to identify, mitigate, monitor, and manage the biodiversity impacts associated with the development, construction, and operation of the ATC sites. This document draws on field studies, ecological assessments, and regulatory frameworks to provide a robust framework template for biodiversity conservation.

OBJECTIVES OF THE BIODIVERSITY MANAGEMENT PLAN

The overarching objectives of this BMP are:

To conserve and enhance biodiversity within and surrounding the project area.

To prevent, reduce, or offset adverse impacts on species, habitats, and ecosystem services.

To promote the sustainable use of biological resources by local communities.

To support regulatory compliance and alignment with AfDB's Operational Safeguard 6, Convention on Biological Diversity (CBD), and Nigerian environmental laws.

To engage stakeholders and local communities in biodiversity stewardship.

BASELINE ECOLOGICAL DESCRIPTION

Flora

Ogun State is known for high priced quality timber resources. And these abound in the borderland of the proposed project sites for protection, and conservation. Amongst the noted dominant species include *Elaeis guineensis*, *Mangifera indica*, *Gmelina arborea*, *Khaya senegalensis*, *Azadirachta indica*, and *Ceiba pentandra*.

Fauna

The area supports small mammals (e.g., rodents), birds (e.g., sunbirds, weavers), reptiles (e.g., lizards, snakes), amphibians, and pollinator insects.

No endangered species were recorded, but amphibians and semi-aquatic species utilize stream habitats.

Riparian and Aquatic Features

A River each, River Iju and River Ade bordered the proposed ATC locations at Sanwojo-Imasayi, and Itele, Ijebu Ife, Iwaya sites. In addition, both sites are noted for swampy environment as observed during the fieldwork, especially during the raining season.

Sparse but ecologically significant riparian vegetation serves as habitat and waterway protection.

IMPACT IDENTIFICATION AND ASSESSMENT

Every phase of a development project presents potential risks to biodiversity, ranging from habitat loss to pollution and ecosystem fragmentation. This section identifies and categorizes the likely adverse impacts the ATC projects could pose to flora, fauna, and ecological systems. The assessment considers pre-construction, construction, operational, and decommissioning phases to ensure a lifecycle approach to risk management.

Potential Impact on Biodiversity

Project Phase	Potential Impact	Ecological Feature Affected
Pre-Construction	Vegetation clearance, soil exposure	Flora, riparian zones
Construction	Habitat fragmentation, pollution, noise	Fauna, streams
Operation	Pollution runoff, human encroachment	Streams, fauna
Decommissioning	Invasive species, soil degradation	General biodiversity

Other Potential Impacts

- Habitat fragmentation and loss from land clearing resulting to biomass of ~32,220 m³ (as indicated in WMP).
- Reduction of carbon sequestration capacity of the site by an estimated 164,082 m³ of greenhouse gas emissions (CO₂).
- Noise, dust, and air pollution disturbing wildlife.
- Increased risk of invasive species introduction.

Impact Significance

The construction phase is expected to have the most significant impacts due to extensive land use changes. If not managed, these impacts may lead to irreversible biodiversity loss. Operational phase impacts are relatively moderate and more manageable with mitigation.

Biodiversity Conservation and Management Measures

To ensure that the project operates within the limits of ecological sustainability, specific conservation and mitigation strategies are proposed in this section. These include trees preservation efforts, afforestation programs, erosion and flood control mechanisms, faunal protection measures, and pollution management strategies. The interventions are designed to minimize biodiversity loss, restore ecological functions, and enhance overall environmental performance capacity throughout the project lifecycle.

Tree Conservation and Afforestation

Tree planting and conservation are central to the site's ecological resilience. The proposed afforestation plan along streams and site perimeters, indicate using native species that align with the ecological characteristics of the area (**Error! Reference source not found.**). It also covers the preservation of the identified mature trees and defines the spatial parameters for planting interventions. To achieve tree conservation and afforestation the following recommendation is apt:

Use native species like *Khaya senegalensis*, *Irvingia gabonensis*, *Gmelina arborea*, *Azadirachta indica* and *Tectona* for tree planting.

Maintain a minimum 10m riparian buffer on both stream banks.

Preserve a minimum of 70% of the identified trees within the buffer zone of development footprint.

Label and monitor these trees using geotagged coordinates.

Fauna Protection

Project development may result in the displacement or disruption of local wildlife species. There are measures to protect faunal populations, maintain movement corridors, reduce noise and habitat disturbance, and discourage poaching. It integrates species-specific needs with broader landscape-level conservation planning.

Restrict vegetation clearing to non-breeding seasons for birds and amphibians.

Train workers to avoid hunting or disturbing native species.

Create wildlife corridors connecting the two stream ecosystems

Pollution Control

Pollution from construction and operational activities, if unmanaged, can severely degrade biodiversity. This subsection describes mechanisms for controlling chemical runoff, waste discharge, and air and noise pollution to preserve ecological integrity, especially within the hydrologically sensitive zones of the site

Prevent fuel, lubricant, or chemical leaks near streams.

Establish a buffer drain system that filters runoff before reaching watercourses.

Avoidance Measures

Site key infrastructures away from sensitive habitats the two rivers as indicated.

Avoid clearance during critical breeding/nesting periods.

Minimization Measures

Use low-impact vegetation clearing methods such as forestry mulching, selective land clearing and manual clearing using hand tools.

Install silt fences and erosion control near streams (refer to FECP).

Enforcement of endangered species act which prohibit bushmeat hunting of certain animals and illegal logging activities by workers and the public.

Restoration and Rehabilitation

The restoration and rehabilitation action considered the dual approach of evaluating both IUCN status and ecosystem service delivery of the tree species. This approach will ensure that conservation efforts are ecologically meaningful and socioeconomically beneficial.

Restore disturbed areas using native species such as *Khaya senegalensis*, *Gmelina arborea*, *Irvingia gabonensis*, *Azadirachta indica*, *Tectona grandis*.

Maintain ecological corridors for species movement.

Alien and Invasive Species Management

Conduct pre-import inspections of materials.

Manually remove invasive species with mechanical techniques such as hand-pulling, mulching and cutting.

Educate workers on alien species identification.

Replacement Strategy Plan

In alignment with the tree planting initiative for the ATC, a **future replacement strategy** for trees planted along riparian buffer zones is been developed. This strategy anticipates the natural aging, senescence, or potential loss of these trees after three decades, ensuring the sustained ecological integrity and protective functions of the riparian corridor. The long-term replacement strategy is designed to:

Maintain continuous riparian buffer functionality including erosion control, water quality regulation, and habitat protection.

Avoid ecosystem service degradation due to tree senescence or mortality after 30 years.

Strategic Framework for Planted Tree Replacement (Year 30+)

Year 15 and 25: Conduct a comprehensive ecological audit of the riparian buffer areas to evaluate the health, canopy density, root stability, and biomass of existing planted trees.

Identify dead, declining, or high-risk trees for phased removal and replacement.

Implement succession planting using native and resilient species identified in the original afforestation plan: *Elaeis guineensis* (Oil Palm), *Mangifera indica* (Mango), *Azadirachta indica* (Neem), *Anacardium occidentale* (cashew), *Khaya senegalensis* (African mahogany), *Gmelina arborea* (gmelina), *Azadirachta indica* (neem) and *Tectona grandis* (teak).

Apply a staggered replanting approach (between year 15 and year 25) between the 10m gap of the planted tree to avoid canopy gap creation and allow continuous ecological functions during transition.

Maintain species diversity and consider emerging climate-resilient varieties, based on updated ecological assessments.

Benefits of the BMP

The implementation of a Biodiversity Management Plan (BMP) for the Agricultural Transformation Centre (ATC) offers multiple environmental, social, and economic benefits that extend beyond regulatory compliance. These benefits include:

Environmental Benefits

Biodiversity Conservation – Protects and maintains native flora and fauna, including ecologically valuable species and habitats such as riparian zones and mature tree stands.

Habitat Connectivity – Maintains and restores wildlife corridors, enabling species movement between fragmented habitats.

Water Quality Protection – Prevents sedimentation and chemical pollution in streams through buffer zones and erosion control measures.

Ecosystem Services Preservation – Ensures continued provision of ecosystem functions such as carbon sequestration, pollination, nutrient cycling, and climate regulation.

Social and Community Benefits

Improved Livelihood Opportunities – Engages local communities in afforestation, ecological monitoring, and sustainable land management activities.

Cultural Value Preservation – Conserves plant species and landscapes of cultural or traditional significance to the host communities.

Education and Awareness – Enhances local understanding of biodiversity through training and participatory conservation programs.

Disaster Risk Reduction – Reduces risks of flooding, erosion, and land degradation, protecting community infrastructure and farmlands.

Economic Benefits

Long-Term Project Sustainability – Minimizes environmental liabilities that could cause project delays or sanctions.

Cost Savings – Reduces maintenance costs over time through natural erosion control, flood management, and pest regulation by healthy ecosystems.

Ecosystem-Based Business Opportunities – Supports potential eco-tourism, sustainable forestry, and non-timber forest products.

Regulatory and Institutional Benefits

Compliance Assurance – Aligns with Nigerian environmental regulations, Cross River State biodiversity protection laws, and AfDB Operational Safeguard 6.

Reputational Gains – Demonstrates corporate environmental responsibility, enhancing the project's credibility with financiers, regulators, and communities.

Framework for Continuous Improvement – Provides a structured monitoring and evaluation system that enables adaptive management of biodiversity issues.

BIODIVERSITY MONITORING PLAN

Parameter	Methodology	Frequency	Responsible Entity
Tree survival rate	Tagging, geo-referencing	Quarterly	Environmental Units of OYS-SAPZ & DBOC / ESMP Implementation Consultant
Stream water quality	Sampling (DO, pH, turbidity)	Monthly	Environmental Units of OYS-SAPZ & DBOC / ESMP Implementation Consultant
Wildlife presence	Transect and camera surveys	Bi-annually	Environmental Units of OYS-SAPZ & DBOC / ESMP Implementation Consultant
Invasive species emergence	Visual inspection, quadrats	Bi-annually	Environmental Units of OYS-SAPZ & DBOC / ESMP Implementation Consultant

Erosion signs	Visual + drone imagery	Post-rainy season	Environmental Units of OYS-SAPZ & DBOC / ESMP Implementation Consultant
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Institutional Framework and Responsibilities

OYS-SAPZ Project Management: Overall accountability for BMP implementation.

Environmental/HSE Officer: Day-to-day monitoring and enforcement.

Third-party Ecological Consultant: Technical studies, validation, reporting.

Community Stakeholders: Watchdog roles, participatory monitoring.

Federal & Ogun State Ministries of Environment/ Forestry: Oversight, permitting, compliance checks.

CAPACITY BUILDING AND COMMUNITY ENGAGEMENT

Train staff on ecological conservation and BMP procedures.

Establish community biodiversity committees.

Organize workshops on sustainable agriculture and bushmeat alternatives.

Engage in school biodiversity clubs and awareness campaigns.

BMP Implementation Monitoring Budget Estimate

Items	Activities	NGN	USD
Restoration and native planting	Site preparation, seedling procurement, and planting of native trees	DBOC	
Invasive species control	Manual/mechanical removal, community sensitization, and monitoring	DBOC	
Community outreach and education	Workshops, training sessions, production of IEC materials	DBOC	
PIU / ESIC		3,500,000.0	2258.065
Contingency (10%)	Buffer for unforeseen expenses and project risks	DBOC	
Total		3,500,000.0	2258.065

Reporting And Compliance

Quarterly progress reports to OYS-SAPZ and FMEnv and monthly to AfDB

Annual biodiversity compliance audits.

Public disclosure of ecological performance which will be embedded in the Stakeholder Engagement Plan (SEP).

Mid- and end-term BMP evaluations tied to project milestones.

CONCLUSION

The SAPZ ATC sub-projects in presents both challenges and opportunities for biodiversity. Through this robust Biodiversity Management Plan, ecological integrity will be maintained, ecosystem services sustained, and legal/regulatory compliance ensured. Restoration, conservation, and proactive environmental stewardship will remain key to the project's long-term sustainability.

ANNEX 8: TRAFFIC MANAGEMENT PLAN

Introduction

A well-designed traffic plan can reduce the risk of accidents involving vehicles, personnel, and equipment, especially during loading, unloading, and transportation of potentially hazardous materials. By streamlining traffic flow and access routes, the plan can improve efficiency and reduce delays, leading to faster exploration and production cycles. A traffic management plan should include protocols for emergency evacuations, spill response, and other potential hazards, ensuring the safety of personnel and minimizing environmental damage. Hence, the following strategies are summarized for effective traffic management in the project area.

Objectives and Scope of the Traffic Management Plan (TMP)

This Traffic Management Plan (TMP) is designed to ensure the safe, efficient, and coordinated movement of vehicles, equipment, materials, and personnel in and around the SAPZ Project Site. The plan supports construction, logistics, operational, and emergency requirements with minimal disruption to surrounding communities and road users. This plan covers: the construction phase, operational phase, internal site traffic, external (access road) traffic, traffic safety, controls, and emergency procedures. In summary, the objectives of the TMP are:

- To reduce the risk of traffic accidents
- To manage construction and operational logistics effectively
- To ensure smooth traffic flow within and around the ATC
- To minimize disruption to nearby communities

Traffic Demand, Classification and Vehicle Types

At all the phases of the project, there are various traffic demands and associated vehicles. For instance, during the initial construction phase, the plan might involve diverting traffic on a specific road to allow for heavy vehicle access to the site. Consequently, flagmen would be stationed at key intersections to manage traffic flow and ensure safety. On the other hand, once the SAPZ ATC is operational, the plan could include designated delivery zones and parking areas, as well as traffic calming measures like speed bumps to control traffic speeds within the zone. Public transportation options would also be considered. However, the traffic demands, classification and vehicle types are summarized herein based on the major phases:

Construction Phase

Several vehicles which may disrupt traffic flows will be used. These are summarized in table below which include: heavy vehicles (e.g., excavators, dump trucks, concrete mixers), delivery trucks (e.g., raw materials, machinery), personnel buses and light vehicles, fuel and water tankers, among others.

Vehicular Demands and their Purpose During Construction Phase

Vehicle Type	Estimated Volume	Purpose
Heavy-duty trucks (e.g. dumpers, concrete mixers)	50–70/day	Earthworks, concrete delivery
Construction equipment (excavators, cranes)	10–20/day	Site preparation and structure erection
Light vehicles & pickups	40–60/day	Engineers, supervisors, logistics
Personnel buses	5–10/day	Labour transport

Operational Phase

During the operational phase, major vehicles needed include agricultural produce delivery trucks, export container trucks, employee and visitor vehicles, waste management trucks, among others. Their functions are summarized in below.

Vehicular Demands and their Purpose During Operational Phase

Vehicle Type	Estimated Volume	Purpose
Produce delivery trucks (5–20 tons)	80–100/day	Input and output transport
Container trucks	20–40/day	Processed goods export
Waste management trucks	5/day	Residue & waste removal
Staff cars and motorcycles	100–150/day	Employee commute
Visitors/official cars	10–30/day	Inspections and business visits

Traffic Management Model

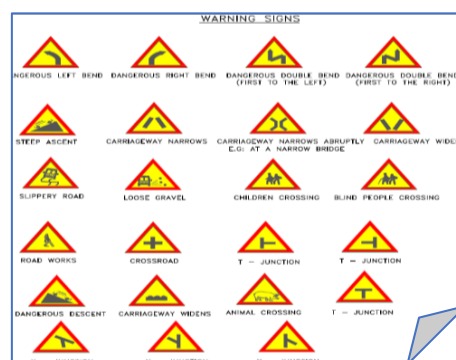
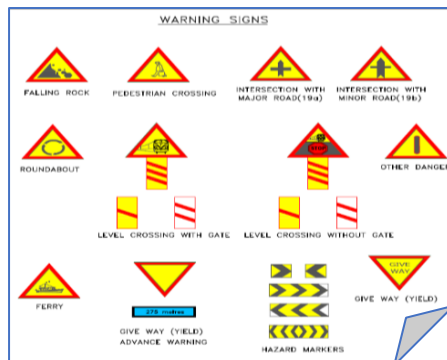
The management plan for traffic within the facility should include entry/exit points, parking lots, no parking, among others. The parking lot allocate suitable parking space for staff and visitors at each of the facility. Meanwhile, the objective of designing and operating parking areas involves providing an access point capacity more than the peak rate of traffic flow that traverses the driveway. On the other hand, parking restriction sign (No Parking) allows for free flow of traffic across the facility.

MANAGEMENT, MONITORING AND ENFORCEMENT

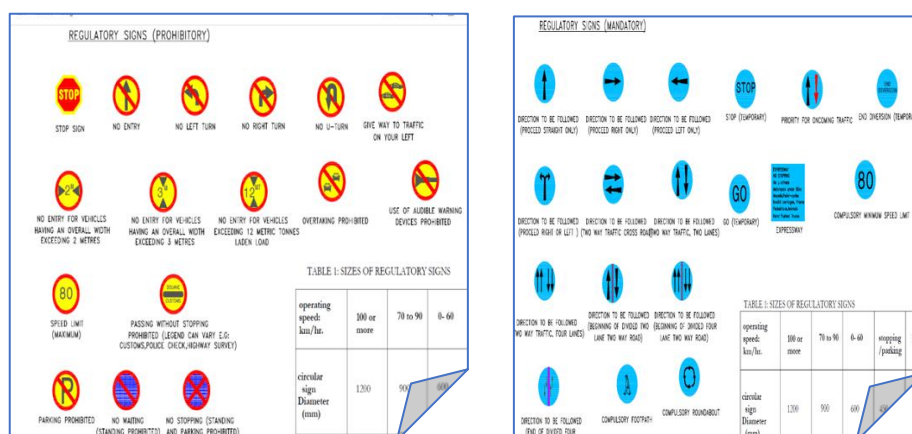
Effective traffic management shall comprise of traffic coordinator, traffic marshals, security officers, among others and their role is summarized in table below.

Traffic Control Team

SN	Role	Responsibility
1	Traffic Coordinator	Oversees plan implementation
2	Traffic Marshals	Enforce compliance and report violations
3	Security Officers	Control gate access and vehicle logs



Road Traffic Signs



Road Traffic Signs

ANNEX 9: FLOOD AND EROSION CONTROL PLAN (FECP)

Introduction

Across Nigeria, the twin threats of flooding and erosion continue to erode development gains, damaging infrastructure and diminishing agricultural productivity. In recent years, flooding has evolved into a recurrent hazard, with Ogun State facing heightened vulnerability due to its tropical climate, undulating terrain, and proximity to major river systems as well as boundary with the Atlantic Ocean. Research identifies heavy, prolonged rainfall, fragile tropical soils, unsustainable land-use practices, deforestation, inadequate drainage infrastructure, and development on natural floodplains as key drivers of these hazards. Collectively, these factors intensify the state's exposure to flood and erosion risks, underscoring the urgency of a proactive Flood and Erosion Management Plan tailored to the region's unique environmental conditions.

The proposed project sites in Ogun State is characterized by undulating terrain and gentle slopes, with elevation ranging between 63 and 71m above sea level. This is consistent with the broader geomorphological features of larger sections of Ogun State. Slope gradients are generally mild, falling within the 0–9% range, and exhibit a gradual decline toward adjacent valleys and low-lying floodplains. This landscape configuration influences surface hydrology, with certain areas becoming susceptible to runoff accumulation and localized flooding during periods of high-intensity rainfall. The topographic conditions are particularly relevant for site drainage planning, erosion control, and infrastructure stability within the proposed project footprint.

The soil structure is characterized by highly weathered, iron-rich, and acidic tropical soil predominantly classified as Ferric Acrisol. Soil texture across the area generally ranges from sandy-loamy soils, moderately deep, and strongly acidic due to prolonged weathering and leaching. These soils exhibit low to moderate organic matter content and are often loosely bound at the surface, particularly in cultivated or disturbed areas. While elevated areas tend to be well-drained, low-lying zones near seasonal waterways frequently experience poor drainage. This heterogeneity in soil texture and drainage, combined with the loose topsoil, increases the area's susceptibility to environmental hazards such as sheet erosion, surface runoff, and gully formation.

Vegetation in Ogun State reflects its transitional ecological position between the southern rainforest belt and the northern Guinea savanna zone. The landscape is characterized by patches of secondary forest, mosaic of grasses, shrubs, and scattered trees, with common species including guinea grass (*Panicum maximum*), elephant grass (*Pennisetum purpureum*), teak (*Tectona grandis*), gmelina (*Gmelina arborea*). Common economic trees include oil palm, cashew, mango, and raffia palm, alongside native species such as locust bean. Undergrowth features grasses, shrubs, and occasional ferns, especially near streams and low-lying areas. Agricultural activities have extensively modified the natural vegetation. Farmlands dominate the terrain, supporting crops like yam, cassava, maize, melon, okra, and vegetables. Traditional land-use practices such as shifting cultivation and bush fallowing are widely observed. Boundary marking is typically done using natural vegetation lines or cleared paths.

Understanding the local soil structure, topography, and vegetation is crucial to designing and implementing an effective flood and erosion management strategy tailored to the environmental realities of the proposed project sites.

The proposed Agricultural Transformation Centre (ATC) is a flagship development aimed at strengthening agri-business value chains and driving inclusive economic growth. In light of increasing climate variability and site-specific environmental challenges, this Flood and Erosion Management Plan (FEMP) has been developed to guide the planning, design, and operational strategies for managing hydrological and geological risks at the sites.

Aims of the FECF

The primary aim of the plan is to: Safeguard infrastructure, farmlands, community asset, and conserve natural ecosystems from hydrological geomorphological hazards.

Objectives of the FECF

The specific objectives of the FECF are to:

Prevent or significantly reduce the occurrence of flooding and erosion within and around the project site and its environs.

Mitigate flood risks associated with seasonal rainfall patterns and rising water tables, and increasing runoff.

Prevent soil degradation, gully formation and sediment displacement through physical (e.g. proper drainage channels), biological (e.g. revegetation), and structural (culverts, check dams) controls measures.

Strengthen infrastructure resilience through climate-smart planning, design and engineering approaches aligned with vision of the ATC.

Safeguard nearby communities, livelihoods, agricultural lands, and surface water bodies within and around the proposed project sites.

Integrate traditional ecological knowledge with modern engineering, actively engage stakeholders, and align with national and international best practices for climate resilience flood and erosion control.

Conserve natural floodplains, stream channels, riparian zones and wetland that serve as ecological buffers natural barriers to flooding.

Site Planning and Engineering Flood Controls

The site layout should incorporate deliberate planning and engineering measures to effectively manage flood risks and ensure the long-term resilience of the ATC. These measures shall include:

- **Topographic Regrading:** Elevate critical structures above the 1-in-25-year flood level using engineered fill and properly compacted construction platforms. This measure will be incorporated into the project's design and construction phases to ensure that low-lying and erosion-prone areas are recontoured, building platforms are raised above anticipated flood levels, and surface runoff is efficiently channelled to designated drainage systems. These interventions will enhance structural stability, improve flood resilience, and prolong foundation integrity.

Drainage Masterplan: Develop a site stormwater management system including:

- Primary and secondary channels to efficiently collect and convey surface runoff away from sensitive areas.
- Concrete-lined trapezoidal drains with a depth of $\geq 0.5\text{m}$, and a slope gradient of 1% designed to manage runoff velocity and prevent scouring.
- Vegetated swales and bioswales along peripheries to encourage infiltration, filter sediments, and enhance groundwater recharge.

- **Check Dams:** Use small rock-fill check dams along identified internal streams and channels to reduce flow velocity and trap sediment transport, thereby enhancing downstream water quality and stabilizing embankments.

Culvert Design Optimization: Existing culverts, along the flow route of storm water from the site to the river, will be evaluated and expanded to accommodate peak flow volumes. This will reduce the risk of blockage and overtopping, which commonly leads to erosion and localized flooding.

Permeable Pavement Systems: Within pedestrian and parking zones, permeable surfaces will be adopted to enhance stormwater infiltration, reduce surface runoff, and mitigate waterlogging.

Soil Erosion Prevention Measures

To safeguard the integrity of the landscape and minimize land degradation within the project area a strategic mix of structural and vegetative soil erosion control measures shall be incorporated into the site design. These measures are aimed at reducing surface runoff, preventing gully formation, and enhancing long-term soil stability.

Structural Measures

Gabion and Rip-raps: Heavy-duty gabion mattresses and riprap to be installed at vulnerable riverbanks, streams edges and culvert outlets to prevent gully initiation and expansion of the gullies. These structures dissipate energy from flowing water and protect embankments from scouring and undercutting.

Terracing and Contour Trenching: Shall be applied along project slopes >6% gradient to slow water movement, increase infiltration and reduce erosion potential, especially around cleared or disturbed project area.

Sediment traps and Barriers: Temporary erosion control devices such as silt fences, sediment traps, and sandbag check dams will be installed at critical locations to capture suspended sediments and prevent sedimentation of downstream watercourses, during construction.

Reinforced Embankments: In flood-prone zones, engineered embankments will be reinforced with stone pitching and geotextile membranes to ensure long-term slope stability.

Conservation of Wetlands: Existing natural wetlands within or adjacent to the project area should be preserved and integrated into the overall flood control strategy.

Vegetative Measures

To support long-term flood and erosion control of the project, natural stabilization strategies will be implemented alongside engineering controls. These vegetative measures enhance soil binding, reduce surface runoff, and promote ecological resilience.

Hydro-seeding and Grass Carpeting: Stabilize exposed or soil surfaces with deep-rooted, fast-growing grass species such as Guinea grass and Vetiver grass due to their high soil-binding capacity and effectiveness in reducing surface erosion.

Afforestation of Slopes: Plant native trees such as *Gmelina*, *Acacia (White Teak)*, *Acacia auriculiformis* (Earleaf Acacia), and *Albizia (Siris Tree)*. These species are selected for their canopy coverage, fast growing nature, adaptability to tropical conditions, slope stabilization and erosion control deep roots, and ability to anchor soil, and reduce rainfall impact.

Riparian Buffers: Implement the planting of trees along both sides of the stream channels at 10-meter intervals, in strict accordance with the BMP and the accompanying vegetation map. This intervention is a deliberate measure to ensure long-term protection of stream integrity, enhancement of water quality, and mitigation of climate and biodiversity risks.

Agroforestry Integration: On farmlands adjacent to the site, agroforestry practices will be encouraged to promote sustainable land use while providing erosion control through integrated planting of crops and trees.

Community Greenbelts: Designated greenbelts and parklands will be incorporated into the layout to act as flood plains and water sinks, while enhancing environmental aesthetics and community well-being. **Erosion-Control Landscaping**

This section outlines a comprehensive erosion-control landscaping and management plan tailored for the proposed ATC. The interventions are designed to sustainably manage runoff, stabilize soil, prevent erosion, and protect the ecological integrity of the project site throughout the construction and operational phases.

Shelterbelts and Windbreaks: Design green belts and shelterbelts using indigenous, low-runoff landscape species such as Vetiver grass, Elephant grass (*Pennisetum purpureum*), and Acacia auriculiformis (Earleaf tree) to serve as windbreaks and erosion buffers.

Strategic Afforestation and Tree Preservation: 62 existing trees will be preserved, with additional trees to be planted at 10-meter intervals along the water channel and site perimeter. This strategic intervention plays a vital role in stabilizing soil, reducing surface runoff, enhancing groundwater recharge, and acting as a natural buffer against erosion. The combination of preserved and newly planted trees not only provides critical ecological functions but also enhances the site's visual appeal and reinforces the centre's commitment to environmental sustainability.

Mulching and Ground Covers: Mulch or biodegradable ground covers will be applied over exposed soil surfaces in erosion-prone areas to reduce surface runoff velocity, minimize soil displacement, and retain soil moisture. These measures will remain in place until permanent vegetation is established, thereby stabilizing the soil, supporting plant growth, and enhancing overall erosion control effectiveness.

Green Infrastructure. Green infrastructure and landscape design will be integrated in erosion-prone areas, including vegetation buffers, permeable surfaces, and bio-swales, to complement engineered erosion-control measures and enhance site resilience. These interventions will be incorporated into the project's planning, construction, and maintenance phases to strengthen environmental resilience, reduce long-term maintenance costs, and support the ecological integrity of the site.

In order to control erosion and sedimentation during the construction phase, a series of strategically-timed interventions have been planned. Table 1 presents these site-specific actions, their functions, and the corresponding stages of implementation to uphold environmental standards.

Table 1: Construction Phase Measures

Measures	Description	Timeline
Diversion Berms	Create temporary earth bunds to divert runoff away from work zones.	Pre-construction
Stabilized Site Entry	Use rock pads and sediment wash pits to reduce sediment tracking by vehicles.	Ongoing
Slope Protection	Geotextile fabric application and turfing on newly cut embankments to prevent slope failure.	Within 7 days of exposure
Rain Event Protocol	Cease land clearing 24 hrs before heavy rainfall forecasts; inspect all erosion controls post event.	As needed

Operational and Long-term Control Measures

To ensure sustained flood and erosion risk mitigation, OYS-SAPZ shall commits to the following operational and long-term control measures as part of its environmental stewardship obligations:

Routine Cleaning of Drainage Networks: OYS-SAPZ shall implement quarterly maintenance program involving the de-silting and debris removal from all site drainage channels, culverts, and retention ponds to ensure unimpeded water flow and prevent localized flooding.

Periodic Vegetation Maintenance: OYS-SAPZ will undertake routine rimming of grass cover and replacement of dead plants on slopes and erosion-prone areas to maintain effective ground cover and enhance slope integrity throughout the project lifecycle.

Storm Event Monitoring: OYS-SAPZ shall Install automatic rain gauges to monitor precipitation; Any storm event exceeding 50mm/hour will trigger an inspection protocol within 24 hours to assess erosion control systems and initiate immediate corrective actions where needed.

Community Early Warning System: OYS-SAPZ in collaboration with Ogun State Emergency Management Agency (SEMA), shall deploy flood early-warning mechanisms, including sirens and alert systems, to safeguard vulnerable downstream communities.

Emergency preparedness and Response: OYS-SAPZ shall be committed to maintaining a comprehensive emergency preparedness framework and these measures should be well established and effectively maintained. All emergency protocols shall be reviewed bi-annually, updated based on site conditions, and kept fully operational to ensure rapid and effective response to extreme weather events.

Institutional Roles and Responsibilities

Effective implementation of the FECP for the proposed ATC requires the coordinated efforts of multiple institutions. Each stakeholder plays a distinct role in ensuring compliance, monitoring, and sustainability of environmental safeguards.

Table 2: Monitoring and Evaluation Framework

Role	Responsible Entity	Key Functions
FECP Oversight	OYS-SAPZ SPIU	Oversight, supervision, and review of the flood plan implementation
Execution	DBO Contractor	On-ground implementation of all flood/erosion works.
Monitoring	Environmental Consultant	Routine inspection, performance review, and reporting.
Supervision / Regulation	Ogun State Ministry of Environment / NESREA	Ensure standards and regulatory compliance and enforcement

This monitoring framework establishes clear performance indicators and responsibilities for overseeing flood and erosion control measures. It facilitates early risk identification, ensures compliance with environmental safeguards, and supports data-driven decision-making across all phases of the project lifecycle.

Table 3: Proposed Monitoring Plan

Indicator	Method	Frequency	Responsible Unit
Drainage capacity and flow	Flow rate measurement and ponding observations	Quarterly	DBOC
Siltation in retention basins	Sediment depth gauges and visual inspections	Monthly	HSE
Gully formation hotspots	Geotagged photographic surveys	Biannually	Environmental Consultant
Rainfall events above design	Rain gauge IOYS and hydrological alerts	Event-based	HSE

The estimated budget outlines the financial requirements necessary to implement the flood and erosion control measures detailed for the proposed ATC. Adequate budgeting ensures timely execution of mitigation strategies and supports long-term sustainability. Tables 3 and 4 present the proposed FECP implementation monitoring plan and budget respectively.

Table 4: FECP Implementation Monitoring Budget

Activity	NGN	USD
Earthworks for drainage, bunds, regrading	DBOC	
Gabions, ripraps, and erosion matting	DBOC	
Vegetation and afforestation	Embedded in BMP	

Sediment control and monitoring systems	DBOC	
Training and early warning system	DBOC	
PIU / ESIC	3,500,000.00	2258.065
Total	3,500,000.00	2258.065

Conclusion

Ultimately, successful implementation of the FECF will contribute to the broader goals of climate adaptation, disaster risk reduction, sustainable rural development ensures operational sustainability, and demonstrate compliance with national and global environmental standards. Through strategic design, proactive implementation, and continuous monitoring, the ATC will become a model for climate-resilient agricultural infrastructure in Nigeria.

ANNEX 10: CLIMATE CHANGE MANAGEMENT PLAN (CCMP)

Introduction

Climate change has emerged as one of the most pressing global challenges of the 21st century. It refers to significant and lasting changes in the Earth's climate system, including shifts in temperature, rainfall, and weather patterns. This is not just an environmental issue, it has far-reaching consequences for economies, ecosystems, and human well-being. Understanding the root causes of climate change and its wide-ranging impacts, especially on agriculture is essential to developing effective, sustainable solutions.

The Ogun State SAPZ proposed ATC zone is situated in the humid tropics of south-western Nigeria, where climate trends indicate rising mean annual temperatures and increased variability in both rainfall intensity and distribution, driven by global climate change. Relative humidity remains consistently high throughout the year, supporting agricultural productivity but also elevating the risk of moisture-related crop diseases. Seasonal wind patterns significantly influence local weather conditions: south-westerly monsoon winds dominate the wet season, while north-easterly Harmattan winds bring dry, dusty air between December and February. These shifts are governed by the seasonal movement of the Inter-Tropical Convergence Zone (ITCZ). Microclimatic variation is observed across the landscape, with forested areas remaining slightly cooler and low-lying regions prone to temporary flooding during periods of intense rainfall. For detailed baseline meteorological data, refer to the ESIA report on Air quality, Noise levels, and Field meteorology.

The environmental and climatic conditions in Ogun State, and especially at the proposed project sites, present both opportunities and constraints for the establishment of the proposed ATC. This underscores the need for the deliberate integration of a Climate Change Management Plan (CCMP) across all stages of development, from planning and construction to operation and future scaling. A well-integrated CCMP will enhance local adaptive capacity, promote environmental stewardship, strengthen infrastructure resilience, and ensure the long-term viability of agriculture as a key driver of economic development in the intervention areas.

Objectives of the CCMP

The CCMP for the ATC sites seeks to:

- To mainstream climate risk analysis and adaptation planning across all stages of project design, development, construction, and operational management, ensuring climate-resilient outcomes.
- To identify, reduce, and monitor greenhouse gas (GHG) emissions associated with construction activities, agro-transformation operations, land-use changes, and energy consumption within the ATC framework.
- To build climate resilience into infrastructure, agricultural inputs, water systems, and supply chains, ensuring service continuity and productivity under a range of future climate scenarios.
- To align project implementation with Nigeria's national climate strategies, including the Nationally Determined Contributions (NDCs), the Climate Change Act (2021), and the Roadmap to Net-Zero (2050–2070), while contributing to broader international climate targets.
- To promote sustainable land management practices, reduce deforestation, and improve air quality through the adoption of low-emission technologies and regenerative environmental interventions.
- To establish robust monitoring and evaluation (M&E) systems for tracking climate risks, adaptation progress, mitigation outcomes, and policy effectiveness over time.
- To strengthen institutional and community capacity for climate action by facilitating stakeholder engagement, awareness campaigns, and technical training on climate-smart agriculture and ecosystem-based adaptation.

Climate Risk Assessment Summary

The ATC project area is subject to climatic fluctuations typical of a transitional ecological zone, with increasing variability in rainfall and temperature extremes. These evolving conditions present ongoing risks to agriculture, infrastructure, and the long-term resilience of project interventions.

Baseline Condition for ATC area include:

Climate: The region is influenced by a bimodal rainfall regime, with two distinct seasons. The wet season, extending from April through October, delivering most of the annual 1,800–2,500 mm rainfall, and a dry season from November to March bringing reduced precipitation. Peak rainfall generally occurs in the middle months of the wet season, which can affect site access, drainage, and structural maintenance planning.

Temperature: Average temperatures range from 25 °C to 32 °C, with the hottest period typically between February and April. Cooler conditions are observed during the height of the rainy season, while night-time temperatures remain mild throughout the year.

Humidity: Relative humidity in the area remains consistently high throughout the year, typically ranging between 70 and 90 percent.

Wind: Prevailing winds are generally light, with speeds from calm (0.00 m/s) to about 1.40 m/s under normal conditions. Stronger gusts occur infrequently, usually during isolated storms, and are not a dominant climatic feature.

Topography and Soils: Gently undulating terrain with elevations ranging from 64–76 meters above sea level; soils are predominantly classified as Ferric Acrisols.

Vegetation and Land Use: Land cover in the area reflects a transitional forest–savanna mosaic. While natural vegetation remains in some areas, much of the immediate surroundings have been cleared for mixed-use purposes including infrastructure, access roads, and community facilities.

Key Climate-Related Risks and Implications

Given the baseline climatic and environmental conditions of the ATC area, several climate-related risks have been identified that may affect the planning, construction, and long-term operation of the ATC. The key risks are outlined below:

1. Rainfall Variability and Flood Risk:

The ATC site lies in a region with high annual rainfall (1,800–2,500 mm) and a bimodal wet season.

Increasingly erratic and intense rainfall events could lead to:

Seasonal flooding, especially in low-lying or poorly drained areas.

Damage to critical infrastructure such as feeder roads, culverts, storage units, and processing facilities.

Increased surface runoff and soil erosion, particularly on Ferric Acrisol soils with moderate infiltration capacity.

Delays in land preparation, harvesting, and logistics during peak rainfall months.

2. Heat Stress and Elevated Temperatures

With ambient temperatures ranging from **25°C to 32°C** and peak heat intensifying between **February and April**, the ATC structure may face several heat-related challenges:

Crop productivity risks, especially during sensitive growth stages such as flowering and grain filling, which are highly susceptible to thermal stress.
[FAO (2016), IPCC AR6 WGII (2022), NIMET Annual Climate Review]

Water demand is expected to rise, driven by increased evapotranspiration and soil moisture loss under higher temperatures.

Occupational heat risks for workers engaged in outdoor activities may rise, affecting safety and productivity, and elevated risk of heat-related illnesses.

[Source: WHO (2015). *Climate Change and Human Health*]

3. High Humidity and Disease Pressure:

Relative humidity levels between 64–89% promote favourable conditions for fungal and bacterial outbreaks.

Prolonged wetness may lead to:

Contamination risks in processing facilities, as moisture-laden environments encourage mold growth on equipment, surfaces, and raw materials, affecting food safety.

Increased post-harvest spoilage of stored agricultural products, especially grains, tubers, and perishable produce, reducing overall product quality and market value.

Reduced shelf life of processed goods, making it difficult to meet quality standards for regional and export markets.

4. Greenhouse Gas (GHG) Emissions:

The use of diesel generators, agro-transformation equipment, and transport fleets will result in notable CO₂ and NO_x emissions, especially if run on fossil fuels. This can:

Increase the industrial hub's carbon footprint, contributing to global greenhouse gas accumulation and climate change.

Elevate operational costs over time due to inefficiencies in fuel combustion, maintenance of aging diesel machinery, and potential future penalties for high-emission practices.

Reduce air quality, leading to elevated levels of particulate matter and toxic gases, posing health risks such as respiratory illness, fatigue, and decreased worker productivity.

5. Soil Degradation

The site's Ferric Acrisol soils may degrade further under intensive land use and climate stress. Risks include:

Erosion and topsoil loss, especially during intense rainfall.

With increased erosion, the natural drainage of the land may be disrupted. Poor drainage can result in water pooling around buildings or infrastructure, increasing the risk of flooding during heavy rainfall.

The degradation of the soil can affect any green spaces or landscaping within the transformation centre.

Climate Change Mitigation Measures

To reduce the climate impacts and enhance its long-term sustainability, a range of climate change mitigation measures should be implemented.

1. Energy Efficiency and Low-Carbon Technologies

OYS SAPZ/DBOC shall implement the following measures to enhance energy efficiency and transition toward low-carbon operations:

Deployment of Renewable Energy Systems: Integrate solar photovoltaic (PV) and hybrid energy systems to power lighting, administrative facilities, and essential infrastructure, thereby reducing dependence on diesel generators and lowering greenhouse gas emissions.

Off-Grid Energy Solutions for Climate Resilience: Install decentralized solar systems to ensure uninterrupted power supply during climate-induced grid disruptions and minimize reliance on fossil fuel-based energy sources.

Sustainable Building Design: Construct energy-efficient buildings using high-albedo roofing materials, passive ventilation strategies, and thermal insulation to reduce cooling loads and improve indoor comfort under changing climate conditions.

Smart Energy Management: Implement motion sensors, LED lighting, and smart metering systems to optimize energy consumption, facilitate real-time monitoring, and encourage behavioural changes that support sustainable energy use.

2. Sustainable Transport and Logistics

OYS SAPZ/DBOC shall implement the following sustainable mobility strategies:

Low-Emission Fleet Transition: Prioritize the use of low-emission vehicles and motorbikes for haulage, staff transport, and intra-facility movement to reduce carbon intensity.

Climate-Resilient Road Infrastructure: Design and construct internal and access roads using materials and engineering practices tailored for high rainfall, extreme heat, and seasonal variability to minimize infrastructure degradation and ensure all-season accessibility.

Adoption of Clean Mobility Solutions: Promote the use of electric or biofuel-compatible vehicles such as tricycles, forklifts, and mini-vans within the facility to reduce fossil fuel dependence and operational emissions.

Optimized Logistics and Fleet Management: Consolidate transport and delivery schedules to minimize vehicle trips, idle time, and fuel consumption resulting in lower greenhouse gas (GHG) emissions and cost savings.

3. Greenhouse Gas (GHG) Emissions Management

OYS SAPZ/DBOC shall implement the following GHG emissions management strategies:

Establishment of Emissions Baseline: The ATC will define its emissions boundaries, collect data on **Scope 1** (direct emissions), **Scope 2** (indirect emissions from electricity consumption), and **Scope 3** (supply chain emissions from upstream activities such as procurement and logistics), and apply the 2006 IPCC Guidelines along with national tools. A baseline year will be set for future performance comparisons.

Emission Intensity Reduction Targets: The ATC will pursue a **10–20% reduction in GHG emissions intensity** within the first five years of operation. This will be accomplished through the implementation of energy efficiency upgrades, process optimization, and the use of sustainable construction and operational materials. Staff will be trained in climate-smart practices, and a robust Monitoring, Reporting, and Verification system will be established to track progress and enable adaptive management.

Residual Emissions Offset Strategy: Unavoidable (residual) emissions will be addressed through nature-based solutions, including **agroforestry initiatives** and **wetland restoration programs** within the ATC site. These interventions will support both **carbon sequestration** and **local ecosystem enhancement**.

Climate Change Adaptation Measures

To ensure long-term sustainability and climate readiness of the ATC, essential resilience strategies will be embedded in all planning, construction, and operational phases. These strategies are designed to protect the proposed infrastructure from climate-related risks. These measures include:

1. Infrastructure Resilience

OYS-SAPZ/DBOC shall implement the following measures:

Climate-Smart Building Design: All facilities within the ATC area will be constructed using climate-resilient design principles, including **structural reinforcements** and **flood-resistant architectural features**.

Elevation and Structural Reinforcement: In flood-prone zones, buildings will be constructed on **elevated platforms** with **reinforced foundations** to minimize flood-related damage and maintain operational continuity.

Erosion and Stormwater Management: The site will incorporate **oversized drainage channels, culverts, and retention ponds** to manage surface runoff during intense rainfall events and prevent waterlogging.

Stormwater Harvesting: Buildings will be equipped with **stormwater harvesting systems** to capture and reuse rainwater, reducing pressure on local water resources and drainage systems.

Heat Resilience Measures: Infrastructure will integrate **shade structures, weather-resistant materials, passive ventilation systems, and adaptive operational protocols** to reduce exposure to extreme temperatures and enhance worker safety.

2. Ecosystem-Based Adaptation

OYS-SAPZ/DBOC shall integrate the following ecosystem-based initiatives:

Riparian Buffer Zones: Establish **10-meter vegetative buffer zones** along waterways to reduce erosion, runoff, and sedimentation. These buffers will be reinforced with deep-rooted native vegetation to stabilize riverbanks and protect freshwater ecosystems.

Reforestation of Degraded Areas: Identify and restore ecologically degraded zones within and surrounding the project area using native and climate-resilient species such as *Gmelina*, *Acacia*, *Albizia*, and *Mango*, enhancing microclimatic conditions, promoting carbon sequestration, and supporting habitat restoration.

Green Infrastructure in Buildings and Facilities: Building design and landscaping will incorporate **green buffers**, **bioswales**, **pollinator gardens**, and **native plantings** around administrative and production areas. These features will reduce stormwater runoff, improve air quality, and lower ambient temperatures through shade and evapotranspiration. Where possible, green roofs and living walls will be introduced to further enhance insulation, biodiversity, and carbon uptake.

Permeable Surfaces and Soil Health Preservation: Deploy permeable pavements and ground covers to reduce surface runoff, recharge groundwater, and prevent hardscaping-related erosion. Soil compaction will be minimized in construction zones, and organic mulching will be used to maintain soil structure and moisture content.

CAPACITY BUILDING AND POLICY INTEGRATION

Governance Framework

The OYS SAZP shall appoint a qualified Climate and Sustainability Officer to oversee the implementation, monitoring, and continuous enhancement of CCMP strategies.

The CCMP shall be fully integrated into the Environmental and Social Management System (ESMS) protocols and embedded within all relevant procurement policies to ensure compliance across the entire project value chain.

Training and Awareness

Bi-annual capacity-building workshops will be conducted for key stakeholders, including project staff, local government officials, and farmer groups (Suppliers and out growers) focusing on climate risk awareness, adaptation strategies, and Green House Gas (GHG) literacy.

Customized educational toolkits will be developed and disseminated, incorporating infographics, real-time climate alerts, and behavioural guidance materials. These resources will be provided in both English and relevant local dialects to ensure inclusive and culturally appropriate communication

Monitoring and Evaluation

To ensure accountability and track the success of the CCMP, a structured M&E framework will be implemented. This will monitor progress, measure outcomes, and guide adaptive management for the ATC. Table 1 shows the KPIs.

Table 1: Key Performance Indicators (KPIs)

KPI Description	Target	Monitoring Frequency	Responsible Entity
Reduction in greenhouse gas (GHG) emissions (Scope 1,2 & 3)	At least 10% reduction	Annual	HSE
Deployment of renewable energy systems	Minimum of 2 systems	Annual	DBOC
Number of trees to be preserved and planted.	Relevant stands of trees preserved, adequate riparian buffers at 10-meter intervals based on data collection	Biannually	HSE
Climate resilience workshops conducted for farmers and staff	Minimum of 2 workshops/year	Annual	HSE
Assessment of critical infrastructure for climate risks	100% of infrastructure assessed	Annual	HSE
External audits of MRE activities	1 audit every 2 years	Every 2 Years	External Audit Consultant

Tools and Mechanisms

GHG Inventory Tool: Adopt standardized African Development Bank (AfDB) and Inter-governmental Panel on Climate Change (IPCC) spreadsheet calculators' tools to track emissions from energy use, waste, and transport

Climate Risk Index: Create a geo-coded local index to assess exposure, sensitivity, and adaptive capacity at the community level, using variables such as elevation, rainfall variability, and land use. and track vulnerability.

Early Warning Systems: Collaborate with the Nigeria Meteorological Agency (NiMet) and National Emergency Management Agency (NEMA) to disseminate location-specific alerts for extreme weather events such as floods, droughts, and other related climate issues.

Annual Climate Scorecard: Publish a performance dashboard showing progress across key indicators, shared with local communities and development partners to promote transparency.

Budget Estimate

Error! Reference source not found. presents the indicative costs for implementing key elements of the CCMP. These values will be validated through detailed cost assessments during project execution.

Table 2: CCMP Implementation Monitoring Budget

Component	NGN	USD
Solar systems and smart meters	DBOC	-
Green infrastructure & afforestation	Embedded in BMP	-
GHG inventory and reporting tools	DBOC	
Climate training and toolkits	DBOC	
Water harvesting and CSA systems	DBOC	
Monitoring and audit	DBOC	
PIU / ESIC	3,500,000.00	2258.065
Total Estimate	3,500,000.00	2258.065

Conclusion

The CCMP for the ATCs offers a strategic, integrated approach to addressing the complex climate challenges facing the region. Grounded in robust environmental data and aligned with national and global climate priorities, the plan outlines a comprehensive framework for mitigation, adaptation, capacity-building, and performance monitoring.

ANNEX 11: CULTURAL HERITAGE MANAGEMENT PLAN (CHMP)

The Agricultural Transformation Centre (ATC) at Sanwojo-Imasayi, and Itele-Iwaya Ijebu Mushin in Yewa North and Ijebu East Local Government Areas in Ogun State, under the Ogun State Special Agricultural Processing Zones (OYS-SAPZ) program is designed for processing, storing, and packaging agricultural products, linking smallholder farmers to larger markets. However, large-scale land-based projects like this carry the risk of adverse impacts on tangible and intangible cultural heritage resources, which are essential to community identity, spiritual well-being, and social cohesion.

The CHMP provides a structured approach to:

Identify, evaluate, and document cultural heritage within the Project Area of Influence (PAI).

Mitigate potential impacts from land acquisition, site clearing, infrastructure construction, and project operations.

Engage meaningfully with stakeholders, including custodians of cultural knowledge and spiritual leaders.

Establish operational procedures, particularly for "chance finds" of archaeological, historical, or sacred significance.

Integrate respect for cultural heritage into project design, workforce conduct, and community relations.

The CHMP complements the ESIA findings and ensures compliance with AfDB Operational Safeguard 8 (Cultural Heritage), Nigerian legal requirements, and global best practices.

OBJECTIVES OF THE CHMP

This CHMP seeks to:

1. **Preserve Tangible Heritage:** Prevent damage, destruction, or loss of physical cultural resources such as shrines, burial sites, sacred groves, artifacts, and monuments within the project area.
2. **Respect Intangible Heritage:** Protect spiritual practices, oral traditions, festivals, traditional knowledge systems, and community rituals integral to local identity.
3. **Promote Informed Consent:** Ensure free, prior, and informed consultations with affected communities regarding cultural heritage risks and mitigation options.
4. **Establish Robust Procedures:** Implement field-ready Chance Finds Protocols to safeguard cultural resources discovered unexpectedly during project activities.
5. **Foster Sustainable Coexistence:** Encourage community participation in heritage management while enabling the project to proceed responsibly.
6. **Comply with Regulatory Standards:** Fulfil obligations under Nigerian law, AfDB safeguards, and international conventions on cultural heritage protection.

LEGAL AND POLICY FRAMEWORK

The CHMP is developed in accordance with:

Nigerian Legal Provisions

National Commission for Museums and Monuments (NCMM) Act, CAP N19 LFN 2004: Establishes legal protection for antiquities, historical sites, and cultural property. Mandates NCMM oversight for significant cultural resources.

Nigerian Constitution (1999, as amended): Guarantees the protection of cultural rights, including the right to enjoy, develop, and preserve cultural heritage.

Land Use Act (CAP L5, LFN 2004): Regulates land acquisition, acknowledging customary ownership and traditional land uses, which may be linked to cultural heritage.

State and Local Government Regulations: State and LGA traditional leadership structures play a central role in identifying, protecting, and managing community heritage.

International Standards

AfDB Operational Safeguard 8 (OS8-Cultural Heritage): Requires clients to avoid or minimize impacts on cultural heritage and engage with communities, ensuring respect for spiritual, cultural, and historical values.

UNESCO Convention for the Protection of the World Cultural and Natural Heritage (1972): Promotes safeguarding globally and nationally significant cultural resources.

ILO Convention 169 (Indigenous and Tribal Peoples, where applicable): Provides for cultural rights and protection of indigenous heritage, though Nigeria has not ratified this, its principles guide best practice.

United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP): Recognizes rights to cultural identity, heritage preservation, and participation in heritage-related decisions.

CULTURAL HERITAGE CONTEXT OF THE PROJECT AREA

Ogun State is renowned for its rich, diverse cultural heritage, including:

Tangible Heritage:

Sacred forests and groves associated with deities or ancestral spirits.

Shrines, altars, and religious structures.

Burial sites and ancestral graveyards.

Historic landmarks, artefacts, and objects of archaeological value.

Intangible Heritage:

Traditional festivals, rites of passage, and spiritual ceremonies.

Oral histories and folklore passed through generations.

Indigenous knowledge systems related to agriculture, ecology, and health.

Traditional authority structures, such as councils of elders and cultural custodians.

Preliminary consultations with community leaders and the ESIA scoping process indicate:

There are likely undocumented cultural resources within or near the project footprint.

Festivals and religious events can influence project schedules due to community participation.

CULTURAL HERITAGE MANAGEMENT MEASURES

Baseline Identification and Documentation

The assessment of the cultural heritage of the project area shows that:

The cultural heritage of the study communities is linked to language, dress and food, festivals and dances.

The communities have various similarities in the way they dress, foods they eat and ways they conduct their marriages.

Indigenous languages spoken in the communities are some of their cultural heritages.

Among all the communities, land is considered a major socio-cultural asset and a heritage that must be bequeathed to succeeding generations.

Avoidance, Protection, and Buffer Zones

Design project layout to avoid physical disturbance of identified cultural heritage resources.

Where avoidance is impossible, implement protective buffers (e.g., fencing, signage, no-go zones) as agreed with communities.

Respect traditional access routes and practices associated with sacred sites.

Seek NCMM and community approval for any necessary relocation or modification of cultural features (only as a last resort).

Chance Finds Procedure

If unexpected cultural heritage is discovered during excavation, earthworks, or other activities:

1. Immediate Action:

Suspend work in the discovery area.

Secure the site to prevent damage or unauthorized access.

2. Notification:

Inform OYS-SAPZ management, cultural monitors, NCMM, and local authorities.

3. Assessment:

Qualified cultural heritage experts assess the find's significance.

4. Decision-Making:

Determine appropriate actions (preservation, relocation, further study) in consultation with stakeholders.

5. Documentation:

Record the find, including photographs, descriptions, GPS coordinates.

6. Work Resumption:

Resume activities only after formal clearance by authorities and cultural leaders.

Community Engagement and Participation

Establish continuous dialogue with host communities regarding cultural heritage management.

Form a Cultural Heritage Committee with representatives from:

Traditional authorities and custodians.

Youth, women, and vulnerable groups.

OYS-SAPZ community liaison officers.

Consult on all heritage-related decisions, including avoidance measures, access restrictions, and potential relocation of cultural features.

Provide feedback on project activities and incorporate cultural knowledge into project operations where appropriate.

Intangible Heritage Promotion

Avoid scheduling construction or disruptive activities during key community festivals or spiritual events.

Encourage workers and contractors to respect local customs, attire, language, and spiritual practices.

Explore opportunities to support cultural revitalization, such as documenting oral traditions or sponsoring community heritage initiatives.

ROLES AND RESPONSIBILITIES

Stakeholder	Responsibilities
OYS-SAPZ Management	Overall CHMP oversight, resource allocation, regulatory compliance
Contractors/Subcontractors	Implement Chance Finds Protocols, comply with cultural protection measures
Community Relations Team	Facilitate consultations, maintain cultural respect among workforce
NCMM and State Heritage Agencies	Provide technical guidance, legal oversight, and approvals
Community Cultural Leaders	Identify cultural resources, guide protection measures, and mediate decisions

MONITORING, EVALUATION, AND REPORTING

Monitoring Activities

Routine inspections of known heritage sites to ensure protection measures remain effective.

Regular workforce briefings on cultural sensitivity and respect protocols.

Inclusion of cultural heritage indicators in broader environmental and social monitoring frameworks.

Evaluation

Mid-project and end-of-phase audits to assess:

Effectiveness of avoidance and protection measures.

Implementation of Chance Finds Procedures.

Community satisfaction with heritage management efforts.

Reporting

Monthly internal reports detailing:

Heritage incidents or grievances.

Community consultations conducted.

Heritage-related training sessions.

Formal notifications to NCMM and stakeholders in case of significant discoveries or incidents.

GRIEVANCE REDRESS FOR CULTURAL HERITAGE ISSUES

Dedicated grievance channels for cultural heritage concerns, accessible to all community members.

Confidential reporting options to encourage open feedback.

Grievance resolution process:

Acknowledgement of receipt within 3 days.

Investigation and community dialogue within 14 days.

Resolution communicated promptly to complainants.

Escalation mechanisms for unresolved grievances, involving traditional leaders, OYS-SAPZ management, and authorities.

CAPACITY BUILDING AND TRAINING

Mandatory cultural sensitivity training for all project staff and contractors.

Specialized sessions for field workers on recognizing cultural resources and respecting community customs.

Inclusion of community representatives in training where relevant.

Continuous learning approach, with refresher courses and updated protocols based on evolving project context.

BUDGET ESTIMATION

The budget below outlines the financial requirements for identifying, preserving, engaging, documenting, and monitoring cultural heritage resources throughout the project lifecycle.

Item	Activities/Description	NGN	USD
Cultural Heritage Baseline Survey	Engagement of archaeologists, anthropologists, local historians, GIS mapping	DBOC	
Community Consultation & Engagement	Traditional leaders' dialogues, town halls, ritual consultations, meeting logistics	DBOC	
Documentation of Cultural Resources	Recording oral histories, festivals, sacred sites, artefacts (video, photos, reports)	DBOC	

Item	Activities/Description	NGN	USD
Physical Protection of Sites	Fencing, signage, restricted access zones, relocation planning (if needed)	DBOC	
Training and Capacity Building	Local sensitization on cultural heritage importance, staff orientation	DBOC	
Contingency for Chance Finds	Emergency excavation/study in case of unplanned discoveries during earthworks	DBOC	
Monitoring and Reporting	Periodic monitoring, third-party review, reporting tools, community observer stipend	DBOC	
SPIU / ESIC		3,500,000.00	2258.065
Cultural Celebration/CSR Activities	Support for traditional festivals, cultural centres, preservation projects	DBOC	
TOTAL	At the February current rate of \$1/1,385	4,500,000.00	3,249.10

CONCLUSION

The ATC project acknowledges the fundamental importance of preserving cultural heritage for the well-being of host communities. Through this CHMP, the project commits to:

Safeguarding both tangible and intangible cultural resources.

Promoting respectful engagement with cultural leaders and custodians.

Aligning with legal requirements, AfDB OS8, and global best practice.

Fostering sustainable coexistence between development objectives and cultural heritage preservation.

ANNEX 12: LIVELIHOOD RESTORATION AND ENHANCEMENT PLAN (LREP)

The Agricultural Transformation Centre (ATC) project is designed to drive agricultural processing, job creation, and rural economic development under the Special Agro-Industrial Processing Zone (SAPZ) programme. The ATC is expected to generate long-term benefits; however, land acquisition and construction may temporarily or permanently affect the livelihoods of individuals and households in the project area. This Livelihood Restoration and Enhancement Plan (LR&EP) is designed to ensure that project-affected persons (PAPs), particularly those whose livelihoods are adversely impacted by land acquisition and other project activities associated with the development of the ATC, are supported to restore or improve their livelihoods and standards of living.

Objectives of the LREP

This LREP is prepared to meet the following objectives:

- To restore affected livelihoods to pre-project levels or better.
- To enhance income-generation opportunities for host communities.
- To provide targeted support to vulnerable groups.
- To improve the resilience and adaptive capacity of affected households.
- To ensure sustainable livelihood development aligned with the SAPZ's agro-industrial focus.
- To facilitate inclusive economic participation and social cohesion
- To align with lender standards (AfDB ISS) and Nigerian legal framework.
- To integrate sustainable development goals (SDGs 1, 2, 5, and 8).

Project Context and Scope of Impact

Project Location: Sanwojo-Imasayi, Yewa North &. Itele Ijebu Mushin, Iwaya, Ijebu East LGA, Ogun State

Land Requirement: Approximately 21.001 ha &. 20ha for ATCs infrastructure

Potential Impacts: Displacement of farmlands, economic trees, informal businesses, livestock rearing zones, and temporary employment loss

Primary Livelihoods Affected: Subsistence farming, livestock husbandry, trading, and informal artisanal activities

Legal and Policy Framework

The LR&EP is developed in compliance with:

Nigerian Land Use Act (1978)

AfDB OS5 – Involuntary Resettlement

SAPZ Programme Implementation Manual

Socioeconomic Baseline

Affected Communities:

Sanwojo-Imasayi, Yewa North &. Itele Ijebu Mushin, Iwaya, Ijebu East LGAs

Other contiguous villages

Livelihood Sources:

Rain-fed farming on cassava, yam, maize, vegetables, plantain, bananas, oil palm etc.

Majority of the PAPs are subsistence or small-scale farmers

Some engage in artisanal processing.

Livestock husbandry and aquaculture

Sand mining and sales

Small-scale palm oil processing

Petty trading and local crafts

Artisanal works

Civil/public service employment

High dependence on natural resources, low access to credit, and limited mechanization

Vulnerable Groups:

Female-headed households

Unemployed Youths and elderly without income

Households with no land titles

People living with disabilities

Livelihood Impacts from The ATC Project

Impact Type	Description
Land Take	Loss of farmland and economic crops
Restriction of Access	Disruption to forest resources, and cultural sites
Employment Disruption	Interruption of trading and informal sector employment
Disruption of livestock husbandry activities	Encroachment on livestock husbandry zones near project area
Loss of income	From farming, and micro-enterprises
Loss of access	To forest resources and seasonal harvest areas
Temporary job displacement	During land preparation and civil works

Livelihood Assessment Matrix

Livelihood Type	No. of Affected HHs	Key Vulnerabilities	Restoration Measures	Enhancement Measures
Rainfed Farming	6 HHs & 8 HHs	Loss of land and produce	Land-for-land, inputs, extension services	Outgrower schemes, Agro-industrial processing clusters
Petty Trading	33	Income shock, market loss	Business kits, financial literacy	Linkages to ATC canteens, retail supply chains
Artisanship	12	Loss of customer base	Toolkits, marketing skills	In-hub service contracts (carpentry, welding, repairs)
Youth (unemployed)	47	Lack of skills, job access	Apprenticeship, vocational training	Digital marketing, e-commerce for agro-products
Women (cross-cutting)	68	Financial exclusion, labor load	Formation of women's groups, access to credit	Gender-responsive agribusiness training

Livelihood Restoration Strategies

Land-Based Livelihood Restoration

Provision of alternative farmland (where feasible)

Provision of access to irrigation schemes.

Soil improvement assistance (organic composting, fertilizers).

Capacity in climate-smart agriculture and regenerative practices
Establishment of demonstration farms and cooperative farming models.
Formation of farmer cooperatives
Development and integration of farmers into out-grower schemes to provide raw materials to the ATC

Fisheries and Aquaculture Livelihood Support

Provision of fishponds and fingerlings.
Training on aquaculture (e.g., catfish farming) fish feed formulation and disease management.
Training in aquaculture (e.g., catfish farming) aligned with the hub's agro-industrial value chains
Provision of cold storage and market access support.

Agricultural Input Support

Subsidized seed distribution (maize, cassava, cocoa, yam, rice, etc.).
Provision of tools and farming equipment.
Linkages with agro-dealers and extension officers.

Skills Development and Vocational Training

Training in agri-business, poultry, piggery, aquaculture, and food processing etc.
Short-term vocational training in tailoring, welding, carpentry, mechanics, and solar installation.
Entrepreneurship development for youth and women.
Apprenticeship placement and certification
Employment facilitation in ATC construction and operations

Financial Support and Microcredit

Start-up capital support or revolving loan schemes.
Partnerships with microfinance institutions (MFIs) and cooperatives.
Access to financial literacy programs.

Support for Small and Medium Enterprises (SMEs)

Business advisory services for traders and service providers.
Inclusion in ATC value chain contracts (transport, supply, catering).
Micro-grants and business start-up kits
Training in business management, value addition, and financial literacy
Linkages to ATC markets and supply chains

Gender and Youth Mainstreaming

Targeted training for women on agribusiness and cooperative formation.
Provision of childcare support during capacity building sessions.
Youth incubation programs linked to the ATC.

Employment Opportunities

Prioritization of PAPs in ATC job recruitment
Labour-intensive public works (roadside planting, community sanitation) for transitional support

Special Measures for Vulnerable Groups

Targeted support for women, female-headed households, youth, and persons with disabilities

Tailored livelihood packages (e.g., home-based processing, tailoring, etc.)

Formation of women's cooperatives and youth agribusiness groups

Vulnerable Groups Support Strategy

Tailored Support: Home-based enterprises, flexible training schedules

Dedicated Quotas: In all training and financial programs

Support Services: Childcare provisions, psychosocial counselling

Monitoring: Gender- and vulnerability-sensitive M&E framework

Livelihood Enhancement Initiatives

Community resource centres for information, training, and ICT use.

Agro-industrial processing cooperatives and women-led market linkages.

Out grower schemes and guaranteed off-take arrangements.

Renewable energy support (solar dryers, solar water pumps).

Public-private partnerships for agricultural mechanization.

Implementation Framework

Stakeholder	Role
Ogun State Government	Policy oversight, land administration, budget support
ATC Project Implementers	Execution, monitoring, and reporting
Community-Based Organizations	Mobilization, grievance redress, feedback loops
NGOs and CSOs	Technical support, capacity building, independent monitoring
Yewa North & Ijebu East LGAs	Coordination, local logistics, youth and women engagement

Monitoring and Evaluation Framework

Indicator	Target	Frequency
% of households with restored farmland	100% of displaced farming households	Quarterly
Number of individuals trained	500+ in Year 1	Biannual
Number of new micro-enterprises supported	At least 200 within first 2 years	Annual
% of income restored (compared to baseline)	100% within 18 months	Biannual
Number of women/youths trained	Minimum 40% of total beneficiaries	Quarterly

Risks and Mitigation Measures

Risk	Mitigation Measure	Risk Rating
Inadequate funding or delays	Secure lender funds and include LREP in main project budget	High
Lack of community participation	Continuous sensitization and local partnership	Medium
Elite capture of benefits	Transparent selection criteria, independent monitoring	High
Gender-based exclusion	Gender-specific programming and quotas	Medium
Sustainability of enterprises	Mentorship, market linkages, business training	Medium

Grievance Redress Mechanism (GRM)

Multi-tier GRM at village, LGA, and project levels.

Complaints register at community centres and local government offices.

Independent oversight by civil society organizations.

Toll-free line and grievance response team.

LRP Implementation Budget

The estimated budget for the implementation of the LRP is NGN3,750,000 (USD 2,707.58, @ NGN1,385:1USD). The details and breakdown are in the LRP prepared as a stand-alone for implementation.