



ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA)
FINAL REPORT
FOR THE PROPOSED EBONYI STATE
SPECIAL AGRO-INDUSTRIAL PROCESSING ZONE (SAPZ) HUB



April, 2024

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ABBREVIATIONS & ACRONYMS

AfDB	African Development Bank
ACHPR	African Charter on Human and Peoples' Rights
ACRWC	African Charter on the Rights and Welfare of the Child
ATCs	Agricultural Transformation Centres
AoI	Area of influence
BAT	Best Available Technology
BCS	Broad Community Support
BPT	Best Practical Technology
BOQ	Bill of Quantities
CAT	Convention against Torture
CBOs	Community Based Organisations
CCAC	Climate and Clean Air Coalition
CoC	Code of Conduct
CEDAW	Convention on the Elimination of All Forms of Discrimination against Women
CEMPs	Construction Environmental Management Plans
C-ESMP	Contractors Environmental and Social Management Plan
CO	Carbon monoxide
CITES	Convention on International Trade and Traffic in Endangered Species
CRC	Convention on the Rights of the Child
CRPD	Convention on the Rights of Persons with Disabilities
CPGs	Consumer Packaged Goods
CSOs	Civil Society Organisations
dB	Decibel
DFIs	Development Financial Institutions
EA	Environmental Assessment
EIA	Environmental Impact Assessment
ESMANR	Ebonyi State Ministry of Agriculture & Natural Resources
ESG	Ebonyi State Government
ESME	Ebonyi State Ministry of Environment
EBSMoH	Ebonyi State Ministry of Health
EBSPIU	Ebonyi State Project Implementing Unit
EBSAPZ	Ebonyi State Special Agro-Industrial Processing Zone
ESAP	Environmental and Social Action Plan
ESEU	Environmental Sanitation and Enforcement Unit
ESF	Environmental and Social Framework
ESIA	Environmental and Social Impact Assessment
ESS	Environmental and Social Standards
E&S	Environmental and Social
ESMP	Environmental and Social Management Plan
ESMMP	Environmental and Social Management and Monitoring Plan
FAO	Food and Agriculture Organisation
FEPA	Federal Environmental Protection Agency
FGD	Focus Group Discussions
FGN	Federal Government of Nigeria
FMAFS	Federal Ministry of Agriculture and Food Security
FMEnv.	Federal Ministry of Environment
FMWASD	Federal Ministry of Women Affairs and Social Development
GBV	Gender Based Violence
GFSI	Global Food Safety Initiatives

GHGs	Green House Gases
GON	Government of Nigeria
GPS	Global Positioning System
GRM	Grievance Redress Mechanism
GRC	Grievance Redress Committee
Ha	Hectare
HIV/AIDS	Human Immune Deficiency/ Acquired Immune Deficiency Syndrome
$_2S$	Hydrogen sulphide
HSE	Health Safety and Environment
IEE	Initial Environmental Evaluation
IESIA	Integrated Environmental and Social Impact Assessment
ISS	Integrated Safeguards System
ICESCR	International Covenant on Economic, Social and Cultural Rights
ICCPR	International Covenant on Civil and Political Rights
IUCN	International Union of Conservation of Nature
IPF	Investment Project Financing
ISO	International Organization for Standardization
IRM	Independent Review Mechanism
KII	Key informant interviews
LEL	Lower Explosive Limit
LFN	Laws of the Federation of Nigeria
LGA	Local Government Area
MDAs	Ministries, Departments and Agencies
MoU	Memorandum of Understanding
NAP	National Action Plan
NESREA	National Environmental Standards and Regulations Enforcement Agency
NGOs	Non-Governmental organizations
NIMET	Nigerian Meteorological Agency
NO_2	Nitrogen dioxide
OS	Operational Safeguards
OHSP	Occupational Health and Safety Plan
PM	Particulate matter
PAP	Project Affected Persons
PACs	Project Affected Communities
PPE	Personal Protective Equipment
RAM	Risk Assessment Matrix
RH	Relative Humidity
SAPZ	Special Agro-Processing Zones
SEA	Sexual Exploitation and Abuse
SEP	Stakeholder Engagement Plan
SH	Sexual Harassment
SME	Small and Medium Scale Enterprise
STDs/STIs	Sexually Transmitted Diseases/Sexually Transmitted Infections
SO_2	Sulphur dioxide
SPM	Suspended Particulate Matter
TDS	Total Dissolved Solids
TOR	Terms of Reference
UNFCCC	United Nations Framework Convention on Climate Change
UN SDG	United Nations Sustainable Development Goal
USEPA	United State Environmental Protection Agency
VOCs	Volatile Organic Compounds

EXECUTIVE SUMMARY

ES 1 Project Background

The Special Agro-industrial Processing Zones (SAPZ) programme is a major investment of the Federal Government of Nigeria (FGN), driven by the Federal Ministry of Agriculture and Food Security (FMAFS) in collaboration with the state governments, development partners, relevant Federal Ministries, Departments, and Agencies (MDAs), and private investors to develop agro-processing clusters in areas of high agricultural production across the country. This clustering approach is to help address investment challenges in the development of agro-processing enclaves across Nigeria, including poor access to quality infrastructure, inadequate feedstock supplies, and other challenges confronting the agro-processing environment.

SAPZs, therefore, will be developed with the requisite infrastructure for an agro-processing environment, which will help reduce cost absorptions and engender competitiveness in agro-industrial production, which is critical to further unlocking the potential of Nigeria's agriculture to create ready markets and wealth for farming communities and reduce rural poverty. It is a strategic move to rapidly develop modern agro-processing capacity to serve the vast and growing local market, create a sustainable market for farmers, reduce post-harvest losses of local agricultural produce, and thereby create wealth for farmers, promote import substitution, and create sustainable agriculture-related jobs for the populace, especially women and youth.

The SAPZ programme is aligned with national policies and priorities. It seeks to sustainably contribute to poverty alleviation, reduce hunger, and inequality while providing opportunities for economic diversification, job creation, building climate resilience, and improved livelihoods in Nigeria. It will also contribute to rural infrastructure development, improved access to agricultural markets, increased farm productivity, the adoption of agricultural technology, climate-smart agricultural production and processing practices, increased value addition and agro-processing, increased skills acquisition, and job creation for all actors along the value chain, including smallholder farmers, women, and youth.

The SAPZ will be made up of two building blocks, which include the Agricultural Transformation Centre (ATC), which is a community-based rural institution within the host community, supported by the provision of quality production drivers for the production of feedstock, the Aggregation Centre (AC) for primary storage, and the Agro-Industrial Hub (AIH), equipped with desirable infrastructure to create a modern agro-processing environment where secondary value addition will take place. The Agro-Industrial Processing Hub (AIH) will draw its processing feedstock from the ATC, where activities of the production clusters and Aggregation Centres are being coordinated.

The Program has four mutually reinforcing components namely:

- (i) Support the development of enabling climate adapted infrastructure for Agro-Industrial Hubs (AIHs);
- (ii) Improve agricultural productivity and enterprise development to enhance agricultural value chains and job creation in the SAPZ Catchment Areas;

- (iii) Support Agro-Industrial Zone Policy and Institutional Development; and
- (iv) Programme Coordination and Management.

The key design features of the program are the following:

- Support economic and social development programmes of the Federal Government of Nigeria (FGN) and Ebonyi State;
- Contribute to rural infrastructure development;
- Improve access to agricultural markets;
- Increase agricultural production and productivity;
- Stimulate the adoption of agricultural technology;
- Facilitate climate smart agricultural production and processing practices;
- Increase value addition and agro-processing; and
- Increase skills acquisition and job creation for all actors along the value chain, including the smallholder farmers, women and youth.

The expected outcomes of the Phase I of the SAPZ Programme are:

- Development of infrastructure including Agro-Industrial Processing Hubs (AIHs),
- Development of Agricultural Transformation Centers (ATCs),
- Development of irrigated lands and farm to market access roads;
- Supply of certified agricultural inputs and extension services;
- Skills development for farmers and Micro, Small and Medium Scale Enterprises (MSMEs); and
- Updated agro-industrial zone policy and establishment of regulatory institution/special regulatory regime.

The first phase of the Special Agro-Industrial Processing Zone (SAPZ) Programme is being implemented in seven (7) states, namely: Cross River, Imo, Kaduna, Kano, Kwara, Ogun, and Oyo, and the Federal Capital Territory (FCT). The SAPZ phase one is valued for a total sum of USD538.05 million (net taxes), funded by AfDB, IsDB, IFAD, GCF, Federal and State Governments.

The second phase of the SAPZ programme has been receiving relevant attention at appropriate quarters. Expressions of interest (EOIs) from about twenty-one (21) states, including Ebonyi State, to participate in the second phase have been submitted to the Federal Ministry of Agriculture and Food Security, Abuja. It will commence immediately with the enlistment of interested states based on their levels of readiness.

Ebonyi State desires to be enlisted in the Phase 2 of the SAPZ Programme. To qualify for enlistment, the state has to meet specified criteria: all of the four major criteria for enlistment.

To meet this set of criteria, Ebonyi State has concluded to engage the services of an agribusiness and environment consultant to conduct a feasibility study suitable to fulfil the eligibility criteria for the state's qualification in the SAPZ programme.

Specifically, the eligibility criteria will include but not limited to:

- Completed/ Draft Feasibility Studies;
- Comprehensive Environmental and Social Impact Assessment (ESIA) Studies;

- Determination of Value Chain where Ebonyi State has comparative advantage;
- Determination of Sites for one AIH and 2 or more ATCs;

The above necessitates the need for more effective consultation, participation, and inclusion of the members of the communities (including women and youths) in Ebonyi State in the processes of developing a feasibility study and ESIA for the SAPZ Programme. The task should therefore include a complete feasibility study, an implementation plan, and be structured in such a way that it will not hurt women and other marginalised groups but should be designed to effectively address the needs of the SAPZ programme and harness the strengths of all categories of members of the communities.

ES 2 Rationale for the Participation of Ebonyi State in the SAPZ program

Ebonyi State had the lowest Human Development Index (HDI) when compared with other states in the Southeast (United Nations Development Programme (UNDP), 2013). The poverty rate in the state was 56%, which was higher than the national average of 46% and the average of 27% for the South East in 2013 (UNDP, 2013). Recently, the poverty rate in Ebonyi State increased to 58.9% (Eze et al., 2019). About 80% of Ebonyi citizens are classified as falling below the poverty line, that is, living below the \$1.9 per day benchmark with a life expectancy of 47 years (UNDP, 2013; UNDP, 2016; NBS, 2017). According to NBS (2013, 2017), Ebonyi State is among the 10 poorest states in the Federation.

However, since 85% of Ebonyi people currently engage in agriculture as their major occupation, agriculture, considering its potential, can be used to lift the state out of poverty through the creation of job opportunities for women and youths. Ebonyi State is a leading producer of rice, cassava, yam, potatoes, maize, and beans. Rice is predominantly cultivated in Ikwo, yams in Izzi, with other regions in the state such as Amasiri, Edda, and Ezillo making notable contributions, and Effium and Ezzamgo taking the top spots in cassava production.

The Ebonyi state government, through its ministry of agriculture and natural resources, in recognition of the opportunity provided by agriculture, set its vision to include

- raising the farmers' purchasing power by increasing their real income and improving the quality of life and living standards of the farmers and rural dwellers
- increase in food production to ensure the attainment of a level of food security that will generate the availability and affordability of food commodities for the populace.

The state government has also prioritised food security and hunger reduction, and to achieve this, it has embarked on an aggressive agricultural revolution with about 2 billion naira in consolidated funds to boost rice production in the state. This investment has yielded dividends, as Ebonyi is now one of the leading producers of rice in the country. In addition, the state government, in conjunction with the CBN, has made it possible for rice farmers in the state to benefit from the Anchor Borrowers' Programme (ABP) introduced by the Apex bank. Over 100,000 farmers in Ebonyi State have benefited from the scheme. Another programme initiated by the state government to boost food production and alleviate poverty is the 'one man, one hectare programme.' This programme enjoins every inhabitant of Ebonyi State to have a farm. Based on the government's investments in

agriculture, Ebonyi State has regained national prominence as one of the food baskets of the nation.

The SAPZ programme thus further presents a huge opportunity for the Ebonyi State Government to revitalise its economy, reduce poverty, improve youth employment, and reduce the crime rate by focusing on those agricultural areas where it has a comparative advantage.

ES 3 Rationale for the ESIA

The SAPZ Program has been classified as Category 1 in accordance with the African Development Bank Integrated Safeguards System (ISS) and national legislation. The validated category is based on the large-scale, multisector and the sensitive nature of the Program. In line with the national legislation and the ISS, the Borrower is required to prepare an Environmental and Social Impact Assessments for all concerned investments, including Resettlement Action Plans and/or Livelihood Restoration Plans where applicable. Additionally, all associated facilities and investments equally require the applicable Environmental and Social Assessments (ESIAs, RAPs LRP, Audits etc.), to be prepared for disclosure by the Borrower and the Bank. Each of the potential partners (BOI and NIRSAL) are also required to prepare Environmental and Social Management Systems for disclosure on their websites as well as on the Bank's website.

ES 4 Objective of the Consultancy

The purpose of the ESIA is to identify and address possible direct, indirect and cumulative significant adverse environmental and social impacts that are likely to arise from the proposed program for the purpose of acceptability and sustainability. The primary objective of the ESIA is to facilitate an effective decision-making process and to ensure that the implementation processes during the execution of the proposed program are sustainable. Some of the activities to be carried out during the ESIA preparation include: ensuring that the program activities are environmentally sound, encouraging community consultation and participation and enhancing social wellbeing.

Specifically, the ESIA seeks to provide a clear process including action plans that integrate environmental and social considerations into the proposed SAPZ program. The ESIA is also site-specific and consists of a well-documented set of mitigation, monitoring, and institutional actions to be taken before and during implementation to eliminate the adverse environmental and social impacts, offset them, or reduce them to acceptable levels. The ESIA also includes the measures required to implement these actions, addressing the adequacy of the monitoring and institutional arrangements within the State.

The objectives of the ESIA are to:

- Initial scoping activities in order to understand the project's field of influence, activities, and impacts that will have to be outlined in the Framework.
- Provide maps to illustrate the general setting of the project-related development of the SAPZ industrial Hub and its adjoining areas, which can be potentially affected.

- Identify and describe all potential significant changes that may occur as a result of the project. These would encompass environmental and social impacts, both positive and negative, as a result of project interventions, such as involuntary resettlement, social conflicts and disturbance, or environmental risks such as threats to land and natural resources, biodiversity, and natural habitats.
- Specific types of projects and associated environmental and social impacts that might require separate assessments in relation to location, project size, and other site-specific factors need to be identified.
- Analysis of alternative approaches against current project plans from an environmental, socioeconomic, and cultural standpoint. Alternatives should be compared in terms of their potential impacts: capital and operating costs, suitability under local conditions, including skill requirements, public and political acceptability, level of technology, as well as their institutional, training, and monitoring exigencies.
- Analysis of existing environmental policies and legislation, including directives for environmental impact assessment, and assess needs for strengthening these policies in the context of this project.
- Analysis of the sub-sector-specific policies, laws, and regulations that have environmental implications. The sectoral investment planning process, in terms of objectives, methodology, and procedures for review and approval of plans and projects, should be carefully reviewed.
- Preparation of an implementation plan. The plan should include measures for integrative and participatory environmental and social monitoring and institutional and training requirements to implement them. Such a plan should recommend feasible and cost-effective measures to prevent or reduce significant impacts to acceptable levels and estimate the impacts and costs of those measures.

ES 5 Approach/Methodology for the ESIA Study

The approach and methodology for the ESIA involve the following:

- desktop study; review of design reports and literature;
- reconnaissance visits and site inspections;
- public/stakeholder consultations and involvement;
- data collation, analysis and reporting;
- identification and assessment of environmental and social impacts;
- mitigation measures;
- monitoring and management plan.
-

ES 6 Policy, Legal, Regulatory and Administrative Frameworks National Policy & Legal Regulatory Requirements

The following policies were reviewed as they pertain to the proposed Ebonyi state SAPZ programme (details on their applicability can be found in the body of the report)

- National Policy on the Environment 1989 revised 1991;
- National Erosion and Flood Control Policy 2005;
- Environmental Impact Assessment Act No. 86, 1992 (*FME_{env}*);

- The National Guidelines and Standards for Environmental Pollution Control in Nigeria 1991;
- National Guidelines on Environmental Management Systems (1999);
- National Air Quality Standard Decree No. 59 of 1991;
- National Environmental Standards and Regulations Enforcement Agency Act (NESREA Act) 2007;
- Land use act 1978 Modified 1990;
- Endangered Species Act 1985;
- FEPA/ FMEnv. EIA Procedural guidelines 1995;
- S.1.15 National Environmental Protection (The Management of Solid and Hazardous Wastes Regulations) 1991;
- Public Health Law;
- Workmen Component Act 1987 Revised 2010.

Ebonyi State Policy & Regulatory Instruments

- Ebonyi State Ministry of Agriculture and Natural Resources;
- Ebonyi State Ministry of Environment;
- Ebonyi State Sanitation and Environmental Protection Agency;
- Ministry of Sport and Youth Development.
- Ministry of Women Affairs and Social Development

ES 7 AfDB Operational Safeguard Policies Applicable to Ebonyi State-SAPZ Program
The AfDB OS policies 1-5 are applicable to the proposed Ebonyi State SAPZ program

ES 8 World Bank Environmental and Social Standards Applicable to Ebonyi State-SAPZ Program
The World Bank Environmental and Social Standards (ESS 1,2,3,4,5,6,8) are applicable to the proposed Ebonyi State SAPZ program

ES 9 International Conventions, Agreements and Protocols to which Nigeria is Signatory and Applicable to the proposed Ebonyi State Special Agro-Industrial Processing Zone (SAPZ) program

The following international conventions, agreements and protocols are applicable to Ebonyi State SAPZ

- Vienna convention for the protection of the Ozone Layer and the Montreal protocol for Control of Substances that deplete the ozone layer.
- Basel convention on the prevention of trans-boundary movement of hazardous wastes and their disposal.
- Convention on Biodiversity.
- Convention on climate change.
- Convention on Desertification.
- Convention on Persistent Organic Pollutants.
- World Health Organization (WHO) Health and Safety Component of EIA, 1987.

ES 10 Institutional Framework

The proposed Ebonyi State SAPZ Programme will involve many federal and state ministries, departments and agencies (MDAs), local governments, communities, and the civil society. This is because an effective implementation of programmes requires inter-ministerial coordination, collaboration, and information sharing at all levels of government. Thus, each component, sub-component and activity will be implemented through the relevant federal and State MDAs. The various MDAs include those responsible for agriculture, planning, economy and finance, works, environment and water resources. Although, the investments for Ebonyi State Special Agro-Industrial Processing Zone (SAPZ) Programme are made through the Ebonyi State Project Implementing Unit (EBSPIU), the Ebonyi State government has the primary responsibility for land management and land allocation for agriculture purpose.

The Federal Ministry of Agriculture and Food Security (FMAFS) is the lead implementing agency for the SAPZ Programme. The National Coordinating Office, headed by a National Coordinator and hosted by the FMAFS is responsible for the overall coordination of the programme. The Ebonyi State Programme Implementing Unit (EBSPIU), headed by the State Programme Coordinator and hosted by the Ebonyi State Ministry of Agriculture and Natural Resources will be responsible for the coordination in Ebonyi State. Thus, the Ebonyi State-PIU is directly responsible for coordinating the activities of the Ebonyi State Special Agro-Industrial Processing Zone (EBSAPZ) Programme, including the implementation of this ESIA. Both the federal and State level coordinating units have environmental officers who take responsibility for mainstreaming environmental issues into the SAPZ sub-programmes.

The Proposed Sites for the location of the AIH and ATCs

S/N	Proposed Site	Value Chain	Building Block
1	Nkaliki	Livestock	AIH
2	Ishiagwu Ndiebor	Rice	ATC
3	Onuigboji-Ikwo	Rice	ATC
4	Amangwu	Rice	ATC
5	Ugwulanwu	Cassava	ATC
6	Amata Ugwulangwu	Cassava	ATC
7	Amika 135	Cassava	ATC
8	Amaleze	Cassava	ATC
9	Ezillo	Cassava	ATC

ES 11 Biophysical Environment

Climate of Ebonyi State is tropical Savannah based on the Koppen classification (the most widely used system of climatic classification). This climate type is characterized by relatively high rainfall and it is expressed as contrast between a dry season and a wet season. These two seasons are very dependent on the two prevailing air masses blowing over the country at different times of the year; the dry north-easterly air mass of Saharan origin, and the humid maritime air mass blowing from over the Atlantic.

Rainfall is the principal climatic element in Ebonyi State as it is in every other part of the country and tropical region in general. The rainfall regime starts in April and ends in October. The regime is principally controlled by the two major air-masses: the moist tropical maritime (TM) with its associated westerlies and the dry tropical continental air mass (TC) with its associated easterlies. The analysed fifteen years' data records (2008 - 2022) show that annual total rainfall amount in the project area range between 1,181.2 mm and 2,170.03 mm with a mean of 1,866.56 mm (Fig. 4.1). In other words, the average annual rainfall in Ebonyi State is about 1,867 mm. As shown in Fig. 4.1, highest annual rainfall of 2,170 mm was recorded in 2008 while the lowest of 1,181 mm was received in 2022. The annual rainfall that characterized the State is enough to sustain rice, cassava, and other staple crops cultivation in Ebonyi State including shallow root plants such as sweet potatoes and yam.

Temperature characteristics in Ebonyi State is typical of a tropical area which is high and relatively stable throughout the year with an indication of seasonal fluctuations. The temperature is usually higher during the dry season and lower during the wet season. The mean maximum temperature of the area ranges from 35.84°C during the dry season to as low as to 28.65° C in the wet season while the mean minimum temperature ranges from 20.05° C to 24.91° C for the wet and dry seasons respectively. As shown in Fig. 4.3, an average temperature of the area depicts a double maximum as it peaks in the month of March and nosedive continuously through August; while it rises again from September and peak in November as the second maxima. In Ebonyi State, records show that a daily temperature value, particularly during the dry season weather could be as high as 38.84° C and it was observed that locals make use of it in drying parboiled rice and other agricultural processing.

Wind speeds are greatly influenced by the creation of cyclonic and anti-cyclonic vortices that have logical connection with the various seasons. Analysis shows that the wind speed in the study area is relatively high throughout the year. As shown, mean monthly wind speed ranges from 6.1 km/h to 9.0 km/h. High wind speed is common at the onset and peak of the rainy season while it is low during the dry season. However, an hourly wind speed could be high as 12 km/h.

Geological distribution of the proposed/selected Ebonyi state SAPZ project sites and Ebonyi State in general cuts across Tertiary and Cretaceous sedimentary rocks. The dominant rock type which covers over 70% of the State is the Cretaceous sedimentary rock. The specific material type covering the project are Azu River Group and undifferentiated sedimentary rock. Except the Amangwu project site, every other selected location for the

proposed SAPZ program fall within the Azu River Group mineralisation and poor yield (National Atlas, 1978) as it is underlain by cretaceous shales. Nevertheless, groundwater can be recovered from the weathered and well jointed intrusive rocks found in this area. In practical terms, groundwater resources would be needed in some of the proposed project sites, hence, there is a need to conduct hydro-geological investigation to determine locations of best/optimal yield before a borehole is dug, this will prevent borehole failure as well prevent waste of valuable resources and manpower.

The three major rivers in Ebonyi State, are Abonyi, Aloma, and Azu. The Aloma River drains the north-eastern section of the State while Azu and Abonyi drain the central and southern parts of Ebonyi State. These Rivers eventually drain into the river Calabar in the south eastern section to the Ebonyi State. The aforementioned rivers are perennial rivers; hence, they are important and they are often used by the locals for various activities including fishing and domestic purposes (such as washing and bathing). These Rivers also enhances the farming activities across the state. With optimal irrigation processes using these Rivers farming activities can be carried out throughout the year.

With respect to air quality, the observed mean values of $PM_{0.5}$, $PM_{1.0}$, $PM_{2.5}$, $PM_{5.0}$ and PM_{10} at the selected farm clusters are $1.19 \mu\text{g}/\text{m}^3$, $2.66 \mu\text{g}/\text{m}^3$, and $7.35 \mu\text{g}/\text{m}^3$, respectively. None of the measured particle sizes as at the time of the study exceeded their limits. Lowest mean(background) and highest mean (background) noise levels recorded are 36.9dB(A) and 63.6dB(A), respectively and they are observed at sample location **AQ8**(Cassava Cluster (Amaleze)) and **AQ1** (Nkaliki Integrated Farm). The highest background noise at Nkaliki was not unconnected to the frequent movement of automobiles on a major access road to the farm. Meanwhile, the FMEnv maximum noise level limit of 90dB(A) for 8-hour exposure limit and the 70 dB(A) Industrial area noise limit of the World Bank were not breached at any of the sampling locations. Therefore, the baseline ambient noise level at the selected farm clusters as at the time of the study are low when compared with the regulatory limits. As observed during the field exercise, major sources of noise across the selected sites are occasional vehicular movement and, in some cases, bird sounds and human voices.

The pH of the groundwater sample ranged from 7.10 (GW4) to 8.60 (GW5) with an overall mean of 7.8. Based on pH scale, the sample groundwater is basic, and they are all within the specified range of 6.5 – 9.2 for drinking water recommended by both WHO and NSDWQ. The water temperature values recorded in the sampled water were all within the normal temperature value (<40oC) for natural water in the tropical environment. The electric conductivity (E.C) ranged from $15.60 \mu\text{S}$ to $127.70 \mu\text{S}$ with a mean of $78.7 \mu\text{S}$, the highest and the lowest EC values were observed at station GW02 (Ndiebor area) and GW04 at Ezillo area, respectively. Also, the TDS values ranged 20.0 to 62.9 mg/L with an overall mean of 40.2 mg/L; measured TDS in all the samples can be considered to be very low when compared to the FMEnv limit 500 mg/L. furthermore, salinity concentration value for the groundwater samples ranged from 0.02 to 0.06ppt with an average of 0.04 ppt while Dissolved oxygen (DO) had a range of 1.62 to 2.67mg/L with a mean value of 2.13 mg/L. None of the measured in-situ parameters contravened their limits where specified or stated.

The sampled groundwater total hardness concentrations overall mean was 12.13 mg/L and this is generally low when compared to set its set limit of 500 mg/L, hence, the values are

within acceptable limit. The measured chemical oxygen demand (COD) values ranged from 3.99 mg/L at GW03 to 6.19 mg/L at GW04, and fall within the limit of 8.5 mg/L for COD. Of the four-groundwater sampled, turbidity was only observed in GW02 and the value was 0.10 NTU and this does not breach the limit of 1.0 NTU set by the FMEnv while oil and grease were not observed in any of the samples, in other words, the O&G values were below the equipment resolution limit of <0.001mg/L and this indicates that the groundwater sampled are not polluted with hydrocarbon compounds.

On microbes, the measured properties are THB, THF, THUB, THUF, and E. coli and they do not show indication of polluted water. As shown in Table 4.6, THUB and THUF were not observed in all the samples while E.coli was noted in GW02 and GW03.

With respect to flora study of the project sites, a total of 57 species in 56 genera and 29 families were encountered during the study. The commonest plant families recorded were Poaceae (34.48%) with ten species, Asteraceae (24.14%) with seven species, Euphorbiaceae (20.69%) with six species, Fabaceae and Arecaceae (10.34%) recorded three species each, while Anacardiaceae, Araceae, Malvaceae and Musaceae recorded two species each (6.90%). None of the plants species is in the threat or endangered categories of the IUCN. The recoded fauna is also not in the endangered category of IUCN.

Results of the soil laboratory analysis revealed that the electric conductivity (EC) values ranged from 14.9 to 35.0 $\mu\text{S}/\text{cm}$ with a mean of 23.58 $\mu\text{S}/\text{cm}$, the observed EC values could be said to be low when compared to maximum limit of 2000 $\mu\text{S}/\text{cm}$ stipulated by the FAO, 1974. Likewise, the soils total organic carbon (TOC) mean was 1.00%, the lowest TOC of 0.28 % was observed at SS5 (Ugwulangwu Cluster) while the highest value of 1.88 % was recorded at the SS9 (Ezillo Site). As shown in Table 4.10, the study area soils TOC range from low to medium based on soil organic matter classification by Udoh (1986). In addition, the measured TOC values fall within a critical limit of 0.8% specified by Snapp (1998) for optimum yield in most arable crops. Organic matter plays a significant role in the dynamics of soils as it stores water, provides a living environment for organisms, and promotes structural stability, supplies and stores nutrients.

Furthermore, the moisture content (MC) value shows that selected sites for the proposed project are well drained and not waterlogged; the measured MC however ranged from 15.2 to 18.6 % with an overall mean of 18.11%, although soil MC is greatly influence by seasonal variations. Phenols, Ammonium, and oil & grease (O&G) was not observed in any of the samples as their values were below the detection limit of the analytical equipment (i.e <0.001 mg/kg). The absence of O&G in the samples indicates that the selected sites are not polluted with hydrocarbon, as at the study period.

The physiognomic view of the study area shows a typical representation of open vegetation in locations with high level of disturbance and close vegetation in areas where vegetation is regenerating. The vegetation pattern is characterized by grasses, herbaceous species, and scanty shrubby/small tree species. Hence the vegetation type is a combination of grassland and shrubland ecosystems.

The Amagwu, Onuigbo, and Amika study area consists mainly of a grassland ecosystem with very few shrubs. Agricultural activities were observed to be ongoing within the

environment, primarily focused on cultivation of *Manihot exculenta* species; while Ndiaabo Isiagwu and Ugwulangwu vegetation had been degraded although the species are undergoing regrowth. Agricultural practices observed within the area involve the cultivation of edible crops such as cassava, yam, cocoyam, pumpkin leaves, and pepper. Economic trees like *Mangifera indica*, and *Elaeis guineensis* were recorded

ES 12 Socio-Economic Characteristics

According to the 2006 census, Ebonyi State has a population of 2,176,947 (NBS, 2012), with a projected population of 3,242,500 for the year 2022. The population growth has a rate of about +2.5%/year (2006 -2022), with a density of approximately 499.8 persons per sq. km and a total land area of 6,488km².

Male (71.4%) respondents outnumber female respondents (28.6%) across the project sites, reflecting the predominance of males in farming and field cropping operations, while females are limited to the processing of produce. Respondents within the age bracket of 18-35 years (55.4%) account for the highest proportion in the sample population., followed by a few within 36-65 years (40%) and above 66 years (4.6%) This implies that there is a youth population in the project area and the potential availability of an active workforce.

Christianity prevails at 90% in the communities, with traditional worship at 5.7% and Islam at 4.3%. This diverse religious landscape highlights the need for fostering understanding and respect among community members to promote social cohesion and prevent conflicts. Common household size as indicated by the respondents include; 6-10 (55.6%), less than 5 (27.8%), 11-15 (13.3%) and above 16 (3.3%). Respondents report common household sizes, with 41.4% falling in the range of 6-10 members, 28.6% in the range of 11-15, 15.7% having less than 5, and 14.3% having above 16 members. This suggests the potential for a substantial labour force within families, enabling distributed farm work and increased productivity. However, caution is advised to safeguard the family's livelihood sources, considering the project's potential impact on a large number of individuals. The community is exclusively made up of the Igbo ethnic group (100%), with variations in the Igbo dialect tailored to each community. This homogeneity indicates robust cultural cohesion, streamlined communication channels, and potential for unity. Planning a project in this community requires cultural sensitivity, effective communication, and alignment with Igbo values to ensure successful implementation. Most respondents possess senior school leaving certificates others possess university qualification

ES 13 Summary of Impacts of the project

The Potential Positive Environmental and Social Impact are

- Improved crop and livestock productivity of farmers;
- Increased farm incomes from crop output and ensuring dignity in farming practices;
- Elevation of rural income and national economy;
- Employment creation for community members;
- Improved infrastructure;
- Employment generation for youth and women;

- Enhanced income and livelihoods of farmers; and improvement in the revenue base of key institutions and regulatory bodies

The Potential Negative Environmental Impacts of the Proposed Project Activities

- Ambient air pollution from release of dusts and gaseous emissions from construction and large-scale land cultivation and processing;
- Noise and vibration from the use of machineries and motorized equipment owing to construction and the expansion of agricultural and processing activities;
- Loss of soil quality from de-vegetation and erosion owing to construction and the expansion of agricultural and processing activities;
- Vegetation loss from preparation activities such as land clearing and construction activities;
- Generation of vegetal wastes and other cleared materials;
- Fauna habitat alteration due to site clearing and construction activities for largescale farming and processing activities;
- Material sourcing, borrow pit formation and management;
- Generation of spoils and other construction wastes;
- Slope instability arising from excavation to construct processing facilities and agricultural activities;
- Increased surface water run-off due to diversion during construction and agricultural activities;
- Predisposition of soil erosion resulting from improper abandonment of borrow pit;
- Underground water pollution from spillages & leakages from oil storage tanks.

The Potential Negative Social Impacts of the Proposed Project Activities

- Loss of farmland and economic trees due to establishment of largescale farms and processing facilities;
- Poor implementation of occupational health and safety measure in the processing facilities and during the construction activities which could lead to the risk of workers involving in accidents;
- Security issues that may lead to kidnapping and stealing of contractor equipment mobilized to site, machines procured to work on the farms and processing machineries and installed in the processing centres;
- Increase in vehicular movement causing traffic congestion and accidents during construction and the expansion of agricultural and processing activities;
- Risks of occupational and social accidents and injuries;
- Risk to community health and safety and exacerbation of the risk of transmission of HIV/AIDS and other STIs due to increase population;
- Increase in crime rate (including prostitution, theft and substance abuse);
- Adverse impacts on community dynamics;
- Threat to community culture due to labour influx;
- Increased burden on public service provision;
- Gender-based violence, including sexual harassment, child abuse and exploitation;
- Local inflation of prices and crowding of local consumer;
- Increased pressure on accommodation and rents;

- Impact on water supply to communities and increased demand on freshwater resources;
- Camp related land use, access roads, noise and lights;
- Increased use/demand on natural resources;
- Risks of occupational accident and injuries such as dizziness, eyes and noise impairment, acute respiratory syndrome from inhalation of dust etc., may occur in construction workers;
- Risks of accidents/incidents from un-reclaimed borrow pits.

This ESMMP will, however, ensure that the negative impacts are reduced to the barest minimum while the beneficial impacts are boosted.

ES 14 Environmental and Social Mitigation Measures

Environmental and Social Mitigation Measures were prepared for all the identified potential impacts. The site-specific measures for each of the value chains are outlined in tables 6.1 – 6.3. The project activities include the following:

- Enhancement of Agricultural Production and Productivity in 50 km Proximity to Agro-Industrial Clusters;
- Agro-Processing activities;
- Processing of Infrastructure development/Construction and/or upgrading of Agro-Industrial Hub infrastructure.

ESS 15 Roles and Responsibility of Institutions in the implementation and monitoring of the ESMMP

S/N	Category	Roles & Responsibilities
1	Federal Ministry of Environment	<ul style="list-style-type: none"> • Lead role - provision of advice on screening, scoping, review of draft ESIA report (in liaison with the Ebonyi State Ministry of Environment), receiving comments from stakeholders, public hearing of the project proposals and social liability investigations, monitoring and evaluation process and criteria.
2	Ebonyi State Ministry of Environment	<ul style="list-style-type: none"> • Environmental monitoring and compliance overseer at the State level • Site assessment and monitoring of ESMMP implementation. • Monitoring ESMMP implementation particularly waste management and pollution control aspects
3	Federal Ministry of Agriculture and Food Security	<ul style="list-style-type: none"> • Provision of overall leadership and direction to other MDAs by engaging all the critical stakeholders to support, cooperate with and participate in established policy direction for the SAPZ; and • Pursuance of an agenda of encouraging and ensuring investors comply with all environmental laws and policies
4	Ebonyi State Ministry of Agriculture and Natural Res,	<ul style="list-style-type: none"> • Provision of all necessary information and support • Pursuance of an agenda of encouraging and ensuring investors comply with all environmental laws and policies governing the SAPZ in consonance with the Safeguard Unit

5	Safeguard Unit	<p>Environmental Safeguards</p> <ul style="list-style-type: none"> • Collate environmental baseline data on relevant environmental characteristics of the selected project sites. • Analyse potential community/individual sub-projects and their environmental impacts. • Ensure that project activities are implemented in accordance with best practices and guidelines set out in the ESMMP. • Identify and liaise with all stakeholders involved in environment related issues in the project; and be responsible for the overall monitoring of mitigation measures and the impacts of the project during implementation. <p>Social Safeguards</p> <ul style="list-style-type: none"> • Develop, coordinate and ensure the implementation of the social aspects of the ESMMP. • Identify and liaise with all stakeholders involved in social related issues in the project. • Conduct impact evaluation and beneficiary’s assessment; and • Establish partnerships & liaise with organizations, CBOs and CSOs.
6	Other State MDAs	<ul style="list-style-type: none"> • Ensure monitoring of mitigation measures and the impacts of the project during implementation as it relates to gender and health issues respectively. • Establish partnerships & liaise with organizations relevant NGOs as well as CBOs and CSOs.
7	E&S Consultant	<ul style="list-style-type: none"> • Development of ESMMP • Training of relevant Staff, regulators, MDAs and contractor on ESIA implementation and monitoring. • Implementation of ESMMP
7	Contractors	<ul style="list-style-type: none"> • Compliance with BOQ specification in procurement of material and construction • Implement ESMMP during project implementation. • Ensure all contractors and workers sign the Code of Conduct (CoC) and are routinely trained on the contents of the CoC. • Prepare C-ESMP for approval of FMEnv. / Ebonyi State Ministry of Environment. • Implement C-ESMMP during project implementation. • Ensure that all construction personnel and subcontractors are trained on the content of the C-ESMP and are made aware of the required measures for environmental and social compliance and performance. • Prepare the OHS manual and abide by labour laws as set out in the agreement. • Provide adequate basic amenities and PPEs to workers and ensure that the PPEs are worn by workers during works. • Prepare and maintain records and all required reporting data as stipulated by the ESMMP, for submission to the Supervising Consultant
9	LGAs	<ul style="list-style-type: none"> • Provision of oversight function across project within its jurisdiction for ESMMP compliance. • Monitoring of activities related to public health, sanitation, waste management amongst others.

10	Host Communities	<ul style="list-style-type: none"> Promote environmental awareness. Review environmental and social performance report made available by project developer. Provide comments, advice and/or complaints on issues of nonconformity. Attend public meetings organized by the project developer to disseminate information and receive feedback.
11	NGOs/CSOs	<ul style="list-style-type: none"> Assisting in their respective ways to ensure effective response actions, conducting scientific research alongside government groups to evolve and devise sustainable environmental strategies and techniques.
12	AfDB	<ul style="list-style-type: none"> Recommend additional measures for strengthening management framework and implementation performance. Implementation support missions and ensuring that the SAPZ and its subprojects comply with the E & S conditions of the loan agreement with the AfDB
13	General Public	<ul style="list-style-type: none"> Identify issues that could derail the project and support project impacts and mitigation measures, Awareness campaigns.

ES 16 Institutional Capacity Strengthening Plan

Capacity Building Activity	Proposed Topics	Objectives	Target Audience	Duration	Cost (Naira)
Module 1: AfDB's ISS and Nigeria Extant Laws on Environmental Protection	<ul style="list-style-type: none"> Introduction to E&S policies and laws in Nigeria AfDB's ISS & OS Operational Safeguards triggered by project activities. The roles and responsibilities of regulators and the AfDB during project implementation 	To enhance awareness of AfDB's OS and applicable national regulatory requirements for project activities	<ul style="list-style-type: none"> Ebonyi State Min of Env, Ebonyi State Min of Agric and Natural Res, Contractors, FMEEnv, Ebonyi State Min of Works, Representatives of the LGAs 	1-day	1,000,000

<p>Module 2: Training on Environmental and Social Management Plan (ESMP) Implementation</p>	<ul style="list-style-type: none"> • Overview of ESMP • Potential Impacts of Project • Pollution & Control Measures • Environmental Management • Labour influx, GBV, Code of Conduct, vulnerable people inclusion • Environmental Performance Monitoring • Environmental Issues Reporting 	<p>To enhance competence in environmental sustainability and regulatory practice</p>	<ul style="list-style-type: none"> • Ebonyi State Min of Env, • Ebonyi State Min of Agric, and Natural Res, • Contractors, • FMEnv, • Ebonyi State Min of Works, • Representatives of the LGAs 	<p>1-day</p>	<p>1,000,000</p>
<p>Module 3: Climate Smart Agriculture</p>	<ul style="list-style-type: none"> • Introduction to climate change • Climate-smart strategies for crop production • Climate-smart livestock production systems • Creation of an enabling environment for climate-smart crop and livestock production 	<p>To mainstream climate change adaptation strategies to enhance project sustainability.</p>	<ul style="list-style-type: none"> • Ebonyi State Min of Env, • Ebonyi State Min of Agric, • Contractors, • FMEnv, • Ebonyi State Min of Works, • Representatives of the LGAs 	<p>1-day</p>	<p>1,000,000</p>
<p>Module 4: Agricultural Waste Management</p>	<ul style="list-style-type: none"> • Agricultural waste management • Agricultural waste recycling strategies • Composting • Biogas Production • Vermicomposting 	<p>To develop & implement eco-friendly and modern methods of livestock waste recycling to prevent environmental degradation and enhance profitability</p>	<ul style="list-style-type: none"> • Ebonyi State Min of Env, • Ebonyi State Min of Agric, • Contractors, • FMEnv, • Ebonyi State Min of Works, • Representatives of the LGAs 	<p>1-day</p>	<p>1,000,000</p>

Module 5: Training on Construction HSE	<ul style="list-style-type: none"> • Introduction to Construction HSE • Overview of Health and Safety Hazards in Construction • Incidents: Causation, Investigation & Reporting • Excavation Safety • First Aid, Defensive Driving etc. • Project/Site Specific OHS • Construction Site Inspection • Personal Protective Equipment 	To ensure completion of project with zero fatalities, zero Lost Time Injuries (LTI) or occupational illness by promoting safe & healthy working conditions for workers and monitoring officers	<ul style="list-style-type: none"> • Ebonyi State Min of Env, • Ebonyi State Min of Agric, • Contractors, • FMEnv, • Ebonyi State Min of Works, • Representatives of the LGAs 	1-day	1,000,000
Total				5 days	5,000,000

ES 17 MONITORING AND REPORTING

Monitoring	Action	Responsibility	When	Deliverables
Internal Monitoring	Regular site visit to ensure that the mitigation measures and actions specified in the monitoring plan and as bound by the contract is satisfactorily implemented.	Environmental Safeguard Specialist from Ebonyi State Implementing Unit. National Safeguards Unit	During Preconstruction, Construction and Operation Phases	Monitoring Reports and documentation
	Site visit for monitoring and inspection to ensure contractor adhere strictly to the engineering designs and specifications for the project	Supervision Consultants	During Construction Phase	Observations and Monitoring Reports to be compiled and presented to the Ebonyi State Implementing Unit.
External Monitoring	Regular site visit to ensure project is implemented in an environmentally & socially sustainable manner using the monitoring indicators specified in the monitoring plan and other national and international environmental & social requirements	FMEnv, LGAs, Representatives of affected communities, and other relevant MDAs.	During Preconstruction, Construction and Operation Phases	Inspect monitoring reports from Safeguard units and provide feedback on observations. Enforce corrective actions where necessary.

The Ebonyi State Implementing Unit shall implement a system of continuous reporting between all parties involved in the ESMMP implementation in order to ensure the receipt of timely feedback and to take rapid corrective actions if there are issues of non-conformance.

ES 18 Record Keeping and Control

The Contractor is required to keep records providing evidence of ongoing mitigation activities. Such records may include site monitoring plan, HSE Policy, Site Specific HSE Plan, Waste Management Plan, Traffic Control Plan, Emergency response and preparedness procedures, site instructions, training records, complaints records, incident report, Inspection, maintenance and equipment calibration records. These documents should be made available to the Safeguard Unit upon request.

The Safeguard Unit is also required to keep records to provide evidence of monitoring activities and effectiveness of the monitoring plan. The site monitoring Plan identifying problems/corrective actions and monitoring reports are to be kept by the Safeguard Unit and are to be made available to relevant regulators upon request. In addition, all significant communications with the FMEnv, *Nigerian* Society of Mining Engineers (NSME) and other relevant authorities should be documented and kept. These documents are required to track performance in order to achieve and demonstrate compliance with the monitoring plan and applicable regulatory requirements

ES 19 Grievance Redress Mechanism

The existing grievance redress mechanism in the project environment which empowers the Community Head and leadership to arbitrate over grievances will be enhanced using the AfDB approach.

At the project level, the design of the GRM may be done with the assistance of a specialized independent consulting team as part of the ESMMP implementation. The GRM shall be designed based on the following principles:

1. Involvement of individuals of mixed levels and functions from the entity (e.g., operations, environmental affairs, community relations, legal affairs, contractors). Staffing the design team from just one function such as community relations or human resources is unwise;
2. The inclusion of a balanced group of representatives from the community, representing the range of constituencies and demographics that will be using the grievance redress mechanism, while keeping the team small enough to be responsive;
3. GRM relying upon clear terms of reference and a work plan that outlines team goals, roles, and responsibilities, level of decision-making authority, reporting lines, tasks, time frame, and products;
4. Making the use of multiple channels (e.g., face to face, phone conversation, mail, text or e-mail, message on a dedicated website), sensitive to cultural customs and traditional methods that may influence or impede the expression of grievances;
5. The existence of a central point of contact that will receive complaints and log them into a central register;

6. Existence and operation of designated complaint resolution staff;
7. Processes for acknowledging the receipt of a grievance and informing the complainant about the time frame in which a response can be expected.

Specifically, for the SAPZ implementation, the GRC at the project level shall constitute from among the members:

1. Director, Agric Department (Ebonyi State Ministry of Agric&Nat Res);
2. Representatives from the 13 LGA (1 each);
3. Village Heads;
4. A Representative of Farmers Group;
5. A Representative of Community Women;
6. Youth Leader;
7. a member from a recognized Non-Government Organization;
8. SAPZ Liaison Officer from Ebonyi State Ministry of Agric & Nat Res(Secretary).

The GRC shall have the right to request the project technical staff, and officers from relevant State or non-State institutions to attend the meetings and provide information. A complainant has the right to appear in person, to be accompanied by a community member, and/or to request to be represented by a community elder. GRCs shall be established at the project level to assure accessibility for Project Affected Persons.

ES 20 Contractual Measures

Action	Remarks
The measures as described in this ESMMP shall be included in the tender documents with appropriate flexibility to adjust these measures to site circumstances, and that the potential contractor will have to prepare their proposals taking into account these measures.	The non-inclusion of these measures in the proposal will lead to a disqualification of the proponent; The contract with the successful bidder should contain these environmental and social management measures as firm conditions to be complied with.
Specifically, the measures should be translated into a suite of environmental specification that are written in the same language style and format as the rest of the contract document	This approach will ensure that the environmental and social controls integrate seamlessly into the tender document and are presented in a familiar form to the Contractor
Cost of mitigation measures be added to the cost of the contractual document	The contractor must take into account and put the cost for the environmental and social requirements specified in the ESMMP.

ES 21 ESIA Disclosures

After a review and clearance by the FMEnv/AfDB, the ESIA will be disclosed at the FMEnv, SME and the host LGA offices as well as at the AfDB website.

Action	Remarks
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Disclosure on 2 national newspapers	The project proponent will disclose the ESIA as required by the Nigeria EIA public notice and review procedures. This entails advert in 2 newspapers: one national and one local (State) newspaper
Disclosure at the Ebonyi Ministry of Environment	The project proponent will display the ESIA as required by the Nigeria EIA public notice and review procedures
Disclosure at the Ebonyi Ministry of Agriculture	The project proponent will display the ESIA as required by the Nigeria EIA public notice and review procedures
Disclosure at the respective LGA offices	The purpose will be to inform stakeholders about the project activities; environmental and social impacts anticipated and proposed environmental and social mitigation measures.

ES 22 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. Table below documents the schedule for the mitigation measures with respective time lapse.

S/N	Activity	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
1	Clearance and Formal Disclosure of ESIA	█	█	█									
2	Inclusion of Environmental & Social Requirements in Bid Docs	█	█	█									
3	Allocating Budget for ESIA	█	█	█									
4	Appointing Support Staff for ESIA	█	█	█									
5	Review & Approval of Contractor's ESIA, Waste & HSE Plan	█	█	█									
6	Finalization of Designs, studies and other preliminary	█	█	█									
7	Environmental and Social Training		█	█	█								
8	Mobilization to site		█	█	█								
9	Site Clearing and preparation		█	█	█								
10	Implementation of Mitigation			█	█	█	█	█	█	█	█	█	

11	Monitoring & Reporting on ESIA Implementation												
12	Environmental and Social Auditing												

ES 23 ESIA Costing and Cost Analysis

The cost analysis illustrated here is structured to ensure that each of the identified mitigation measures is successfully and expertly implemented. It is also designed exclusively for each of the activities identified and value chains in the Ebonyi SAPZ program. Hence, it covers the productivity, Agro-Processing and Small infrastructure activities mitigation measures. In addition, the cost is designed for a global spread across the stated measures. Table below illustrates the synoptic details of the ESIA costing for the Ebonyi SAPZ program.

S/N	ESIA Activities (Monitoring)	Cost Estimate (₦)
1	Impact Mitigation Monitoring	13,308,375
2	<i>Institutional Capacity Reinforcement Programme</i>	5,000,000
Total for Mitigation Monitoring		18,308,375
10% Contingency		1,830,837.5
Grand Total		20,139,212.5

ES 24 ESIA Recommendations

There is the need for more public consultations and awareness to ensure the buy-in and ownership of the proposed programs by the host communities;

ES 25 Consultations: Stakeholders, Expectations of the Project

The expectations of the communities during construction and operation phases are noted as follows:

- i. Timely implementation of the program to keep the enthusiasm
- ii. Full engagement of qualified and skilled youths from the communities to ensure inclusiveness and local ownership of the program;
- iii. Respect for the cultural and religious values;
- iv. Ensuring the safety of road users to avoid accidents that might directly or indirectly be related to the construction and operation works;

- v. Damage to any existing social and physical infrastructures of the communities should not only be replaced but restored to optimum functioning level

CHAPTER ONE

INTRODUCTION

1.1 Background

The Special Agro-industrial Processing Zones (SAPZ) programme is a major investment of the Federal Government of Nigeria (FGN), driven by the Federal Ministry of Agriculture and Food Security (FMAFS) in collaboration with the state governments, development partners, relevant Federal Ministries, Departments, and Agencies (MDAs), and private investors to develop agro-processing clusters in areas of high agricultural production across the country. This clustering approach is to help address investment challenges in the development of agro-processing enclaves across Nigeria, including poor access to quality infrastructure, inadequate feedstock supplies, and other challenges confronting the agro-processing environment.

SAPZs, therefore, will be developed with the requisite infrastructure for an agro-processing environment, which will help reduce cost absorptions and engender competitiveness in agro-industrial production, which is critical to further unlocking the potential of Nigeria's agriculture to create ready markets and wealth for farming communities and reduce rural poverty. It is a strategic move to rapidly develop modern agro-processing capacity to serve the vast and growing local market, create a sustainable market for farmers, reduce post-harvest losses of local agricultural produce, and thereby create wealth for farmers, promote import substitution, and create sustainable agriculture-related jobs for women and youth.

The SAPZ programme is aligned with national policies and priorities. It seeks to sustainably contribute to poverty alleviation, hunger, and inequality reduction while providing opportunities for economic diversification, job creation, building climate resilience, and improved livelihoods in Nigeria. It will also contribute to rural infrastructure development, improved access to agricultural markets, increased farm productivity, the adoption of agricultural technology, climate-smart agricultural production and processing practices, increased value addition and agro-processing, increased skills acquisition, and job creation for all actors along the value chain, including smallholder farmers, women, and youth.

The SAPZ Programme goal is to increase household incomes, foster job creation in rural agricultural communities, especially for youth and women, and enhance food and nutritional security in Nigeria, while the development objective is to support inclusive and sustainable agro-industrial development. Moreover, the programme interventions will seek to enhance the competitiveness of the selected value chains.

The SAPZ will be made up of two building blocks, which include the Agricultural Transformation Centre (ATC), which is a community-based rural institution within the host community, supported by the provision of quality production drivers for the production of feedstock, the Aggregation Centre (AC) for primary storage, and the Agro-Industrial Hub (AIH), equipped with desirable infrastructure to create a modern agro-processing environment where secondary value addition will take place. The Agro-Industrial Processing Hub (AIH) will draw its processing feedstock from the ATC, where activities of the production clusters and Aggregation Centres are being coordinated.

The Programme has four (4) broad mutually reinforcing components namely:

- (v) Support the development of enabling climate adapted infrastructure for Agro-Industrial Hubs (AIHs);
- (vi) Improve agricultural productivity and enterprise development to enhance agricultural value chains and job creation in the SAPZ Catchment Areas;
- (vii) Support Agro-Industrial Zone Policy and Institutional Development; and
- (viii) Programme Coordination and Management.

The key design features of the program are the following:

- Support economic and social development programmes of the Federal Government of Nigeria (FGN) and Ebonyi State;
- Contribute to rural infrastructure development;
- Improve access to agricultural markets;
- Increase agricultural production and productivity;
- Stimulate the adoption of agricultural technology;
- Facilitate climate smart agricultural production and processing practices;
- Increase value addition and agro-processing; and
- Increase skills acquisition and job creation for all actors along the value chain, including the smallholder farmers, women and youth.

The expected outcomes of the Phase I of the SAPZ Programme are:

- Development of infrastructure including Agro-Industrial Processing Hubs (AIHs),
- Development of Agricultural Transformation Centers (ATCs),
- Development of irrigated lands and farm to market access roads;
- Supply of certified agricultural inputs and extension services;
- Skills development for farmers and Micro, Small and Medium Scale Enterprises (MSMEs); and
- Updated agro-industrial zone policy and establishment of regulatory institution/special regulatory regime.

The first phase of the Special Agro-Industrial Processing Zone (SAPZ) Programme is being implemented in seven (7) states, namely: Cross River, Imo, Kaduna, Kano, Kwara, Ogun, and Oyo, and the Federal Capital Territory (FCT). The SAPZ phase one is valued for a total sum of USD538.05 million (net taxes), funded by AfDB, IsDB, IFAD, GCF, Federal and State Governments.

The second phase of the SAPZ programme has been receiving relevant attention at appropriate quarters. Expressions of interest (EOIs) from about twenty-one (21) states, including Ebonyi State, to participate in the second phase have been submitted to the Federal Ministry of Agriculture and Food Security, Abuja. It will commence immediately with the enlistment of interested states based on their levels of readiness.

Ebonyi State desires to be enlisted in the Phase 2 of the SAPZ Programme. To qualify for enlistment, the state has to meet specified criteria: all of the four major criteria for enlistment. To meet this set of criteria, Ebonyi State has concluded to engage the services of an agribusiness

and environment consultant to conduct a feasibility study suitable to fulfil the eligibility criteria for the state's qualification in the SAPZ programme.

Specifically, the eligibility criteria will include but not limited to:

- Completed/ Draft Feasibility Studies;
- Comprehensive Environmental and Social Impact Assessment (ESIA) Studies;
- Determination of Value Chain where Ebonyi State has comparative advantage;
- Determination of Sites for one AIH and 2 or more ATCs;

The above necessitates the need for more effective consultation, participation, and inclusion of the members of the communities (including women and youths) in Ebonyi State in the processes of developing a feasibility study and ESIA for the SAPZ Programme.

1.2 Rationale for the Participation of Ebonyi State in the SAPZ Programme

Ebonyi State had the lowest Human Development Index (HDI) when compared with other states in the Southeast (United Nations Development Programme (UNDP), 2013). The poverty rate in the state was 56%, which was higher than the national average of 46% and the average of 27% for the South East in 2013 (UNDP, 2013). Recently, the poverty rate in Ebonyi State increased to 58.9% (Eze et al., 2019). About 80% of Ebonyi citizens are classified as falling below the poverty line, that is, living below the \$1.9 per day benchmark with a life expectancy of 47 years (UNDP, 2013; UNDP, 2016; NBS, 2017). According to NBS (2013, 2017), Ebonyi State is among the 10 poorest states in the Federation.

However, since 85% of Ebonyi people currently engage in agriculture as their major occupation, agriculture, considering its potential, can be used to lift the state out of poverty through the creation of job opportunities for women and youths. Ebonyi State is a leading producer of rice, cassava, yam, potatoes, maize, and beans. Rice is predominantly cultivated in Ikwo, yams in Izzi, with other regions in the state such as Amasiri, Edda, and Ezillo making notable contributions, and Effium and Ezzamgo taking the top spots in cassava production.

The Ebonyi state government, through its ministry of agriculture and natural resources, in recognition of the opportunity provided by agriculture, set its vision to include

- raising the farmers' purchasing power by increasing their real income and improving the quality of life and living standards of the farmers and rural dwellers
- increase in food production to ensure the attainment of a level of food security that will generate the availability and affordability of food commodities for the populace.

The state government has also prioritised food security and hunger reduction, and to achieve this, it has embarked on an aggressive agricultural revolution with about 2 billion naira in consolidated funds to boost rice production in the state. This investment has yielded dividends, as Ebonyi is now one of the leading producers of rice in the country. In addition, the state government, in conjunction with the CBN, has made it possible for rice farmers in the state to benefit from the Anchor Borrowers' Programme (ABP) introduced by the Apex bank. Over 100,000 farmers in Ebonyi State have benefited from the scheme. Another programme initiated by the state government to boost food production and alleviate poverty is the 'one man, one

hectare programme.' This programme enjoins every inhabitant of Ebonyi State to have a farm. Based on the government's investments in agriculture, Ebonyi State has regained national prominence as one of the food baskets of the nation.

The SAPZ programme further presents a huge opportunity for the Ebonyi State Government. Through its participation in the programme, the state can revitalise its economy, reduce poverty, improve youth employment, and reduce the crime rate by focusing on those agricultural areas where it has a comparative advantage.

1.3 Rationale for the ESIA

The SAPZ Programme has been classified as Category 1 in accordance with the African Development Bank Integrated Safeguards System (ISS) and national legislation. This validated category is based on the large-scale, multisectoral, and sensitive nature of the programme. In line with national legislation and the ISS, the Borrower is required to prepare Environmental and Social Impact Assessments for all concerned investments, including Resettlement Action Plans and/or Livelihood Restoration Plans where applicable. Additionally, all associated facilities and investments will require the applicable Environmental and Social Assessments (ESIAs, RAPs LRP, Audits etc.), to be prepared for disclosure by the Borrower and the Bank. Each of the potential partners (BOI and NIRSAL) is required to prepare Environmental and Social Management Systems for disclosure on their websites as well as on the Bank's website.

1.4 Objective and Scope of the Consultancy

The purpose of the ESIA is to identify and address possible direct, indirect, and cumulatively significant adverse environmental and social impacts that are likely to arise from the proposed programme for acceptability and sustainability. The primary objective of the ESIA is therefore to facilitate effective decision-making and to ensure that the implementation processes during the execution of the proposed programme are sustainable. Some of the activities to be carried out during the ESIA preparation include ensuring that the programme activities are environmentally sound, encouraging community consultation and participation, and enhancing social wellbeing.

Specifically, the ESIA seeks to provide a clear process, including action plans, that integrates environmental and social considerations into the proposed SAPZ programme. The ESIA is site-specific and consists of a well-documented set of mitigation, monitoring, and institutional actions to be taken before and during implementation to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels. The ESIA also includes the measures required to implement these actions, addressing the adequacy of the monitoring and institutional arrangements within the state.

The objectives of the ESIA are to:

- i. Initial scoping activities in order to understand the project's field of influence, activities, and impacts that will have to be outlined in the Framework.
- ii. Provide maps to illustrate the general setting of the project-related development SAPZ industrial Hub and its adjoining areas, which can be potentially affected.
- iii. Identify and describe all potential significant changes that may occur as a result of the project. These would encompass environmental and social impacts, both positive and

negative, as a result of project interventions, such as involuntary resettlement, social conflicts and disturbance, or environmental risks such as threats to land and natural resources, biodiversity, and natural habitats.

- iv. Specific types of projects and associated environmental and social impacts that might require separate assessments in relation to location, project size, and other site-specific factors need to be identified.
- v. Analysis of alternative approaches against current project plans from an environmental, socioeconomic, and cultural standpoint. Alternatives should be compared in terms of their potential impacts: capital and operating costs, suitability under local conditions, including skill requirements, public and political acceptability, level of technology, as well as their institutional, training, and monitoring exigencies.
- vi. Analysis of existing environmental policies and legislation, including directives for environmental impact assessment, and assess needs for strengthening these policies in the context of this project.
- vii. Analysis of the sub-sector-specific policies, laws, and regulations that have environmental implications. The sectoral investment planning process, in terms of objectives, methodology, and procedures for review and approval of plans and projects, should be carefully reviewed.
- viii. Preparation of an implementation plan. The plan should include measures for integrative and participatory environmental and social monitoring and institutional and training requirements to implement them. Such a plan should recommend feasible and cost-effective measures to prevent or reduce significant impacts to acceptable levels and estimate the impacts and costs of those measures.

1.5 Approach/Methodology for the ESIA Study

The approach and methodology for the ESIA involved the following:

- desktop study; review of design reports and literature;
- reconnaissance visits and site inspections;
- public/stakeholder consultations and involvement;
- data collation, analysis and reporting;
- identification and assessment of environmental and social impacts;
- mitigation measures;
- monitoring and management plan.

1.5.1 Review of Available Literature

Information from relevant documents from the programme proponents, and other documents on agricultural development will be of immense help to the ESIA study. Key documents reviewed for this study include:

- SAPZ Environmental and Social Management Framework (ESMF);
- SAPZ Project Appraisal Report (PAR);
- SAPZ Project Implementation Manual (PIM);
- All information collected in the past for the preparation of ESIA for SAPZ or related programme in the State;
- African Development Bank Integrated Safeguards Policy Statement and Environmental and Social Assessment Procedures (ESAP).

1.5.2 Field surveys and site inspection

Field surveys for the socio-economic of the proposed Ebonyi State SAPZ intervention were carried out from 15th to 19th November 2023. This field survey included not only the AIH site in Abakaliki but also the ATC as part of the SAPZ project as reflected in the result. The visits included inspections of the proposed intervention areas in order to confirm the environmental and social issues and conditions to be affected or are likely to develop from the implementation of the programme. This enabled the consultant to appraise the programme area of influence, the nature of the biophysical environment to be affected (especially current land and water uses), the relevant baseline data were also obtained. The socio-economic characteristics of the environment to be potentially impacted by the programme including the neighbouring rural communities, current infrastructural status in the programme area were captured. However, the field survey for the environmental baseline sampling (Water, Soil, Air quality, Vegetation etc.) of the AIH in Nkaliki, Abakaliki which is the focus of this ESIA was carried out in April 2024.

1.5.3 Public/Stakeholder Identification and Consultations

The programme proponents and beneficiaries have been engaged to understand the programme scope, design and implementation and to obtain relevant programme documents. Key stakeholders have also been consulted so as to obtain their comments and concerns on the proposed programme with respect to the potential environmental and socio-economic issues. Details of consultations are provided in Chapter 8.

1.6 Structure of the ESIA Report

This ESIA report was presented in a concise format containing all studies, processes, analyses, tests and recommendations for the SAPZ intervention. The report focused on the findings, conclusions and recommended actions, supported by a summary of the data collected and citations for references used. Below is the indicative Table of Contents and description of the content embedded for the ESIA final report:

Cover Page

Table of Contents

List of Acronyms and their Definitions

Executive Summary

The executive summary provides an overview of the programme objectives and a brief programme component description in addition to a brief non-technical description of the significant findings and recommendations for environmental management that will be adopted by the investor. This is to eliminate or minimize the adverse impacts to acceptable levels as defined by the appropriate authorities and standards. This section will serve as the main consultation document.

- o Chapter 1: Introduction
- o Chapter 2: Legal and Institutional Framework for Environmental Management
- o Chapter 3: Project description and alternative:
- o Chapter 4: Biophysical Environment Conditions and Socio-Economic Characteristics

- o Chapter 5: Assessment of Potential Environmental and Social Impacts Identification and Evaluation
- o Chapter 6: Mitigation Measures
- o Chapter 7: Environmental and Social Management and Monitoring Plan (ESMMP)
- o Chapter 8: Public Consultation

References

Annexure

- o Summary of African Development Bank Integrated Safeguards Policy
- o General Environmental Management Conditions for Construction Contracts/Civil Works
- o List of Persons Met
- o Photos.

CHAPTER TWO

LEGAL AND INSTITUTIONAL FRAMEWORK

2.0 Introduction

This section presents Government of Nigeria’s national policy, legal, regulatory and administrative frameworks that guide environmental sustainability of developmental activities in the country. It also provides a detailed discussion of Ebonyi State policies, legislation, regulations and guidelines on environmental issues that are applicable to the proposed Ebonyi State Special Agro-Industrial Processing Zone (SAPZ) Programme.

In addition, the African Development Bank Integrated Safeguards Policies were identified and those triggered by the proposed Ebonyi State Special Agro-Industrial Processing Zone (SAPZ) Programme are also discussed. A number of national and local environmental guidelines applicable to the operations of the Programme in Ebonyi State were also specifically discussed in the chapter.

2.1 Federal and State Policy, Legal, Regulatory and Administrative Frameworks

A number of national and State environmental guidelines are applicable to the operations of the SAPZ programme. A brief discussion of these is presented in Table 2.1.

Table 2.1: Relevant Federal/Ebonyi State Policies, Legislation, Regulations and Guidelines

Federal Policies				
S/N	Policy Instrument	Year	Provision	Applicability to the proposed Ebonyi State SAPZ programme
1	National Policy on the Environment	1989 revised 1991, 1999	<p>This describes both the conceptual and theoretical frameworks and strategies for achieving sustainable development in Nigeria. The policy identifies key sectors that require the integration of environmental concerns and sustainability with development. The goal of the policy is to achieve sustainable development; it seeks in particular to:</p> <ul style="list-style-type: none"> i. Enhance the quality of the environment; ii. Promote the sustainable use of natural resources; iii. Restore and maintain the ecosystem and ecological processes and preserve biodiversity; iv. Raise public awareness and promote understanding of linkages between environment and development; and v. Cooperate with government bodies and other countries and international organizations on environmental matters 	This policy provides a framework for all developmental projects in Nigeria including the proposed Ebonyi State SAPZ programme.

2	National Agricultural Technology and Innovation Policy (NATIP).	2022-2027.	<p>NATIP is a 6-year national agricultural policy, incorporating the intervention instruments and implementation strategy, aimed at sustainable development of national technological and innovative capacity to fast-track increased productivity, import substitution, with particular emphasis on the reduction of rice, dairy, meat and fish imports, increased resilience through digital and climate-smart agriculture, towards promoting agricultural value chains and investments. The Policy aims at generating agricultural employment and services, promoting the production and supply of raw materials to agro industries, providing markets for the products of the industrial sector, generating foreign exchange and promoting rural socio-economic development, organising and managing the agriculture sector and facilitating agribusiness, and therefore increasing Nigeria's agriculture sector and transforming the country into a leading global food market.</p> <p>The Policy identifies the following interventions as specific and targeted to address the challenge of Nigerian agricultural sector:</p> <ol style="list-style-type: none"> 1. strengthening agricultural research and training systems; 2. rapid mechanization of the sector and automation of livestock, fisheries, poultry and swine production processes; 3. establishment of agricultural development fund; 4. livestock development, improving animal genetic resources, creating a functional model of ranches, grazing reserves, promoting the domestic animal production, strengthening the animal and aquatic diseases surveillance system; 5. strengthening the value-chains for priority crops: rice and cereals, pulses, vegetables, palm oil, sugar cane; 6. marine and inland fisheries and aquaculture development, in order to encourage massive fish production and reduce fish importation; 7. enhancing security of agricultural land and investments and developing rural infrastructure and water resources, with efficient utilisation of reservoirs, dams and waterways to support irrigation, aquaculture, improve water supply and generation of hydro-electric power and reduce land clearing and degradation; 8. encouraging the role of women and youth in agriculture. 	<p>The NATIP is highly applicable to the proposed SAPZ programme especially as it relates to the agricultural employment of women and youth and strengthening the value chain for priority crops</p>
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3	Agricultural Promotion Policy- The Green Alternative	(APP-2016-2020)	<p>The policy develops the framework for facilitating business alliances, promotion of greater farmers-agri-business linkages, and support for critical infrastructure in the value chain development. The policy thrust promotes climate smart agriculture through the following strategies:</p> <ol style="list-style-type: none"> i. Increasing public awareness on climate smart agriculture; ii. Improving management of land, water, soil and other natural resources; iii. Strengthening of Institutional linkages and partnerships for ensuring climate smart agricultural governance, policies, legislations and financial mechanisms; iv. Conducting Environmental impact assessment on major agricultural programmes; v. Promoting the use of renewable energy with the involvement of private sector; vi. Facilitating the production and use of soil map to improve land use and management practices by the government; and vii. Promoting the increased adoption of global best practices in handling climate change, including the aspects of adaptation, mitigation and carbon credit by the government. 	The proposed Ebonyi State SAPZ aligns with the APP as it intends to facilitate business alliances and promote greater farmers-agribusiness-linkages
4	National Gender Policy	2006	<p>The goal of the National Gender Policy is to build a just society devoid of discrimination, harness the full potentials of all social groups regardless of sex or circumstance, promote the enjoyment of fundamental human rights and protect the health, social, economic and political well-being of all citizens in order to achieve an equitable rapid economic growth; evolve an evidence based planning and governance system where human, social, financial and technological resources are efficiently and effectively deployed for sustainable development.</p>	The proposed Ebonyi State SAPZ aligns with the National Gender Policy as it intends to empower women and youth to participate effectively in agriculture

5	National Policy on Climate Change	2012	<p>The strategic goal of the Climate Change policy is to foster low-carbon, high growth economic development and build a climate resilient society through the attainment of the following objectives:</p> <ol style="list-style-type: none"> i. Implementing mitigation measures that will promote low carbon as well as sustainable and high economic growth; ii. Enhancing national capacity to adapt to climate change; iii. Raising climate change related science, technology, research, and development to a new level that enables the country to better participate in international scientific and technological cooperation on climate change; iv. Significantly increasing public awareness and involve private sector participation in addressing the challenges of climate change; and v. Strengthening national institutions and mechanisms (policy, legislative and economic) to establish a suitable and functional framework for climate change governance. <p>The policy elaborates on adaptation and mitigation programmes and actions in key sectors including energy, agriculture, water, transport and human settlement.</p>	The proposed Ebonyi state SAPZ is aligned with the National Policy on climate change as the programme intends to facilitate climate smart agricultural production and processing practices
Federal Legal/Regulatory Instrument				
1	Environmental Impact Assessment Act, Cap E12,	LFN 2014	<p>This Act sets out the general principles, procedures and methods to enable the prior consideration of environmental impact assessment on certain public or private programmes. It further provides that before a decision is taken to undertake or authorize the undertaking of any activity, those matters that may likely or to a significant extent affect the environment or have an environmental effect on those activities shall first be taken into account. There are nineteen thematic areas of mandatory study activities. The drivers of deforestation and forest degradation for which mandatory study is required include: agriculture, infrastructure, logging and conversion of forest to other land use, mining and housing. Environmental sensitivity and the area coverage of a programme are some of the criteria for an EIA</p>	The EIA act is applicable to the proposed Ebonyi State SAPZ programme
2	The National Guidelines and Standards for Environmental	1991	These represent the basic instrument for monitoring and controlling pollution in Nigeria	The National Guidelines and Standards for Environmental Pollution Control is applicable to the proposed Ebonyi State SAPZ programme

	Pollution Control in Nigeria			
3	National Guidelines on Environmental Management Systems	(1999)	This establishes the requirements for an Environmental Management System (EMS) in all organizations/facilities in Nigeria.	The National Guidelines on Environmental Management Systems is applicable to the proposed Ebonyi State SAPZ programme
4	National Air Quality Standard Decree No. 59	1991	This defines the levels of air pollutants that should not be exceeded in order to protect public health.	The National Air Quality Standard Decree No. 59 is applicable to the proposed Ebonyi State SAPZ programme
5	The National Environmental Standards and Regulations Enforcement Agency Act (NESREA Act)	2007	This makes provision for solid waste management and its administration and prescribes sanctions for offences or acts, which run contrary to proper and adequate waste disposal procedures and practices.	The NESREA Act is applicable to the proposed Ebonyi State SAPZ programme
6	Child Rights Act	2003	This Act serves as the legal documentation and protection of Children rights and responsibilities in Nigeria. It also serves as the legislation against Human trafficking since it forbids children from being "separated from parents against their will, except where it is in the best interests of the child.	The Child Rights Acts is applicable to the proposed Ebonyi State SAPZ programme
7	Employee's Compensation Act	2010	This Act make provisions for compensations for any death, injury, disease or disability that could arise out of or in the course of employment; and for related matters.	The Employee's compensation act is applicable to the proposed Ebonyi State SAPZ programme
8	Land Use Act	1978 Modified 1990	This is the primary legal means to acquire land in the country. The Act vests all land in the territory of each State in the federation in the Governor of the State and requires that such land shall be held in trust and administered for the use and common benefit of all Nigerians in accordance with the provisions of this Act	The Land Use Act is applicable to the proposed Ebonyi State SAPZ programme
9	Criminal Code		The Nigerian Criminal Code makes it an offence punishable with up to 6 months imprisonment for any person who: <ul style="list-style-type: none"> violates the atmosphere in any place so as to make it noxious to the health of persons in general dwelling or carry-on business in the neighbourhood, or passing along a public way: or engages any act which is, and which he knows or has reason to believe to be likely to spread the infection of any disease dangerous to life, whether human or animal. 	The criminal code is applicable to the proposed Ebonyi State SAPZ programme

10	Endangered Species Act	1985	This provides for conservation and management of wild life in Nigeria and the protection of some of her endangered species from extinction as a result of over exploitation.	The endangered species act is applicable to the proposed Ebonyi State SAPZ programme
11	FEPA/ FMEEnv. EIA Procedural guidelines	1995	These indicate the steps to be followed in the EIA process throughout programme life cycle.	The EIA guidelines is applicable to the proposed Ebonyi State SAPZ programme
12	S115 National Environmental Protection (The Management of Solid and Hazardous Wastes Regulations)	1991	Regulates the collection, treatment, and disposal of solid and hazardous waste for municipal and industrial sources and give the comprehensive list of chemicals and chemical waste by toxicity categories	The Management of Solid and Hazardous Wastes Regulations is applicable to the proposed Ebonyi State SAPZ programme
13	S19 National Environmental Protection (The NEP (Pollution Abatement in Industries and Facilities Generating Waste) Regulations)	1991	These are the imposed restrictions on the release of toxic substances and requirements of Stipulated Monitoring of pollution to ensure that permissible limits are not exceeded during and after the programme.	The Pollution Abatement in Industries and Facilities Generating Waste) Regulations is applicable to the proposed Ebonyi State SAPZ programme
14	S18 National Environmental Protection (National Effluents Limitations Regulation)	1991	This makes it mandatory for industrial facilities to install anti-pollution equipment. It also makes provision for further effluent treatment, prescribe maximum limit of effluent parameters allowed for discharge, and spells out penalties for contravention.	The National Effluents Limitations Regulation is applicable to the proposed Ebonyi State SAPZ programme
15	Workmen Component Act	1987 Revised 2010	This provides for occupational health and safety.	The workmen component act is applicable to the proposed Ebonyi State SAPZ programme
16	Violence Against Persons (Prohibition) Act	2015	The Act becomes necessary as a result of agitations for protection of persons against different forms of violence. The Act strengthens advocacy against rape, female genital mutilation, partner battery, stalking, harmful widowhood practices while prohibiting all forms of violence, including physical, sexual, psychological, domestic, harmful traditional practices and discrimination against persons. It also provides maximum protection and effective remedies for victims and punishment of offenders. The Act is a key instrument for addressing GBV in Nigeria.	The violence against persons act is applicable to the proposed Ebonyi State SAPZ programme
Federal Institutional Framework				

1	The Federal Ministry of Environment (FMEnv)		The FMEnv is the government agency charged with the responsibility to administrate and enforce environmental laws in Nigeria. The FMEnv prohibits public and private sectors from embarking on major developmental programmes or activities without due consideration, at early stages, for environmental and social impacts. In addition to the EIA Act, the Ministry has produced sectorial including sectorial guidelines on infrastructure development which will be duly considered in the implementation of this programme	The FMEnv is responsible for overseeing all development projects in Nigeria including the proposed Ebonyi state SAPZ to ensure their sustainability
2	Federal Ministry of Agriculture and Food Security		The Federal Ministry for Agriculture and Food Security has the responsibility of optimizing agriculture and transformation of the Nigerian economy, with a view to attaining food security and positioning Nigeria as a net food exporter for socio-economic development.	The FMAFS has the sole responsibility of mainstreaming the proposed Ebonyi state SAPZ
Ebonyi State Legislations				
1	Ebonyi State Sanitation and Environmental Protection Law	1999	The law clearly spells out the functions of the State Sanitation and Environmental Protection Authority. It also impose restrictions on the release of toxic materials into the environment as well as responsibilities of industries whose operation are likely to negatively impact the environment.	The law is applicable to the implementation of the proposed SAPZ in Ebonyi state
2	Ebonyi State Violence. Against Persons (Prohibition) Law, NO.002 of 2018	2018	The law prohibit violence in private and public life, eliminate all forms of violence against persons, provide maximum protection and effective remedies for victims and punishment of offenders and for other related matters thereto.	The law is applicable to the implementation of the proposed SAPZ in Ebonyi state
Ebonyi State Institutional Framework				
1	Ebonyi State Ministry of Agriculture and Natural Resources		The Ministry of Agriculture and Natural Resources provides professional services to the agricultural, fisheries and livestock industries, and addresses the challenges of natural resources management. The Ministry ensures global best practice in the management of Ebonyi agriculture, fisheries and livestock industries. The ministry has eight (8) Departments, six (6) Units and five (5) Parastatals which help in carrying out the functions. The vision of the Ministry is <ul style="list-style-type: none"> the achievement of an accelerated pace of agricultural development and make it a major revenue earner for the state. Raising the farmers' purchasing power by increasing their real income and improving the quality 	The Ebonyi state ministry of Agric & Nat. Res. Is responsible for implementing the proposed SAPZ in the state

			<p>of life and living standard of the farmers and rural dwellers.</p> <ul style="list-style-type: none"> • Increase in food production to ensure attainment of a level of food security that will generate availability and affordability of food commodities to the populace. 	
2	Ebonyi State Ministry of Environment		<p>The Ministry of Environment develops and implements State policy, programmes and legislation to protect and conserve Ebonyi’s environment and natural heritage. The vision of the Ministry is the to find solutions to local, regional and global air pollution, accumulation and distribution of toxic waste, destruction and depletion of forests, soil and water, depletion of the ozone layer and emission of “greenhouse” gasses threatening the survival of humans and thousands of other living spaces, the integrity of the earth and its bio-diversity, the security of the nation, and the heritage of future generations..</p>	<p>The Ebonyi state ministry of environment will be responsible for the ensuring that the proposed SAPZ is sustainably implemented</p>
3	Ebonyi State Sanitation and Environmental Protection Agency (EBSEPA)		<p>The mandate for the establishment of Ebonyi State Sanitation and Environmental protection Agency was on 6th December 1996 by His Excellency, the first military administrator of Ebonyi State Commander Walter Feghabor (FSS, PSCT). The edict establishing the Agency was however signed into law in February 1998. This Edict was repealed and replaced with a more comprehensive one signed on 28th May 1999. The agency performs the following functions</p> <ul style="list-style-type: none"> • Flood and soil erosion control in all parts of the state. Its activities here include identification, planning, design, and implementation of mitigation measures • Restoration of degraded lands due to mining, quarrying, or other industrial operations. • Solid waste management in all parts of the state. • Policy formulation, monitoring, and enforcement of environmental standards and guidelines for pollution control in industries, homes, water bodies air, and solid. • Maintenance of waterways and a network of the drainage system in the state. • Environmental beautification through landscaping, planting of flowers, and trees. • Biodiversity conservation including the development of recreation parks. • Ensuring the general well-being of the Ebonyi Environment 	<p>EBSEPA is responsible for the enforcement of environmental laws and guidelines as it applies to the Ebonyi state SAPZ</p>

4	Ebonyi Ministry of Women Affairs and Social Development	<p>The Ministry of Women Affairs & Social Development is a social service ministry charged with the responsibility of taking care of women, children, the physically challenged, orphans and vulnerable children. The health, education, social well-being and economic empowerment of women are the core mandate of the Ministry. In achieving these goals, the Ministry embarks on sensitization of relevant government and non-governmental agencies and stakeholders to partner with her to address the needs of women and children, especially the orphans and vulnerable. Promote the welfare of women in general;</p> <ul style="list-style-type: none"> • Promote the welfare of the child and intimate actions for the development of the child within the protocols of the international convention on the rights of the child; • Promote the full utilization of the potentials of women in development of human resources and bring about their acceptance as full participant in every phase of natural development with equal rights and corresponding obligations; • Promote responsible motherhood and good maternal health of women; • Stimulate actions to improve women civic, political, cultural, social and economic education; • Support the non-governmental organizations and play coordinating role between government and women organization in Nigeria; • Encourage the concept and essence of co-operative societies among women both in the urban and the rural areas and stimulate creative entrepreneurship in the field of cottage and small-scale industries; • Promote the course of the disabled and the elderly and stimulate public awareness and responsibilities on this segment of the society; • Formulate and propagate moral values within the family units and the public generally; • The goal is pursued in liaison with institution and organizations to inculcate moral education in women and children; • Serve as a major advocacy channel for women and children. 	<p>The Ministry of women affairs and social development has a crucial role to play in the proposed Ebonyi state SAPZ as it is responsibility of taking care of women, children, the physically challenged, orphans and vulnerable children which is one of the objectives of the the programmes</p>
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5	Ebonyi State Ministry of Youth and Sports		<p>The Ministry supervises youth and sports development at the State and Local Government Levels. It equally promotes the affairs of the National Youth Service Corps (NYSC) in Ebonyi State. The Ministry has only one parastatal – Ebonyi State Sports Council which is located at the Ebonyi State Township Stadium. The parastatal supervises all the activities of the Council and the maintenance of stadium.</p> <p>Policy Thrust</p> <ul style="list-style-type: none"> • The Ministry is charged with the responsibility of executing the State Government policies on: • Youth development. • Promotion and development of Sports and Sporting Activities in the State. • Promotion and encouragement of youth employment. • Provision of facilities for/and promotion of youth activities (including NYCN). • Organization of youth clubs and associations (including Ebonyi State Youth Development Corps). • NYSC matters. • Supervision of its parastatal, the Ebonyi State Sports Council. • Liaison with other state governments, the Federal Government and external agencies in all matters relating to youth & sports. 	<p>The Ministry of youth and sports has a crucial role to play in the proposed Ebonyi state SAPZ as it is responsibility of youth which is one of the objectives of the programme.</p>
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6	Ebonyi State Ministry of Lands, Survey, and Housing		<p>The present Ministry of Lands, Survey, and Housing was merged with the Housing Department of the former Ministry of Housing and Environment which gave it the present nomenclature as the Ministry of Lands, Survey, and Housing.</p> <p>The functions of the ministry include the following:</p> <ul style="list-style-type: none"> • General land administration and management which include formulation, interpretation, documentation, etc. • Valuation of rights, crops enumeration, assessment of compensation, analysis of formulation and undertaking of market surveys and research on land values; • Building and Engineering services which include preparation of valuation certificates, supervision and overseeing construction of all public building preparation of structural engineering design of steel • Architectural service which includes preparing working and detailed drawing and Asbuilt drawing preparation of contract document and establishing conceptual design as well as broad specification. • Preparation of Bill of Quantity of Government Projects, preparation of estimates, measuring sites and locations preparation of valuation for an interim payment, cost panning and analyzing building cost, etc. • Preparation of regional plans, sub-regional plans, and planning within the framework of national policies. • Provision of survey framework to facilitate the registration of the certificate of occupancy under the law Land Use Act, carrying out all survey and mapping matter of the state, handling of matters relating to both intrastate and interstate boundary • matters in liaison with appropriate authorities. 	<p>The Ministry of women affairs and social development has a crucial role to play in the proposed Ebonyi state SAPZ as it is responsibility for General land administration and management in the state and the provision of land for the programme activities.</p>
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2.2 Development Financial Institutions (DFIs) Environmental and Social requirements

The commitments of DFIs to Environmental and Social Governance in programme financing are embedded in the developed standards known as the safeguards policy. This includes the ISS of the AfDB and the ESS of the World Bank amongst others.

2.2.1 Integrated Safeguards System (ISS) of the African Development Bank (AfDB) Triggered by SAPZ Programme in Ebonyi State

The Environmental and Social safeguards of the AfDB are the cornerstone of the Bank's support for inclusive economic growth and environmental sustainability in Africa. The AfDB will apply the Integrated Safeguards System for the proposed Ebonyi SAPZ programme. The Bank ISS is designed to promote the sustainability of programme outcomes by protecting the environment and people from the potentially adverse impacts of programmes. This requires that all the activities under the programme will comply with the safeguard requirements of the ISS during programme preparation and implementation. The safeguards aim to:

1. avoid adverse impacts of programmes on the environment and affected people, while maximizing potential development benefits to the extent possible;
2. minimize, mitigate, and/ or compensate for adverse impacts on the environment and affected people when avoidance is not possible;
3. help borrowers/clients to strengthen their safeguard systems and develop the capacity to manage E&S risks.

The ISS consists of four inter-related components which include:

1. Integrated Safeguards Policy Statement
2. Operational Safeguards
3. ESAP revised procedures
4. Guidance

Of particular interest is the Operational Safeguards (OSs) which are a set of five safeguard requirements that the Bank's clients are expected to meet when addressing social and environmental impacts and risks. The Bank's staff use due diligence, review, and supervision to ensure that clients comply with these requirements during programme preparation and implementation. As may be necessary the Bank may adopt additional safeguard requirements or update existing requirements to enhance effectiveness, respond to changing needs, and reflect evolving best practices.

The five OSs were designed to:

1. better integrate considerations of E&S impacts into Bank operations to promote sustainability and long-term development in Africa;
2. prevent programmes from adversely affecting the environment and local communities or, where prevention is not possible, minimise, mitigate and/or compensate for adverse effects and maximize development benefits;
3. systematically consider the impact of climate change on the sustainability of investment programmes and the contribution of programmes to global greenhouse gas emissions;
4. delineate the roles and responsibilities of the Bank and its borrowers or clients in implementing programmes, achieving sustainable outcomes, and promoting local participation;

5. assist regional member countries and borrowers/clients in strengthening their own safeguards systems and their capacity to manage E&S risks.

Table 2.2 provides the AfDB Operational Safeguard Policies triggered by the SAPZ and those applicable to the Ebonyi State Special Agro-Industrial Processing Zone (SAPZ) Programme sites.

Table 2.2: AfDB Operational Safeguard Policies Applicable to Ebonyi State-SAPZ Programme

Operational Safeguards	Description	Applicability to the proposed Ebonyi State SAPZ programme	
		Yes	No
OS 1: Environmental and social assessment	This overarching safeguard governs the process of determining a programme's environmental and social category and the resulting environmental and social assessment requirements	[x]	[]
OS2: Involuntary Resettlement: Land Acquisition, Population Displacement and Compensation	This safeguard consolidates the policy commitments and requirements set out in the Bank's policy on involuntary resettlement and incorporates a few refinements designed to improve the operational effectiveness of those requirements	[x]	[]
OS 3: Biodiversity and Ecosystem Services	This safeguard aims to conserve biological diversity and promote the sustainable use of natural resources. It also translates the commitments in the Bank's policy on integrated water resources management into operational requirements.	[x]	[]
OS 4: Pollution Prevention and Control, Greenhouse Gases, Hazardous Materials and Resource Efficiency	This safeguard covers the range of key impacts of pollution, waste, and hazardous materials for which there are agreed international conventions, as well as comprehensive industry specific and regional standards, including greenhouse gas accounting, that other multilateral development banks follow	[x]	[]
OS 5: Labour Conditions, Health and Safety	This safeguard establishes the Bank's requirements for its borrowers or clients concerning workers' conditions, rights and protection from abuse or exploitation. It also ensures greater harmonization with most other multilateral development banks	[x]	[]

2.2.2 World Bank Operational Safeguard Policies Triggered by SAPZ Programme in Ebonyi State

The World Bank Environmental and Social Standards are the cornerstones of the Bank's support for sustainable poverty reduction. The main objective of these policies is to prevent and mitigate undue harms to people and their respective environment during or as a result of the developmental processes. These policies also provide the guidelines for the Bank and the borrower staff in the identification, preparation and implementation of programmes. Table 2.3

provides the World Bank Operational Policies triggered by SAPZ and those applicable to Ebonyi State Special Agro-Industrial Processing Zone (SAPZ) Programme sites.

Table 2.3: World Bank Environmental and Social Standards Applicable to Ebonyi State-SAPZ Programme

Environmental and Social Standards (ESS)	Description	Applicability to the proposed Ebonyi State SAPZ programme	
		Yes	No
ESS1: Assessment and Management of Environmental and Social Risks and Impacts	This overarching standard sets out the Borrower's responsibilities for assessing, managing and monitoring E&S risks and impacts associated with each stage of a programme supported by the Bank through Investment Project Financing, in order to achieve E&S outcomes consistent with Bank's ESS.	[x]	[]
ESS 2: Labour and Working Conditions	ESS 2 recognizes the importance of employment creation and income generation in the pursuit of poverty reduction and inclusive economic growth. Borrowers can promote sound worker-management relationships and enhance the development benefits of a programme by treating workers in the programme fairly and providing safe and healthy working conditions	[x]	[]
ESS 3: Resource Efficiency and Pollution Prevention and Management	ESS 3 recognizes that economic activity and urbanization often generate pollution to air, water, and land, and consume finite resources that may threaten people, ecosystem services and the environment at the local, regional, and global levels	[x]	[]
ESS 4: Community Health and Safety	ESS 4 stipulates that programme activities, equipment, and infrastructure can increase community exposure to risks and impacts. In addition, communities that are already subjected to impacts from climate change may also experience an acceleration or intensification of impacts due to programme activities.	[x]	[]
ESS 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	ESS 5 stipulates that programme-related land acquisition and restrictions on land use can have adverse impacts on communities and persons. This may cause physical or economic displacement.	[x]	[]
ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	ESS 6 recognizes that protecting and conserving biodiversity and sustainably managing living	[x]	[]

	natural resources are fundamental to sustainable development.		
ESS 7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	This ESS applies to a distinct social and cultural group identified as “Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities, indigenous ethnic Minorities etc.”	[]	[x]
ESS 8: Cultural Heritage	ESS8 sets out measures designed to protect cultural heritage throughout the programme life cycle.	[x]	[]
ESS 9: Financial Intermediaries	This ESS applies to Financial Intermediaries (FIs) that receive financial support from the Bank	[]	[x]
ESS 10: Stakeholder Engagement and Information Disclosure	This ESS recognizes the importance of open and transparent engagement between the Borrower and programme stakeholders as an essential element of good international practice.	[]	[x]

2.2.3 International Conventions and Agreements

Several international regulations, protocols, treaties and conventions have been signed by countries of the World. The conventions are aimed at halting environmental degradation and protecting human health against possible adverse effects. As should be expected, Nigeria subscribes to a number of these International Regulations and Conventions that are related to Environmental Protection. Table 2.4 shows some of the international conventions, agreements and protocols to which Nigeria is signatory and which are applicable to the Ebonyi State Special Agro-Industrial Processing Zone (SAPZ) Programme sites.

Table 2.4: International Conventions, Agreements and Protocols to which Nigeria is Signatory and Applicable to the proposed Ebonyi State Special Agro-Industrial Processing Zone (SAPZ) programme

International conventions, agreements and protocols	Applicable to SAPZ		Reasons for their Applicability to SAPZ programme
	Yes	No	
Both the Vienna convention for the protection of the Ozone Layer and the Montreal protocol for Control of Substances that deplete the ozone layer.	[x]	[]	Agricultural works may extend to the forest area. There will be a reduction in tree taxonomy and biomass leading to reduction in carbon sink and release of ODS gasses. Some of the crops may also be emitting or when burnt transmit ODS substances
Basel convention on the prevention of trans-boundary movement of hazardous wastes and their disposal.	[x]	[]	Hazardous chemical might be used as pesticides

Convention on the prevention of the international trade in endangered species (CITES).	[]	[x]	No endangered species(s) of any kind was identified in the programme area.
Convention on Biodiversity.	[x]	[]	Agricultural activities may extend to forest area. This will disturb biodiversity in the area.
Convention on climate change.	[x]	[]	Proposed activities will result in both systemic and cumulative environmental change; thereby contributing to a sustained increase in temperature.
Convention on Desertification.	[x]	[]	Proposed activities may result in deforestation.
Convention on Persistent Organic Pollutants.	[x]	[]	Organic pollutant may be used for agricultural activities.
World Health Organization (WHO) Health and Safety Component of EIA, 1987.	[x]	[]	Proposed activities may be injurious to man and the environment

2.3 Institutional Framework

The proposed Ebonyi State SAPZ Programme will involve many federal and state ministries, departments and agencies (MDAs), local governments, communities, and the civil society. This is because an effective implementation of programmes requires inter-ministerial coordination, collaboration, and information sharing at all levels of government. Thus, each component, sub-component and activity will be implemented through the relevant federal and State MDAs. The various MDAs include those responsible for agriculture, planning, economy and finance, works, environment and water resources. Although, the investments for Ebonyi State Special Agro-Industrial Processing Zone (SAPZ) Programme are made through the Ebonyi State Implementing Unit (EBSPIU), the Ebonyi State government has the primary responsibility for land management and land allocation for agriculture purpose.

The Federal Ministry of Agriculture and Food Security (FMAFS) is the lead implementing agency for the SAPZ Programme. The National Coordinating Office, headed by a National Coordinator and hosted by the FMAFS is responsible for the overall coordination of the programme. The Ebonyi State Programme Implementing Unit (EBSPIU), headed by the State Programme Coordinator and hosted by the Ebonyi State Ministry of Agriculture and Natural Resources will be responsible for the coordination in Ebonyi State. Thus, the Ebonyi State-PIU is directly responsible for coordinating the activities of the Ebonyi State Special Agro-Industrial Processing Zone (EBSAPZ) Programme, including the implementation of this ESIA. Both the federal and State level coordinating units have environmental officers who take responsibility for mainstreaming environmental issues into the SAPZ sub-programmes.

CHAPTER THREE

PROJECT DESCRIPTION AND ALTERNATIVES

This chapter provides a detailed description of the existing conditions under the proposed SAPZ programme.

3.1 Description of Project State

Ebonyi State is situated in South-East Nigeria. The state lies within Longitudes 7° 30' E and 8° 30' E and Latitudes 5° 40' N and 6° 45' N. It has a land area of 5,935 km² with a projected population of 2,253,140 persons in 2016 using a growth rate of 3.5% (National Population Commission, 2016). The State shares boundaries on the North with Benue State, to the West with Enugu State, to the East with Cross River State and to the South with Imo and Abia State (Fig. 3.1).

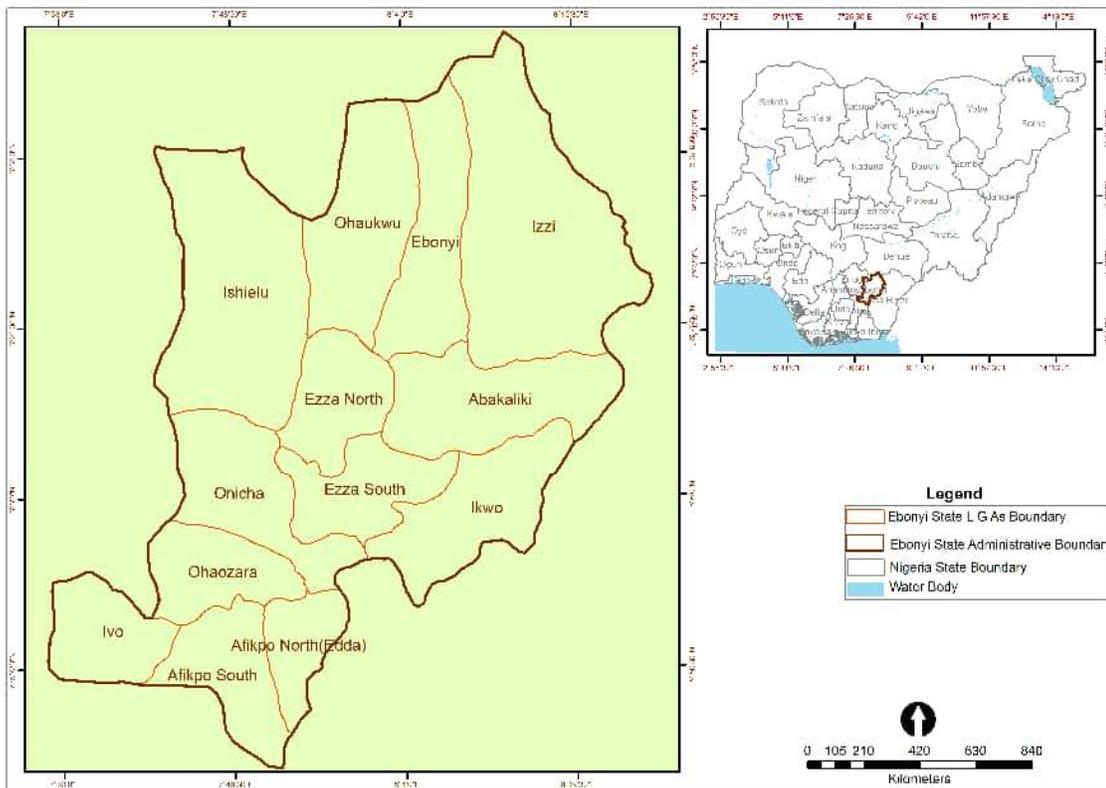


Fig. 3.1: Nigeria depicting Ebonyi State

As shown in Fig. 3.2, administratively, the State is sub-divided into (12) local government areas (LGAs).



Fig. 3.2: Ebonyi State with the LGAs

Ebonyi is one of the six states created in 1996 by the Military government. It was created from parts of both Enugu State and Abia State. It derived its name from the River Abonyi which flows through the north-central parts of the State. Ebonyi State is inhabited and populated primarily by Igbo. There are also non-igbo speaking indigenes which include the Okpotos and the Ntezis in Ishielu Local Government Area.

According to the 2006 National Population Census, Ebonyi State has about 2,173,501 inhabitants. The state has a land area of about 5,535 square kilometer. Abakaliki, the state capital, is the largest city in the state. Other prominent towns include Afikpo, Edda, Onueke, Nkalagu, Uburu, Onicha, Ishiagu, Amasiri and Okposi. The state has 13 Local Government Areas, 3 Senatorial Districts, 6 Federal Constituencies, 24 State Constituencies, 171 Registration Areas/Wards.

There are ten primary languages spoken in Ebonyi State: Afikpo, Mgbo, Izzi, Ezaa, Edda, Ikwo, Kukele, Legbo, Mbembe, Okposi, Uburu and Oring. These languages are all subgroups of the Igbo language and are commonly spoken throughout south eastern Nigeria. Two important traditional festivals are observed every year: the masquerade and the New Yam Festivals. The masquerade is a very important and colourful institution, and features the Omaba Ekpe and Ogbodu masquerades. The New Yam festival is known by various names, such as Joku, lhejoku or Njoku ji. The festival marks the end of the farming season and ushers in the harvest and consumption of the new yam. Traditional industries and works of art include blacksmithing at Ezza and pottery works at Ishiagu in Ivo LGA. Other works of art produced in the State include carved doors and stools, walking sticks, traditional flutes, wooden mortars and pestles.

Ebonyi has several solid mineral resources, including lead, crude oil, and natural gas, but few large-scale commercial mines. The state government has, however, given several incentives to investors in the agro-allied sector to encourage production. Ebonyi is called "the salt of the nation" for its huge salt deposit at the Okposi and Uburu Salt Lakes.

Location of the Proposed AIH Site

The proposed site for the AIH is Nkaliki Integrated Farm. This Farm is an existing facility located within the town of Abakaliki, however, it was observed to be none functional or abadanoned at the time of the visit. In order to revamp this important facility/infrastructure, it was considered suitable for the SAPZ program. The Nkaliki Integrated Farm, as the name implies, has several components which include piggyry, acqualcutre, and poultry among other activities. Several structures/building (about 20) have been completed within the site before it was abandoned. The footprints of existing building within project is shown in Figure 3.1. This chosen site for the Ebonyi AIH is a public/government owned facility.

The facility is located along Edmund road, off Enugu –Abakaliki express, Nkaliki. The site has irregaular shape and it is protected from encroachment with about 5 meters height perimeter fence. Its size is approximately 46.3662 Ha and its geographic extent is between longitudes 8⁰ 4'52.96" to 8⁰ 5'26.78" and between latitude 6⁰ 18'14.56" to 6⁰ 5'3.04". As shown in the imagery, the proosed site is drained by River which flows all through the year.



Figure 3.1: Sateelite imagery depicting proposed site for the Ebonyi AIH

3.2 Current Status of Agricultural Activities in Ebonyi State

Ebonyi state is primarily an agricultural region. It is a leading producer of rice, yam, potatoes, maize, beans, and cassava in Nigeria. The technical session held with representatives of the Ebonyi State Ministry of Agriculture and Natural Resources, Ministry of Environment, International Fund for Agricultural Development [IFAD], Agricultural Development Project and farmers from across the state revealed that the following agricultural practices are carried out Ebonyi state (Table 3.1).

Table 3.1 Agricultural practices in Ebonyi State

SN	Value Chain	L G A	Community
1	Rice	Ikwo	Onuigboji-Ikwo
		Izzi	Ishiagwu Ndiebor
		Edda	Amangwu
2	Cassava	Oha Ukwu	Ngwo
		Ishielu	Umuhueli
		Ohaozara	Ugwulangwu
3	Yam	Izzi	Agbaja
4	Sweet Potato	Ikwo	Nnoyo
		Ishielu	Amazu
5	Livestock	Abakaliki	Nkaliki

The state however has comparative economic advantage in three value chains as outlined

1. Rice cultivation and processing;
2. Cassava cultivation and processing;
3. Integrated livestock and processing

It was thus resolved by the Ebonyi state government through the Ministry of Agriculture and Natural Resources and other relevant stakeholders that these value chains should be prioritised and the following proposed sites were selected for the different value chains and building blocks for the Ebonyi State SAPZ programme (Table 3.2).

Table 3.2: Value chains with proposed Sites for the location of the AIH and ATCs

S/N	Value Chain	Proposed Site	Building Block
1	Livestock	Nkaliki	AIH
2	Rice	Ishiagwu Ndiebor	ATC
3	Rice	Onuigboji-Ikwo	ATC
4	Rice	Amangwu	ATC
5	Cassava	Ugwulanwu	ATC
6	Cassava	Amata Ugwulangwu	ATC
7	Cassava	Amika 135	ATC
8	Cassava	Amaleze	ATC
9	Cassava	Ezillo	ATC

Agro-Industrial Hub (AIH); Agricultural Transformation Centres (ATCs)

3.2.1 Rice cultivation and processing

Among the many agricultural potentials identified in Ebonyi state, the cultivation and processing of the famous Abakaliki rice is paramount making the state so popular and a beehive of commercial hub. No visitor comes to Abakaliki, the state capital, without testifying to the high quality of Abakaliki rice compared with other rice produced locally and internationally. The Abakaliki rice is blessed with so many nutritional values and is naturally salted with good taste.

Rice production in Ebonyi state has no doubt created jobs from which a lot of people feed their families. The rice cultivation aspect provides a lot of jobs as Abakaliki rice is cultivated on a land area of 311,208 hectares by over 140 thousand farmers across the 13 LGAs. The processing aspect also provides a lot of jobs including technical/professional and unprofessional/causal works in Rice Mill outlets, as well as others who sell their wares in the area. This is a comparative advantage the state can leverage on to improve the state's economic activities.

Specifically, Ebonyi state can position itself to claim up to 10% of the global rice market share which is estimated to grow to \$313bn by 2025. To achieve this, the state would require modernizing its rice milling processes, developing solid value chains around clusters, upgrading the market infrastructure, simplifying access to local capital and helping companies improve their operational efficiency.

Some efforts are already underway with the administration of Chief Martin Elechi establishing three state-of-the-art rice mills in the three senatorial districts: Ikwo (Central), Iboko (North) and Osso Edda (South). The state government in partnership with UNIDO and the leadership of Abakaliki Ricemill Owner Industry Association also intends to partner with 19 other states for the distribution of the Abakaliki rice. The government has also embarked on an aggressive agricultural revolution with about 2 billion naira consolidated funds to boost rice production in the state. In addition, the state government in conjunction with the CBN has made it possible for over 100,000 rice farmers in the state to benefit from the Anchor Borrowers' Program (ABP) introduced by the Apex bank. Another program initiated by the state government to boost food and especially rice production and alleviate poverty is the 'one man one-hectare program.' This program enjoins every inhabitant of Ebonyi state to have a farm.



Plate 3.1: Rice mills in Ikwo (Central), Iboko (North) and Edda (South)
 Source: Fieldwork, November 2023

These efforts need to be rapidly scaled up to forestall some of the challenges still limiting the productivity of Rice farmers in Ebonyi State as outlined below:

- Manual planting and harvesting;

- Incursion by cattle herdsmen;
- Pest infestation (birds and rodent);
- Difficulty in processing (threshing, milling, destoning and bagging);
- Marketing and price fluctuation;
- Storage;
- Flood hazards; and
- Transportation.

3.2.2 Cassava Cultivation and Processing

Cassava is extensively cultivated in all the LGAs of Ebonyi State, where every rural household owns a cassava farm. Cassava is used mainly for two main purposes across the state: 90% as human food and only 5-10% as secondary industrial material (used mostly as animal feed). Cassava is considered as a major enterprise in the State and the government is interested in developing its cultivation and encourage investment in the cassava value chain. Ebonyi State is ranked 19th in cassava production in Nigeria and cultivates 29,000 hectares, producing 435,000MT and 15MT/ha annually (Cassava Master Plan, 2006).

The government's desire to boost the participation of local farmers in cassava cultivation is reflected in on-going distribution of stem cuttings from improved varieties under the guidance and support of the State's Agricultural Development Programme (ADP) and International Fund for Agricultural Development (IFAD). The predominance of small-scale farms in scattered location across the State, may however impede the commercialization of its value chain.

3.2.3 Integrated Livestock farms and processing

There are two government-owned livestock farms in Ebonyi state viz; Nkaliki Hatchery complex & Ezzamgbo Veterinary/Livestock Farm.

Nkaliki Hatchery complex

The Nkaliki Hatchery complex regarded as largest in South-east was established in 1979 by Jim Nwobodo administration and covers about 36 hectares of land with modern facilities. The automated poultry farm is located at Hatchery Road, Nkaliki in Abakaliki Local Government Area of the state. The farm was established as a commercial poultry farm with the following integrated value-chain:

1. Broiler production
2. Layers production
3. Layers stock (Broilers)
4. Parent stock (Layers)
5. Hatchery section
6. Poultry processing
7. Poultry feed mill

It was producing 5,000 birds per day before its present sorry state of zero production. It has its own feed mill, slaughter house which is fully automated and most sophisticated in the country, nine pens for layers, parent stock of both male and female pullets. The hatchery has six sets and

each set has 16, 800 birds. It was the envy of all and provided employments for the people directly and indirectly. With more than 3,000 eggs produced daily by the hatchery, villagers, host community and others were opportune to buy and sell chickens in large quantities. People from the neighbouring Abia, Enugu, Imo, Cross River, Benue and Anambra were also buying the birds and eggs in large quantities. The hatchery galvanized economic activities in the state. The eggs and chickens market expanded and stirred increased demand by both local consumers and many who come from outside the state during its good time.

But today, the largest south east poultry farm is now a shadow of itself begging for revival with every activity in the hatchery paralyzed while the pens and all other modern facilities have become dilapidated. Some workers of the farm have left the hatchery following nonpayment of their salaries and the deplorable state of the farm. The hatchery had better days between 1999 and 2007 under former governor of the state, Senator Sam Egwu. It was during the administration that modern facilities were constructed in the farm which increased production of livestock and eggs and placed the hatchery on enviable height.

Presently, most of the facilities are dilapidated except the very few offices in the farm which were built recently. Also, some of the operational vehicles have broken down. The hatchery was established in a very conducive environment. The farm has however gone into comatose with every activity paralyzed. The government made lots of promises and efforts to revive it but to no avail.



Plate 3.2: Nkaliki Hatchery, Abakaliki

Source: Fieldwork, November 2023

Ezzamgbo Veterinary/Livestock Farm

Ezzamgbo Veterinary/Livestock Farm located at Ohaukwu Local Government Area, was also established during the administration of Jim Nwobodo during 1979-1983. It had a veterinary school, piggery, rabbit sections, slaughter house, administrative blocks and two dams to be converted to a fish pond among others in the state. The project has been neglected

The production challenges faced by Livestock farmers in Ebonyi are outlined below:

- Poor accessibility to quality livestock feed;
- Market/price fluctuation;
- Seasonal glut;
- Theft and vandalization;
- High cost of drugs/vaccination;
- Disease and pest attack;
- Lack of quality ingredient for feed formulation;
- Packing/disposal of dropping;
- Low and poor performing breeds;
- Poor weight gain/feed conversion;
- Feeding and management problems; and
- Conflict with neighbours/encroachment.

3.3 Project Alternative

Alternative actions were considered for the study area. The “No Action” alternative assumes that there will be no alteration to the existing areas. This would imply that the proposed SAPZ programme intervention area/location would not be implemented and the agriculture in the state will be left in its present condition with a real potential for it to worsen. Specifically, if the sites are left unimproved, environmental degradation as a result of the ongoing agricultural practices by the locals would continue and in turn will continue to lead to an ever-increasing destruction of the habitat without proper or sustainable management that would further lead to soil erosion, deforestation, etc. In other words, damage and loss rates may increase as there will not be proper and systematic management, monitoring and guidance from the appropriate authorities. This has been the characteristics of the agricultural sector over the years. Furthermore, the poverty level amongst the local population will remain high and the objective of the NATIP and APP of the Federal Government for the country will suffer a setback. A *no-action or no programme* alternative is certainly not recommended.

A “Go Ahead Project Alternative,” though more expensive in terms of cost in every respect at the start, is believed to be the most feasible and profitable than the “do nothing alternative”. The go ahead alternative is expected to reduce the operational costs for crops in the value chain processors by up to 30% and create thousands of new jobs and contribute significantly to Ebonyi State GSP and Nigeria’s economy and consequently poverty reduction. The development of SAPZ programme in Ebonyi State will strengthen the State’s food security, improve regional economic growth and generally improve livelihoods in the rural farming communities in the programme area through increased household incomes that would arise from opportunities for secured markets, improved productivity, reduced post-harvest losses and increased employment of the locals. In addition, the negative impacts on the environmental resources due to the

unsustainable manner in which the local farmers devastate the forest resources to eke out a living in the area will be reduced if not eliminated. In its place there will be enhanced knowledge on how these environmental resources could better be mined or used through the knowledge to be gained from the programme. This in turn will reduce the overall level of poverty prevalent in the country.

The two scenarios considered herewith are summarized in Table 3.2. The inference from this consideration is that even though the go-ahead option is more extensive, it is the preferred or most environmentally sensible alternative, financially feasible and benign option for achieving programme objectives and ensuring economic growth and sustainable development both at the micro and macro scales. Thus, the advantages of the “go ahead” alternative makes it a better option than the “No Action” alternative.

Table 3.2: Analysis of the Alternative

S/N	Criteria	No Project Alternative	Go Ahead Project Alternative
1	Overall Protection of the environment and social well being	The field visits revealed the level of poverty in the communities, the unsustainable manner in which environmental resources are being devastated to the extent that taking a "no action" alternative will not benefit members of the study areas or their environment and even the national economy as the government gradually diversifies from petroleum to non-petroleum focused economy	Intervention would lead to the strengthening of agriculture in a more professionalized and highly organized manner. This will provide room for best practice soil conservation and sustainable management of natural resources. It will further generate income, which in turn increases the living standard of the locals and overall improvement of the national economy even in the absence of petroleum product
2	Long-term Effectiveness and Permanence	No action alternative does not meet the long-term effectiveness and permanence criteria of the national and local economy including the agenda to improve the overall management of environmental resources for sustainable development	The go-ahead option will further improve the local and national economy with sustainable development agenda in mind through a careful planning that will be based on informed decision making by all parties including the locals of the programme environment
3	Compliance with Applicable or Relevant Appropriate Requirements	Does not require compliance with applicable or relevant appropriate requirements even at local levels	All undertakings will go through an established system of screening to ensure the necessary standard and permit requirements even at the local levels are met.
4	Short-term Effectiveness	No action alternative will not add any input under these criteria	The go ahead alternative will be completed in a long-term period based on the programme. However, the benefits when completed outweighs a “no action” alternative because of the systematic manner of development

CHAPTER FOUR

ENVIRONMENTAL AND SOCIAL BASELINE INFORMATION

The proposed SAPZ in Ebonyi State is, no a doubt, a laudable project with potentials to revolutionize agricultural practices within the State that will lead to an eventual economic development and prosperity. However, there is a need to establish the existing environmental and social conditions of the proposed Agro-processing Industrial Hub (AIH) in particular and the Ebonyi State in general. The baseline data becomes necessary for future appraisal of the AIH of the SAPZ program. In view of this, there is a need to acquire accurate and dependable baseline environmental and social data about the identified and selected farm clusters in Ebonyi State in order to identify potential impacts of the activities so that feasible options for negative impact mitigation measures can be properly put in place and implemented. The baseline environmental and social conditions of the proposed program area are discussed under the following sub-headings:

- Physical environment (this includes climate and meteorology, air quality, noise, topography, geology, surface and groundwater quality, soil quality etc);
- Biological environment (vegetation and wildlife); and
- Socio-economic and health environments.

The description of the baseline conditions of the AIH project site was based on a one-season field data collection carried out from 15th to 19th, November 2023. In Ebonyi State and in the southern part of Nigeria, the month of November is a transition period between end of wet season (rainfall period) and start of dry season period. Hence, the field data collected can partly be used to describe both dry and wet seasons for the state. In addition, desktop review of relevant literature (secondary data) was carried to augment the field (in-situ data) and laboratory results. Laboratory analyses of the field samples were conducted at EnvAccord Laboratory located at 13 Alabi Street, off Oguntona Crescent, Gbagada, Lagos. The EnvAccord Laboratory is accredited by the Federal Ministry of Environment (FMEnv) and other relevant regulatory bodies.

4.1 Physical Environmental Conditions

Establishment of the prevailing environmental conditions of an area where a developmental program would be located is one of the cardinal aims of any well-planned intervention programmes such as the proposed SAPZ program in Ebonyi State. The baseline physical environment data description and documentation typically serve two main purposes; first, it provides a benchmark against which future measurement can be compared for the purpose of determining changes in environmental characteristics over time. Secondly, the process of environmental impacts (positive and negative) prediction, identification, and quantification is facilitated by the superimposition of the technical details of the proposed program on the baseline (existing) environmental conditions. Furthermore, this understanding will foster and aid the process of developing and proffering measures that will reduce potential negative impacts and enhance positive impacts of the proposed project. Components of the physical environment studied are outlined below:

- i. Climate and Meteorology;
- ii. Geology and Hydrogeology;

- iii. Drainage and surface water resources (hydrology);
- iv. Air Quality and Noise;
- v. Soil Quality; and
- vi. Groundwater Quality.

4.1.1 Climate and Meteorology

Climate of Ebonyi State is tropical Savannah based on the Koppen classification (the most widely used system of climatic classification). This climate type is characterized by relatively high rainfall and it is expressed as contrast between a dry season and a wet season. These two seasons are very dependent on the two prevailing air masses blowing over the country at different times of the year; the dry north-easterly air mass of Saharan origin, and the humid maritime air mass blowing from over the Atlantic.

In order to have fair representation of the project State in relation to the proposed agricultural/farming development, the rainfall and ambient air temperature data analysed cover a period of 15 years (2008-2022) since they are the principal climatic variables governing an area particularly within the tropical environment. The historical/archival atmospheric data analysed for this study was acquired from the Data Management Unit (DMU) of the Nigerian Meteorological Agency (NiMet) - the custodian of weather data in Nigeria. Primary micro-climatic elements that define climate particularly within the tropical environment include rainfall, temperature, relative humidity, wind speed and direction, and each of these is described in the following subsections.

Rainfall Characteristics

Rainfall is the principal climatic element in Ebonyi State as it is in every other part of the country and tropical region in general. The rainfall regime is principally controlled by the two major air-masses: the moist tropical maritime (TM) with its associated westerlies and the dry tropical continental air mass (TC) with its associated easterlies. The analysed fifteen years' data records (2008 - 2022) show that annual total rainfall amount in the project area range between 1,181.2 mm and 2,170.03 mm with a mean of 1,866.56 mm (Fig. 4.1). In other words, the average annual rainfall in Ebonyi State is about 1,867 mm. As shown in Fig. 4.1, highest annual rainfall of 2,170 mm was recorded in 2008 while the lowest of 1,181 mm was received in 2022. The annual rainfall that characterized the State is enough to sustain rice, cassava, and other staple crops cultivation in Ebonyi State including shallow root plants such as sweet potatoes and yam.

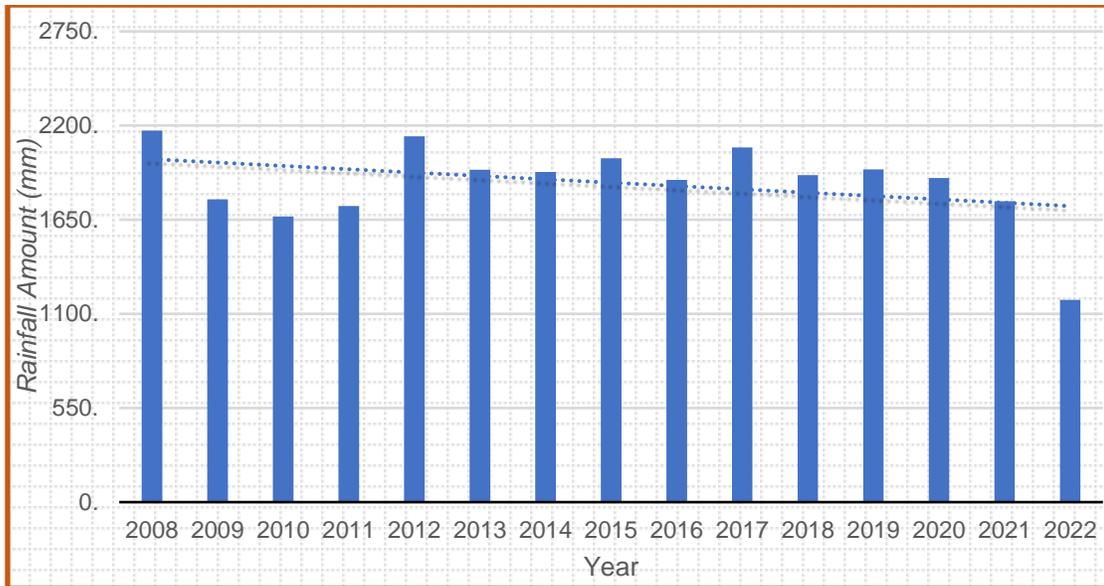


Figure 4.1: Long-term Annual Rainfall Amount in the Project Area (2008-2022)

As shown in **Fig. 4.2**, monthly rainfall amount in Ebonyi rises gradually and continually from January through July where it reaches its first peak and nosedives in August. The reduction in the rainfall amount in August is generally termed August break. After the short break, heavy rainfall is experience in September where it reaches its second peak. The two peaks therefore give rise to rainfall double maxima and it is typical monthly rainfall pattern within the tropical environment which is bimodal in a nature (June/July and September/October). The records further show that, during the intensive wet season (April to September), about 430 mm rainfall amount could be received in a month. This rainfall amount favours the growth/cultivation of hydromorphic plant such as rice. It should be noted that it rains in every month Ebonyi State, however, the amount of rainfall receives vary from one moth to another. Generally, mean monthly rainfall in the study area ranges between 8.63 mm and 302.31 mm and rice can be cultivated/grown twice (two cycle) in a year in Ebonyi State without irrigation based on three months gestation period for rice particularly between April and October.

Furthermore, it was computed from the fifteen years records that number of rain days in a year in the study area ranges from 109 (the least) to 148 (the highest) with a mean of 125 days. In other words, of the 365 days, rain falls in Ebonyi for at least 125 days and this represents about 30%. Furthermore, a single day rainfall event could be high as 152.3 mm or as low as 0.2 mm. Basically, the rainfall characteristics in the project state support farming activities.



Fig. 4.2: Mean Monthly rainfall pattern in the study area (2008-2022)

Temperature Characteristics

Temperature indicates an index of sensible heat from the atmosphere; it also indicates the relative degree of molecular activity of a substance (Howard, 2010). It is expected that the ambient air temperature of the project area would be high all year round as a result of its location within the tropical environment. The tropical world (Latitude 0⁰ to 23⁰ north and south of the equator) is generally considered to be characterized by high temperature due to its short angle of inclination to the sun.

Temperature characteristics in Ebonyi State is typical of a tropical area which is high and relatively stable throughout the year with an indication of seasonal fluctuations. The temperature is usually higher during the dry season and lower during the wet season. The mean maximum temperature of the area ranges from 35.84⁰ C during the dry season to as low as 28.65⁰ C in the wet season while the mean minimum temperature ranges from 20.05⁰ C to 24.91⁰ C for the wet and dry seasons respectively. As shown in **Fig.4.3**, an average temperature of the area depicts a double maximum as it peaks in the month of March and nosedive continuously through August; while it rises again from September and peak in November as the second maxima. In Ebonyi State, records show that a daily temperature value, particularly during the dry season weather could be as high as 38.84⁰ C and it was observed that locals make use of it in drying parboiled rice and other agricultural processing.

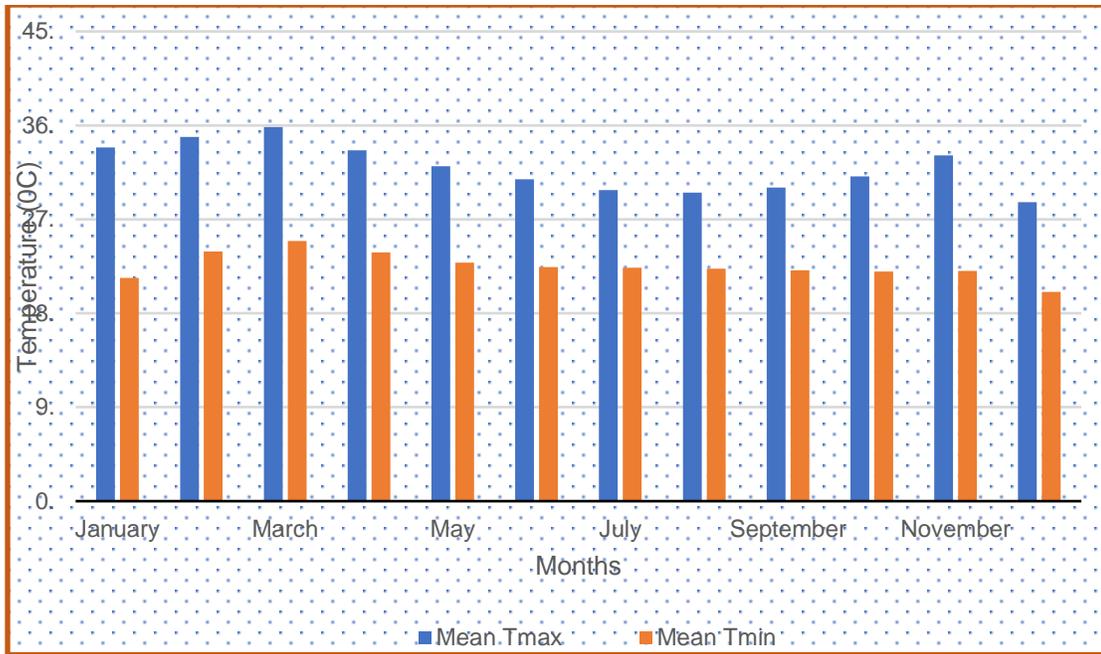


Fig. 4.3: Ambient Air temperature characteristics of the study area (2008 – 2022)

Solar Radiation

Solar Radiation is the amount of solar energy incidence on the earth surface, and it depends on the intensity and duration of sun rays as well as the angle at which the sun rays strike the earth. The long term mean monthly solar radiation characteristic of the study area ranges between 15.55kW/m² and 21.95 kW/m². The mean incident solar radiations around the study area follow closely the reverse pattern of rainfall. As shown in **Fig. 4.4**, the amount of radiation reaching the surface peaks in January and reduces continuously through July. It starts to increase continuously from August and then peaks again in December. The daily weather data analyzed shows that the daily average insolation during the dry season could be high as about 27.9 kW/m² while the least daily solar radiation recorded during wet season was about 4.0 kW/m². The abundance of radiation in the area could be harnessed (through solar panel installation) to power security light within and around the proposed facility during construction and operation to reduce amount of fossil fuel energy that is consumed for the proposed project activities.

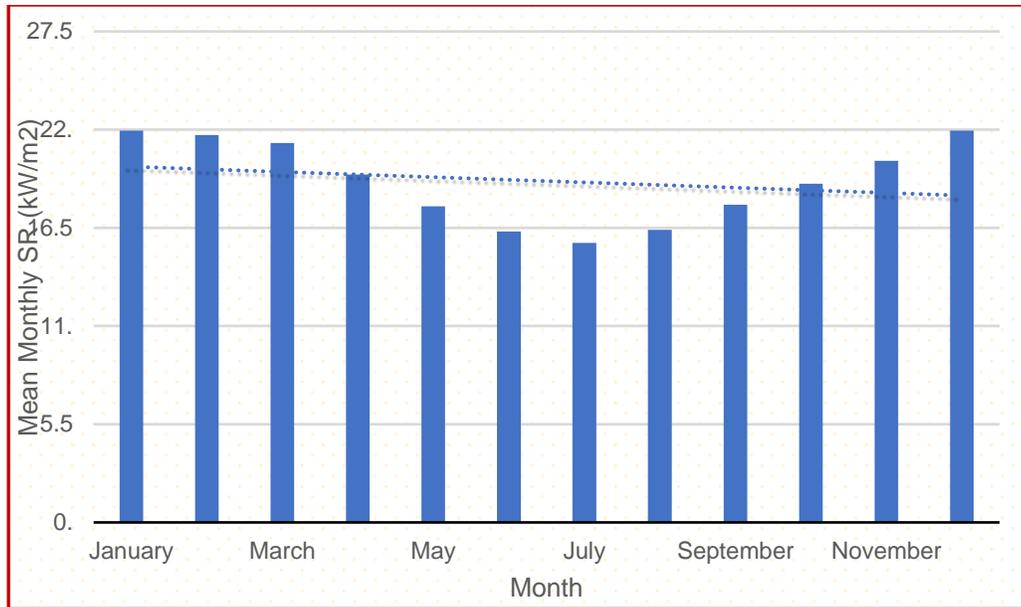


Fig. 4.4: Long term mean Solar radiation of the Ebonyi State

Relative Humidity

Humidity is a general term used to describe the amount of water vapor in the air. It is the ratio of the amount of water vapor actually in a volume occupied by air to the amount the space could contain at saturation. It reaches its diurnal maximum in the early morning hours when temperatures are low and then decreases to a minimum in the early afternoon (Howard, 2010). Relative humidity (RH) within the tropics is generally high and this is expected of areas influenced by the maritime air mass. It was noted that diurnal range which is largely high with maximum values recorded in the early hours of the day while the lowest values are recorded during the noon. Also detected is the seasonal influence; such that the highest values are recorded during the wet season compared to what is recorded during the dry season.

The characteristic of RH in the project area is shown in Fig.4.5. The yearly RH shows a regular pattern as it rises gradually from January through July where the highest value of 71.3% was recorded; from the month of August, the cumulative monthly RH values nosedive continuously through to December with a RH value of 38.7%. The RH pattern show an inverse of temperature trend and similar pattern to rainfall characteristics.



Fig. 4.5: Mean Relative Humidity Pattern in the Study Area

Wind Speed

Wind speeds are greatly influenced by the creation of cyclonic and anti-cyclonic vortices that have logical connection with the various seasons. Analysis shows that the wind speed in the study area is relatively high throughout the year (Fig.4.6). As shown, mean monthly wind speed ranges from 6.1 km/h to 9.0 km/h. High wind speed is common at the onset and peak of the rainy season while it is low during the dry season. However, an hourly wind speed could be high as 12 km/h.

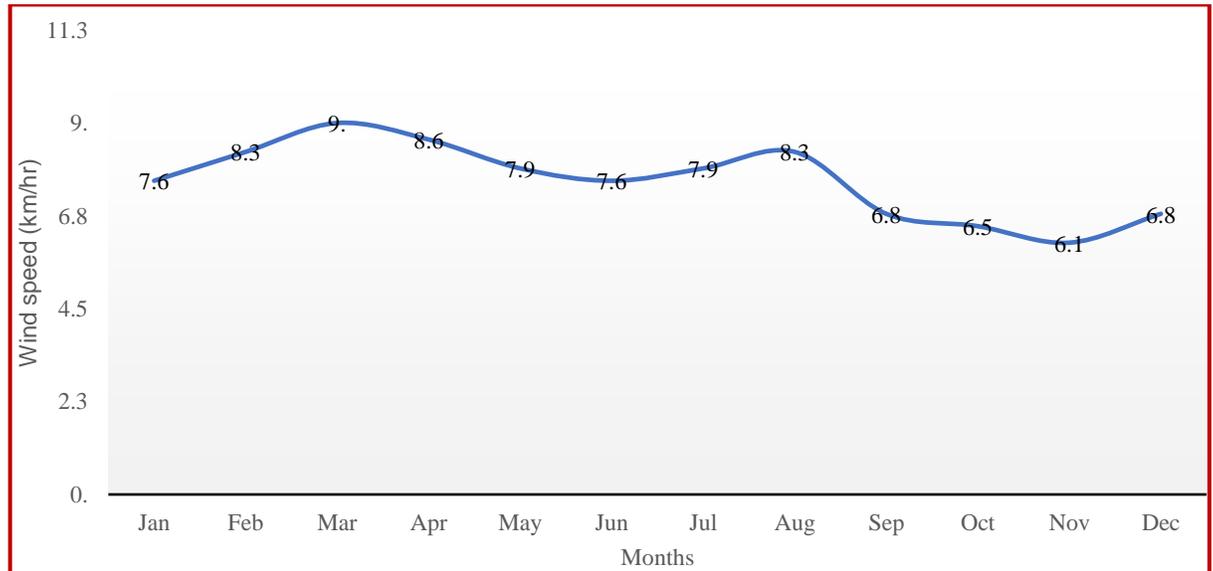


Fig.4.6: Average Monthly Wind Speed of the Project Area

Wind Direction

Dominant wind direction in the project area is south south-western (SSW) depicting the influence of the north-east trade wind which usually heads south-westerly towards the Atlantic Ocean. Mild winds are mostly southwards parallel with the direction of flow of the Niger River. The wind direction indicates the influence of the air mass over the area. This shows that wind pattern varies with seasons and wind rose for the project area is depicted in **Fig. 4.7**.

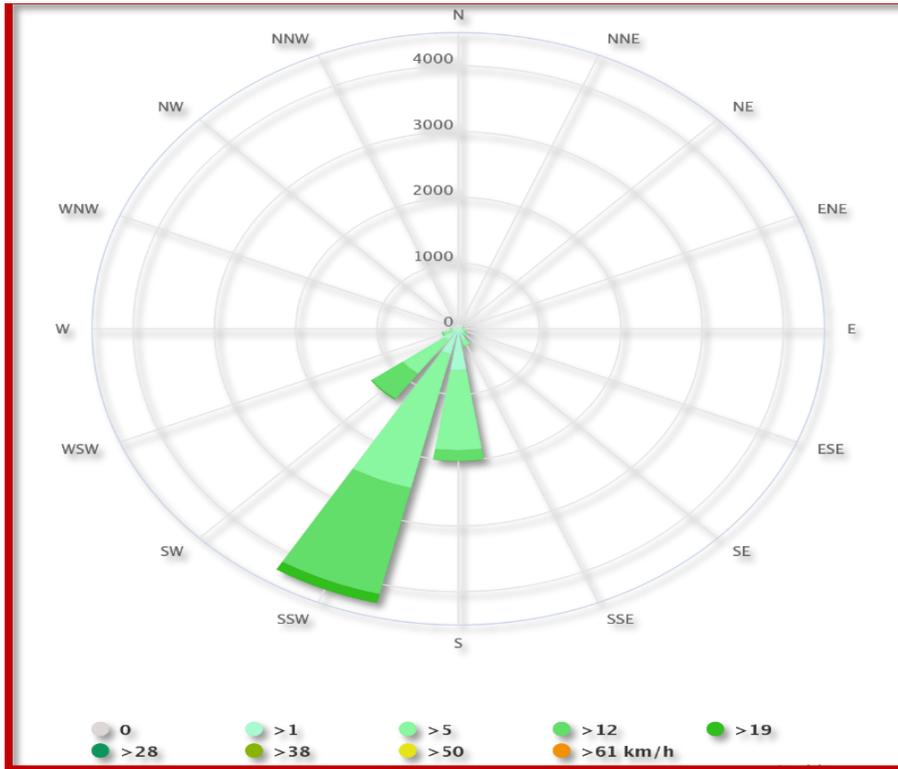


Fig. 4.7: Wind Pattern in the Ebonyi State

4.1.2 Geology and Hydrogeology

4.1.2.1 Geology

Geological distribution of the proposed/selected project site and Ebonyi State in general is shown in Fig. 4.8. As shown, the State cuts across Tertiary and Cretaceous sedimentary rocks. The dominant rock type which covers over 70% of the State is the Cretaceous sedimentary rock. The specific material underlying the project is Azu River Group. Except the Amangwu project site, every other selected location for the proposed SAPZ program fall within the Azu River Group. Characteristics of this rock type are described as follow:

Azu River Group

The Azu River Group has a thickness of about 1,700 meters and it is made up of olive-brown sandy shale, fine grain-grained micaceous sandstones, and micaceous mudstones (National Atlas, 1978). It has been established that this geological zone is underlain by minerals deposits

of Zinc and Lead. Lead mineral mining activities in commercial scale was observed at different location within the State during the field survey and touring.

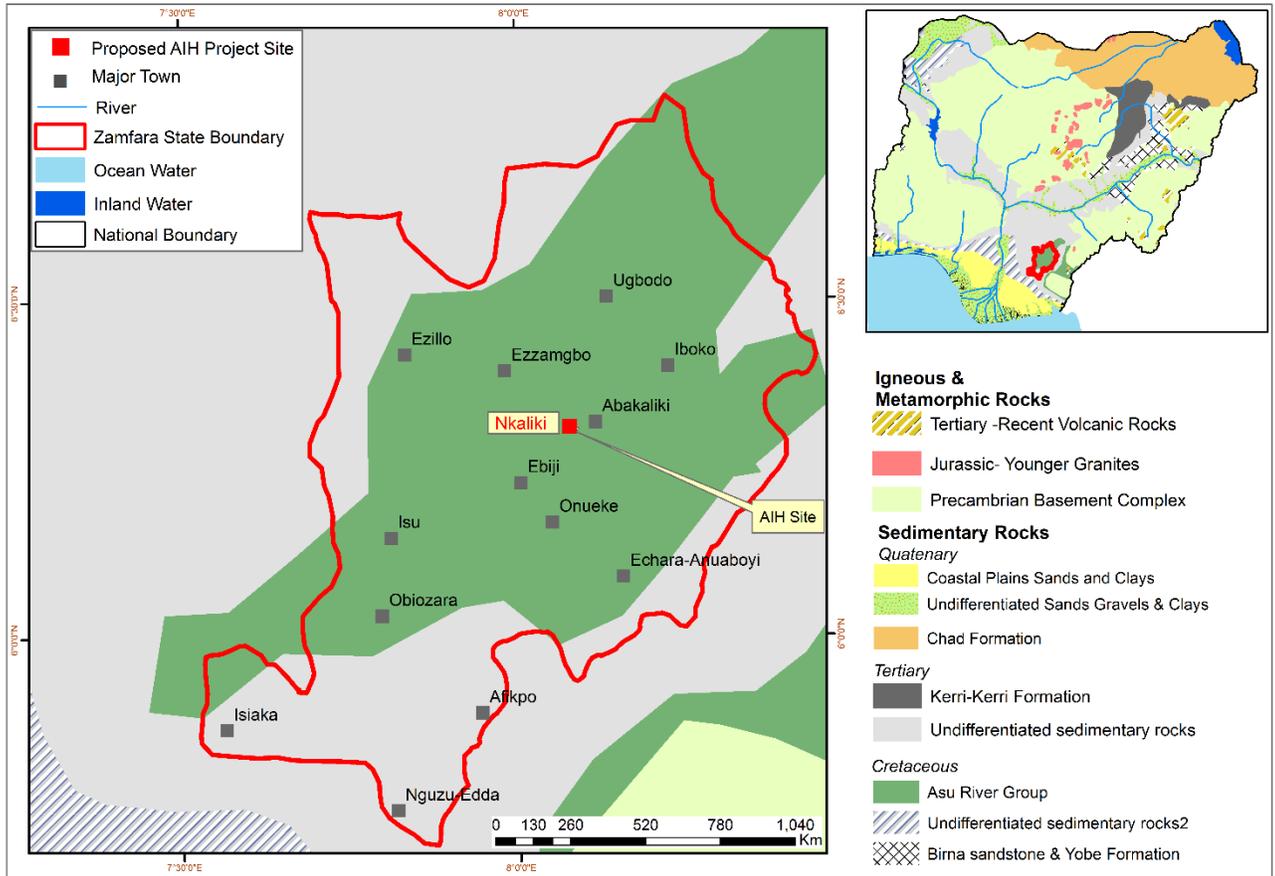


Fig. 4.8: Project Site and Ebonyi State Geology Distribution, Nigeria Geology Inset

4.1.2.2 Hydrogeology

Water is one of the important natural resources and there is a growing need for it either from the surface or groundwater. Based on hydrological provinces of Nigeria, Ebonyi State and proposed AIH site fall within the Cross River Basin. This Basin is notable for its groundwater mineralization and poor yield (National Atlas, 1978) as it is underlain by cretaceous shales. Nevertheless, groundwater can be recovered from the weathered and well jointed intrusive rocks found in this area. In practical terms, groundwater resources would be needed at the project site, hence, there is a need to conduct hydro-geological investigation to determine locations of best/optimal yield before a borehole is dug, this will prevent borehole failure as well prevent waste of valuable resources and manpower.

4.1.3 Surface Water Resources and Topographic Characteristics

Surface Water Resources

The project site is well drained by a River which flows from the northwest to northeast direction. As shown in Fig. 4.9, the proposed site Ebonyi State AIH shares common boundary with Nkaliki River. Nkaliki River is a tributary of Azu River which is one of the major surface water draining Ebonyi State. This River (Nkaliki) is a perennial water body and every surface water and waste water from the AIH and proposed activities within the Hub will drain into this water body. Meanwhile, direct discharge of waste water into this water body during the facility operations will be avoided as much as possible to avoid contamination/pollution.

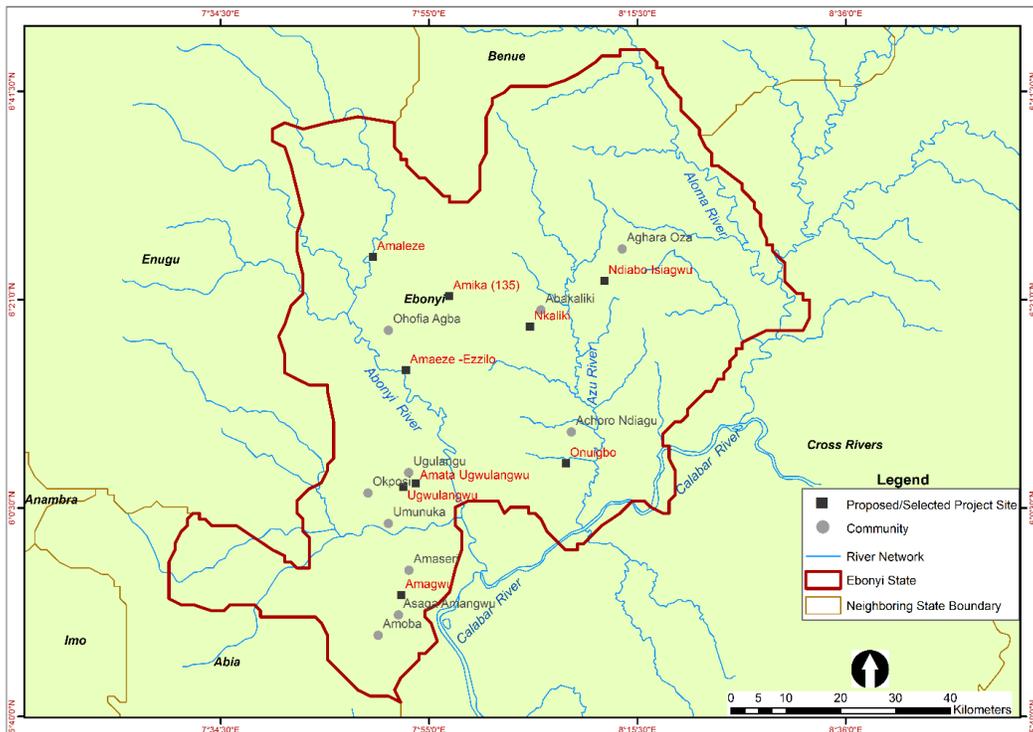


Fig. 4.9: Ebonyi State Surface Water Resources

Topographic Characteristics

The terrain characteristics of the proposed site is shown in Fig. 4.10. As shown, the project site terrain is relatively low and slope gently from the southwest towards the northern section. The elevation range however are 51m to 73m. In practice and by default, all drainage that will be constructed within the Hub should follow the natural pattern of the terrain for free flow of water. The lowland area (bank of the Nkaliki River) that bound the project site can be leverage for aquaculture practice as part of the comprehensive agricultural practices under the SAPZ programme.

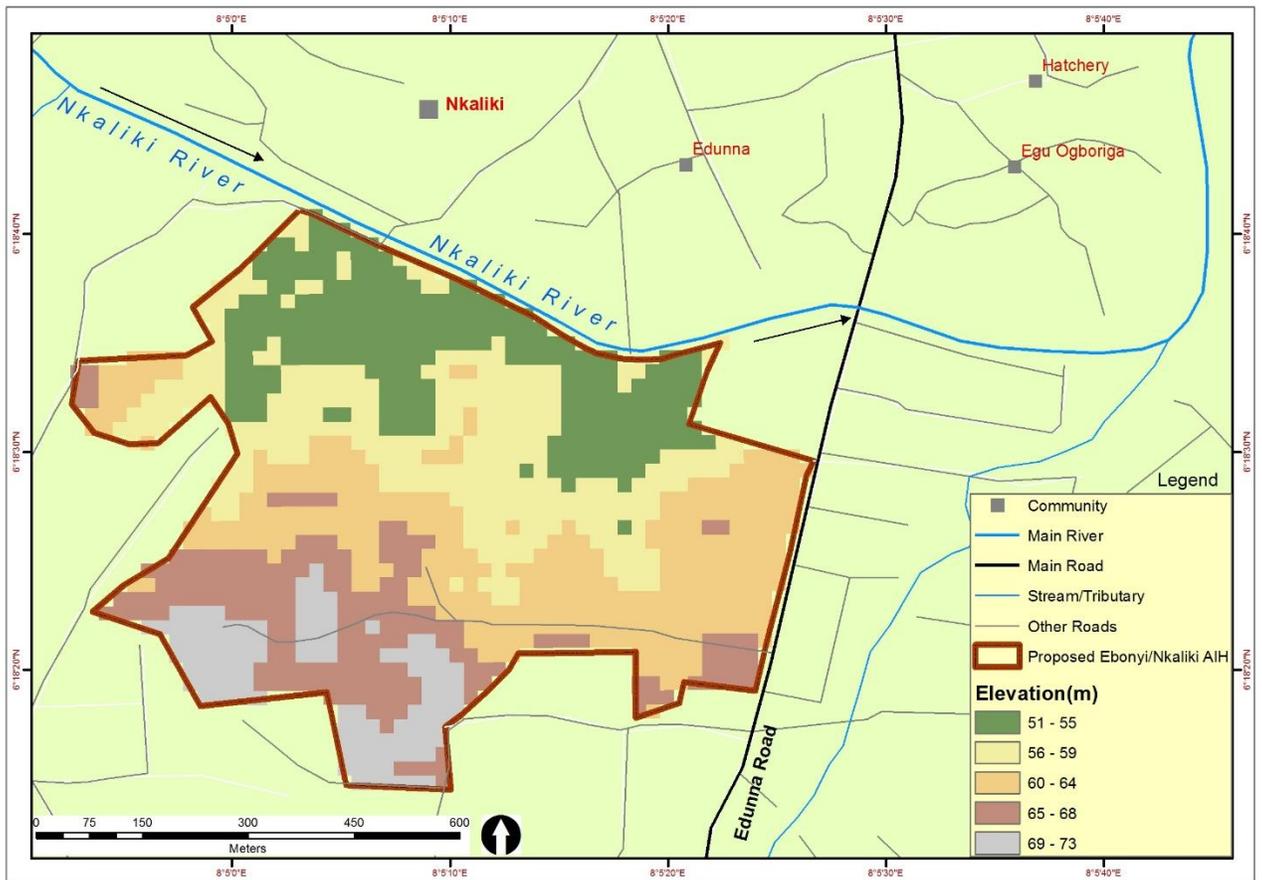


Fig. 4.10: Proposed AIH Terrain Characteristics

4.1.4 Air Quality Assessment

4.1.4.1 Sampling Location Distribution

Ambient air quality was assessed across the length and breadth of the proposed AIH as part of the baseline environmental information. As shown in the Fig.11, air quality was assessed at nine (9) different locations. The air quality sampling code, location coordinates and description of the sampling station environment are presented in **Table 4.1**. In situ meters used for air quality measurement as well as the photographs of field sampling activities are shown in **Plate 4.2**. Specifically, the measured air quality parameters are Nitrogen oxide (NO), Nitrogen dioxide (NO₂), Sulphur dioxide (SO₂), Hydrogen Chloride (HCl), Total Volatile Organic Carbon (TVOC), Carbon dioxide (CO₂), Carbon monoxide (CO), ambient temperature and Humidity. The in-situ measurements were conducted using a pre-calibrated Graywolf Advance Sense TM air quality equipment. In addition, Particulate matter (PM) was measured in-situ at the same locations where ambient air quality was taken using Greywolf Particle Mass/Particle Counter. The five particulates matter sizes measured are PM_{0.5}, PM_{1.0}, PM_{2.5}, PM_{5.0} and PM₁₀. Furthermore, at each location of the air quality measurement, in-situ ambient noise level was observed. The average noise level at each monitored site was taken with a digital battery-powered Sound Pressure Level (SPL) meter (Extech 407730 Sound Meter).

Table 4.1: Air Quality Sampling Locations and Description

Sample Code	Long. (° E)	Lat. (° N)	Description of environment
EBS/AIH/ESIA/AQ&N 1	8.089212	6.305640	Opposite gate house within the Nkaliki Integrated farm
EBS/AIH/ESIA/AQ&N 2	8.089512	6.307111	Frontage of a training hall
EBS/AIH/ESIA/AQ&N 3	8.088677	6.309069	By fish ponds at bank of Nkaliki River
EBS/AIH/ESIA/AQ&N 4	8.086271	6.310095	Northern perimeter(bank of Nkaliki river)
EBS/AIH/ESIA/AQ&N 5	8.086189	6.306183	By main training centre
EBS/AIH/ESIA/AQ&N 6	8.082387	6.306397	By South-western perimeter fence
EBS/AIH/ESIA/AQ&N 7	8.086305	6.308156	At the centre of the propose site
EBS/AIH/ESIA/AQ&N 8	8.083358	6.309288	Northwest section of the project site
EBS/AIH/ESIA/AQ&N 9	8.085245	6.304948	By southern perimeter fence

Note: EBS-Ebonyi State; AIH- Agricultural Industrial Hub; ESIA-Environmental and Social Impact Assessment; AQN- Air Quality and Noise.



Plate 4.2: Air Quality and Noise Sampling Activities

Source: Fieldwork for the Proposed EBS SAPZ Program, April 2024

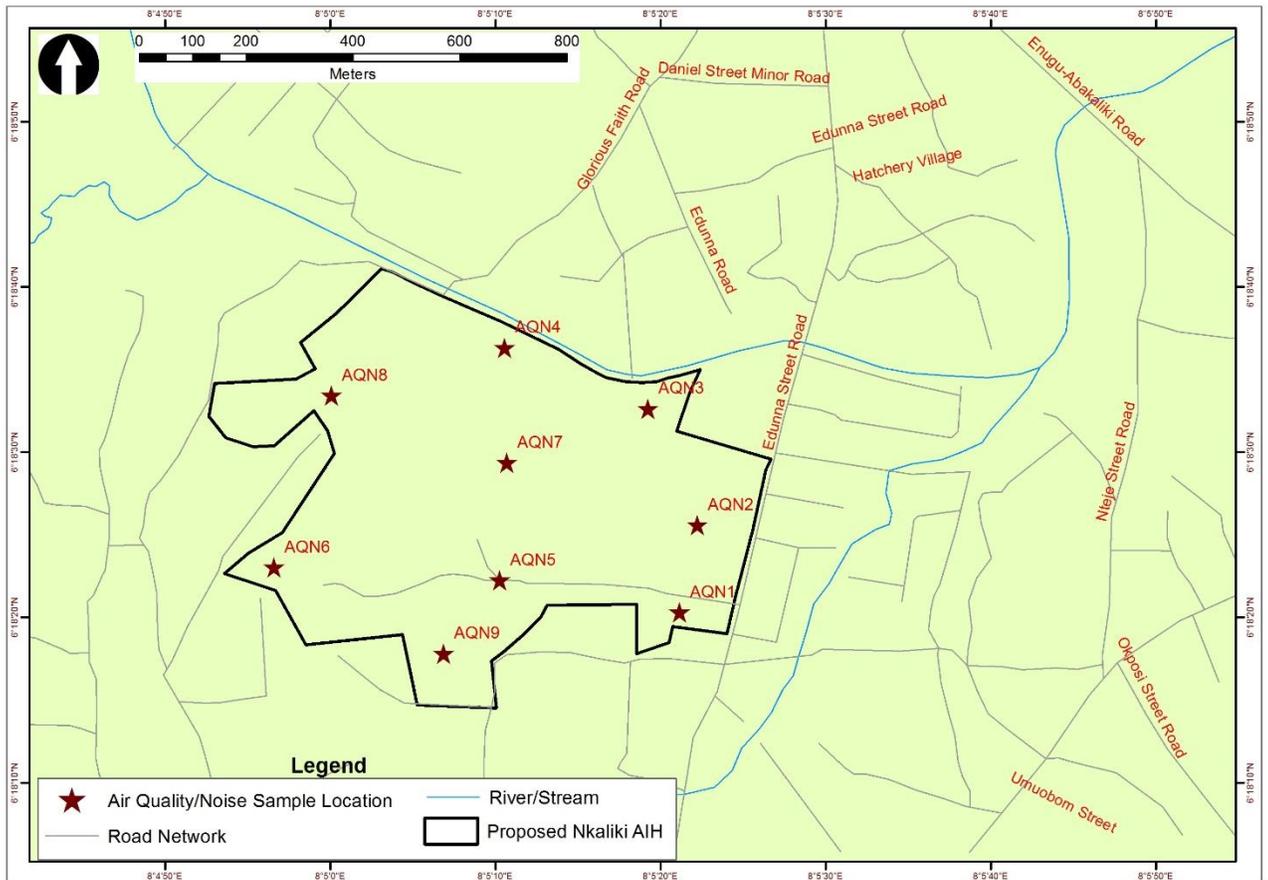


Fig. 4.11: Air Quality and Noise Sampling Locations and Distribution

The observed in-situ gaseous and air pollutants concentration across the proposed project site is summarized and presented in **Table 4.2**. As presented, Carbon monoxide (CO) was observed at all the sample stations and the highest value of 3.27 ppm was recorded at the AQ6 while the lowest value of 1.12 ppm was observed at AQ3. The overall CO mean however was 2.55 ppm. It was observed that the CO values are generally low and do not contravene the FMEnv limit of 10.0 ppm. Similarly, CO₂ range from 0.12 to 1.23 ppm with a mean of 0.77 ppm.

Other pollutant gases measured (detected) are Total Volatile Organic Compound (TVOC) and Hydrogen Chloride (HCl) and their mean concentration across samples are 0.11 ppm and 0.23 ppm, respectively. The TVOC and HCl concentrations fall within the FMEnv limits of 1.6 ppm and 5ppm respectively.

As presented in Table 4.2, the concentrations of Sulphur dioxide (SO₂) and Oxides of Nitrogen were below the equipment detection limits of 0.00 ppm across the sample stations. The relative humidity (RH) ranged from 55.7 % to 68.4 % with a mean value of 60.9% while ambient air temperature values ranged from 27.8°C to 29.2°C with a mean value of 28.6°C. It should be noted that these atmospheric parameters (RH and Temp.) are time and season-dependent and vary from hours to hours and place to place.

Generally, the concentrations of pollutant gases measured in the study area are within their respective regulatory limits, indicating that the ambient air environment of the proposed site for the AIH (Nkaliki Integrated Farm institute) is not polluted.

Table 4.2: Measured Gaseous Concentrations at the Selected Clusters

Sample Code	CO (ppm)	CO ₂ (ppm)	TVOC (ppm)	SO ₂ (ppm)	NO ₂ (ppm)	NO (ppm)	HCl (ppm)	RH (%)	Air Temp. (°C)	Time
AQ1	2.84	1.06	0.16	0.00	0.00	0.00	0.13	55.7	29.2	1:45PM
AQ2	3.27	0.81	0.11	0.00	0.00	0.00	0.39	64.2	28.5	3:03PM
AQ3	1.12	1.01	0.08	0.00	0.00	0.00	0.55	68.4	27.8	10:51AM
AQ4	3.14	0.94	0.07	0.00	0.00	0.00	0.47	70.1	28.7	12:57PM
AQ5	1.28	1.23	0.06	0.00	0.00	0.00	0.03	60.4	29.1	3:17 PM
AQ6	3.27	0.12	0.08	0.00	0.00	0.00	0.04	54.5	28.7	3:55PM
AQ7	2.09	1.06	0.04	0.00	0.00	0.00	0.08	60.4	28.3	9:20AM
AQ8	1.63	0.53	0.30	0.00	0.00	0.00	0.27	58.4	28.4	10:43AM
AQ9	4.33	0.26	0.06	0.00	0.00	0.00	0.05	56.2	29.1	11:25AM
Min.	1.12	0.12	0.04	0.00	0.00	0.00	0.03	55.7	27.8	
Max.	3.27	1.23	0.16	0.00	0.00	0.00	0.55	68.4	29.2	
Avg.	2.55	0.77	0.11	0.00	0.00	0.00	0.23	60.9	28.6	
FME _{Env}	10.0	-	1.6	0.10	0.06	NS	2-5*	-	-	-

Source: Field Observation, April 2024

4.1.4.2 Particulate Matter (PM) Concentration

Atmospheric particles are dispersed materials and may include solid, oil, and water droplets, among others. In the study area, the particulates detected could be from dust re-suspension, vehicular emissions and domestic/commercial activities. The measure particulate matter sizes across the site are summarized in **Table 4.3**. The PM_{0.5} ranged from 0.01 to 0.11 µg/m³ with an average of 0.20 µg/m³ while the measured PM_{1.0} ranged from 0.15 to 0.88 µg/m³ with a mean value of 0.47 µg/m³. Particle size of PM_{2.5}, PM_{5.0} and PM_{10.0} averages are 1.18 µg/m³, 2.71 µg/m³, and 7.20 µg/m³, respectively. None of the measured particle sizes as at the time of the study exceeded their limits where stated, particularly the PM_{2.5} (25 µg/m³) and PM_{10.0} (80 µg/m³) which severe health (respiratory) implications on humans.

Table 4.3: Measured Particulate Matter Concentrations

Sampling Location Code	Concentration ($\mu\text{g}/\text{m}^3$)				
	PM _{0.5}	PM _{1.0}	PM _{2.5}	PM ₅	PM ₁₀
EBS/AIH/ESIA/AQ1	0.04	0.80	1.59	3.74	7.73
EBS/AIH/ESIA/AQ2	0.11	0.48	0.88	2.78	8.91
EBS/AIH/ESIA/AQ3	0.10	0.15	0.92	2.70	8.35
EBS/AIH/ESIA/AQ4	0.20	0.17	0.78	3.22	6.71
EBS/AIH/ESIA/AQ5	0.06	0.88	1.49	3.41	5.81
EBS/AIH/ESIA/AQ6	0.01	0.22	0.86	2.09	6.33
EBS/AIH/ESIA/AQ7	0.08	0.59	1.63	2.93	6.47
EBS/AIH/ESIA/AQ8	1.11	0.50	0.93	1.27	4.62
EBS/AIH/ESIA/AQ9	0.13	0.45	1.58	2.21	9.85
Min	0.01	0.15	0.78	1.27	4.62
Max	1.11	0.88	1.63	3.74	9.85
Mean	0.20	0.47	1.18	2.71	7.20
Limit	-	-	25*	-	80**

Source: Field Observation, April 2024

WHO 24hr Limit, ** World Bank 24hr Limit, *** FMEnv. Limit

4.1.4.3 Ambient Noise Level

The ambient noise levels recorded at the proposed site are presented in **Table 4.4**. As shown, lowest mean (background) and highest mean (background) noise levels recorded are 52.8dB (A) and 69.6dB (A), respectively and they are observed at sample location AQ1 (by the gate house/entrance) and **AQ7** (facility central). The highest background noise measured by the gate house was not unconnected to its proximity to the busy Edmund Road where automobiles are the frequent. Meanwhile, the FMEnv maximum noise level limit of 90dB(A) for 8-hour exposure limit and the 70 dB(A) Industrial area noise limit of the World Bank were not breached at any of the sampling locations. Therefore, the baseline ambient noise level at the project site as at the time of the study are low when compared with the regulatory limits. As observed during the field exercise, major sources of noise in the area are constant vehicular movement and, in some cases, sounds/music and other human activities as the surrounding/neighborhood to the site are fully built-up (developed).

Table 4.4: Measured Ambient Noise Levels at the Selected Farm Cluster

Sample Location Code	Noise Level, dB(A)		
	Min.	Max.	Background
EBS/AIH/ESIA/AN 1	47.3	66.4	69.6
EBS/AIH/ESIA/AN 2	56.2	59.8	60.4
EBS/AIH/ESIA/AN 3	49.3	54.3	57.1
EBS/AIH/ESIA/AN 4	46.1	52.3	56.8
EBS/AIH/ESIA/AN 5	48.4	55.7	53.5
EBS/AIH/ESIA/AN 6	51.2	57.1	66.2
EBS/AIH/ESIA/AN 7	40.2	46.4	52.8
EBS/AIH/ESIA/AN 8	38.9	47.4	56.9
EBS/AIH/ESIA/AN 9	41.7	54.3	63.4
Minimum	40.2	46.4	52.8

Maximum	56.2	66.4	69.6
FMEnv. Limit (8 hrs/day)	-	-	90

AN- Ambient Noise ; AIH- Agricultural-Industrial Hub ; EBS-Ebonyi State ; ESIA- Environmental and Social Impact Assessment

Source: Fieldwork for Ebonyi SAPZ Program, April 2024

4.1.5 Water Quality

Surface and groundwater within and around proposed project area of influence were sampled as part of the baseline data. Existing groundwater (borehole) within the Integrated Farm (Project site) was not functioning at the time of the visit/study, hence, groundwater within the facility could not be sampled. However, two representative samples were collected from household boreholes in close proximity to the site. Also, the surface water draining the area was sample at two locations. As shown in Table 4.5, a total of four (4) water samples were collected; two surface and two groundwater.

Water samples were collected in a 2-litre polyethylene bottle for general physio-chemical examination while samples for oil and grease analysis were taken in a 1-litre glass bottle and preserved with strong sulphuric acid. Heavy metal samples were fixed with strong nitric acid. For the microbial analysis samples, pre-sterilized 50mL McCartney bottles were used. A calibrated Extech Digital DO700 meter was used for in-situ measurements of pH, Electrical Conductivity, Total Dissolved Solids (TDS), Temperature and Dissolved Oxygen (DO) at each location.

The water samples were stored in an insulating material containing ice chests and ice chips (to keep the temperature at 4 degrees Celsius) before transported to the laboratory for further analysis.

The laboratory analysis was carried out at Environmental Accord Limited - an accredited laboratory by regulators including the Federal Ministry of Environment (FMEnv) and the National Environmental Standards and Regulations Enforcement Agency (NESREA). The spatial distribution of the water sampling locations is depicted in Fig. 4.9 while the sampling location coordinates and its physical description are presented in Table 4.5. Pictorial views of field equipment and in-situ measurements activities are shown in Plate 4.3.

Table 4.5: Ground and Surface water sampling locations coordinates and description

Sample Code	Long.(⁰ E)	Lat. (⁰ N)	Remarks/Description
EBS/AIH/ESIA/GW01	8.089917	6.303863	A privately owned borehole adjacent to the Integrated Farm
EBS/AIH/ESIA/GW02	8.091516	6.312433	A privately owned
EBS/AIH/ESIA/SW01	8.080942	6.313341	Upstream of Nkaliki River
EBS/AIH/ESIA/SW02	8.090938	6.310178	Midstream of Nkaliki River
EBS/AIH/ESIA/SW03	8.095267	6.309758	Downstream of Nkaliki River

EBS-Ebonyin State; AIH- Agricultural Industrial Hub; ESIA- Environmental and Social Impact Assessment; GW- Ground Water; SW- Surface Water

Source: Fieldwork, April 2024

4.1.5.1 Water Sample Quality Control

The water sample collection was carried out with appropriate quality assurance and quality control (QA/QC) measures in consistent with relevant local and international guidelines and standards. The QA/QC measures include, amongst others:

- In situ measurement of parameters with short holding time in groundwater and surface water samples immediately after collection;
- Proper calibration of all portable meters used for in situ measurement;
- Collection of separate samples for parameters requiring different treatment/preservation before analysis;
- Adequate preservation and labelling of collected samples;
- Use of disposable rubber hand gloves in order to avoid cross contamination.
- Use of only recommended sample containers to store sample media;
- Adequate labelling of chemical reagents used for sample preservation to avoid mix-up;
- Proper documentation of in-situ readings in log sheets and field notebooks.

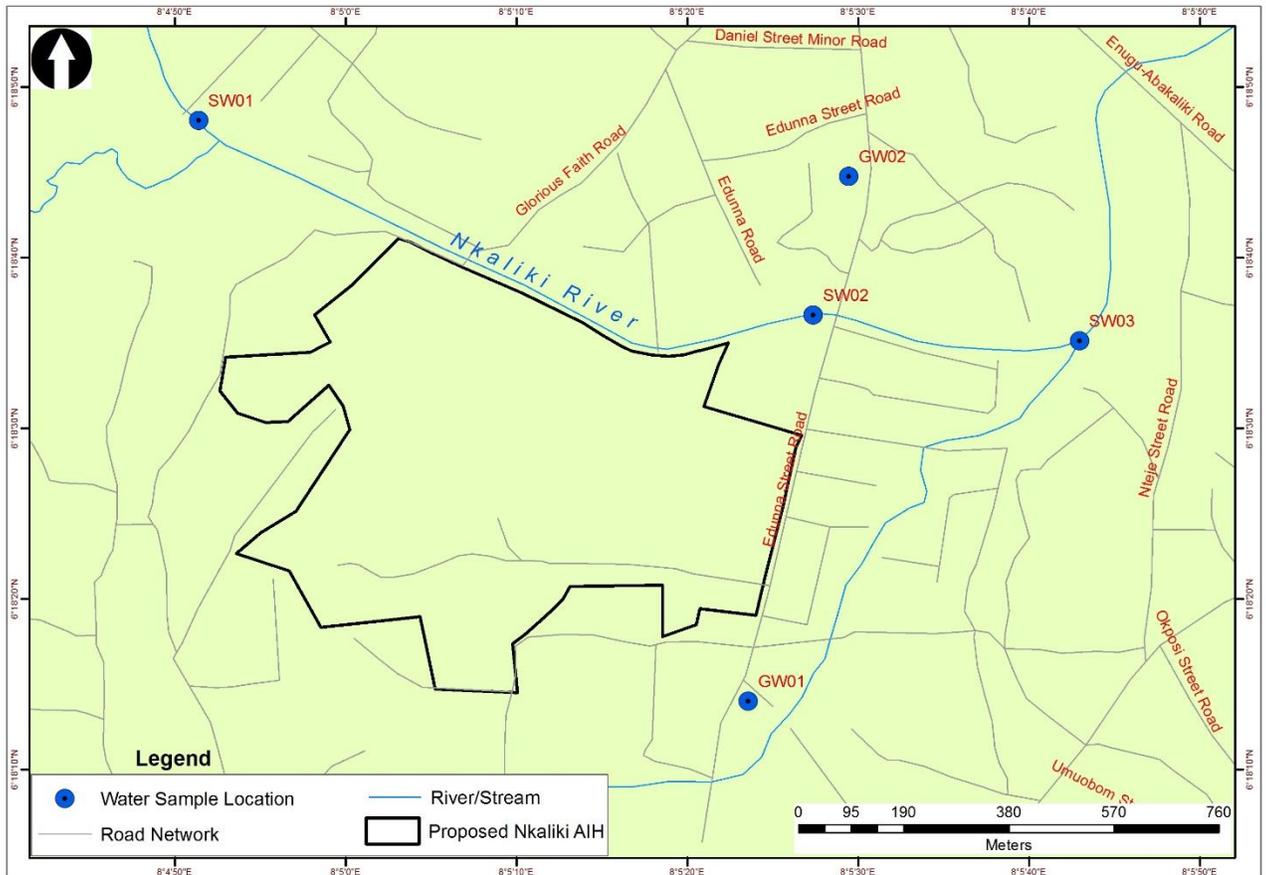


Fig. 4.12: Surface and Groundwater Sampling Locations and Distribution



Plate 4.3: Surface and groundwater sampling and in-situ measurements

Source: Fieldwork for the Proposed EBS SAPZ Program, April 2024

4.1.5.2 Groundwater Quality

4.1.5.2.1 In-Situ Analysis

Sampled groundwater in-situ measurements are presented in **Table 4.6**. As shown, it was observed that there was no significant variation in the sampled BH pH values as it ranged from 8.20 (GW01) to 8.60 (GW2) with an overall mean of 8.40. Based on pH scale, the sample groundwater is basic, and they are within the specified range of 6.5 – 9.2 for drinking water as recommended by both WHO and NSDWQ. The water temperature values recorded in the sampled water were all within the normal temperature value (<40°C) for natural water in the tropical environment.

The electric conductivity (E.C) ranged from 38.70 μ S to 86.40 μ S with a mean of 62.55 μ S, the highest and the lowest EC values were observed at station GW01 and GW02, respectively. Also, the TDS values ranged 20.0 to 45.0 mg/L with a mean of 32.5 mg/L; the measured TDS in the samples can be considered to be very low when compared to the FMEnv limit 500 mg/L. Furthermore, salinity concentration value for the groundwater samples ranged from 0.02 to 0.04ppt with an average of 0.03 ppt while Dissolved oxygen (DO) had a range of 2.07 to 2.69

mg/L with a mean value of 2.38 mg/L. Generally, none of the measured in-situ parameters contravened their FMEnv/NSDWQ limits where specified or stated.

4.1.5.2.2 Physicochemical and microbial characteristics

As shown in Table 4.6, measured total suspended solid (TSS) values ranged from 2.24 to 3.11 mg/L, the highest TSS value was observed in GW01 while the lowest value was measured GW02, the overall TSS mean in the samples however was 2.67 mg/L.

The sampled groundwater total hardness concentrations mean was 10.30 mg/L and this is generally low when compared to set its set limit of 500 mg/L, hence, the values are within acceptable limit. The measured chemical oxygen demand (COD) values ranged from 4.66 mg/L to 5.79 mg/L with a mean of 5.22 mg/L and it falls within the limit of 8.5 mg/L for COD. Of the two samples, turbidity was only observed in GW02 and the value was 0.10 NTU and this does not breach the limit of 1.0 NTU set by the FMEnv while oil and grease (O&G) was not observed in any of the samples, in other words, the O&G values were below the equipment resolution limit of <0.001mg/L and this indicates that the groundwater sampled are not polluted with hydrocarbon compounds.

On microbes, the measured properties are THB, THF, THUB, THUF, and E.coli and they do not show indication of polluted water. As shown in Table 4.6, THUB and THUF were not observed in any of the samples while E.coli was noted in GW01.

4.1.5.2.3 Anions and Nutrients (Exchangeable Cations)

The measured anions in the groundwater sampled are Sulphate (SO_4^{2-}), Nitrate (NO_3^-), and Phosphate (PO_4^{3-}) and their respective mean concentrations are 37.03 mg/L, 0.76 mg/L, and 0.13 mg/L; it was noted that concentrations of these anions are higher in GW02 than in GW01. The anions concentration however, do not breach their regulatory limits particularly the Sulphate with a limit of 400 mg/L and Nitrate with a limit of 50 mg/L.

On the other hand, the groundwater macro nutrients (exchangeable cations) analysed are Sodium (Na), Calcium (Ca), Magnesium (Mg), and Potassium (K). They are abundant elements in the earth's crust aquatic environment and are very important elements required for optimal primary and secondary productivity. However, their concentration could be disproportionate and constitute water quality concern. As shown in Table 4.7, the observed Sodium, Calcium, Magnesium, and Potassium mean concentrations in the groundwater samples are 54.11 mg/L, 26.76 mg/L, 12.47 mg/L, and 4.9 mg/L, respectively. The Ca and Mg concentrations are within the acceptable limit while no limits were set or available for Ca and K. In all, none of the exchangeable cations concentration exceed their regulatory limits where it is stated or available.

4.1.5.2.4 Trace Metals Concentration

The eleven metal elements analysed for pollutions in the groundwater samples are presented in Table 4.7. Of these metals, it was only Iron (Fe) and Zinc (Zn) that were observed in trace

amounts in all the samples and their mean concentrations are 0.53 mg/L and 0.61 mg/L, respectively. As shown in the Table, the Fe concentration in GW01 was high and almost equal to its limit of 1.0 mg/L. Other trace metals such as Nickel (Ni), Arsenic (As), Vanadium (V), Copper (Cu), Lead (Pb), Mercury (Hg), Chromium (Cr), Manganese (Mn) and Cadmium (Cd) were below their respective equipment resolution limits which range from <0.001 (for Cd, Cu, Ni, As, and V) to <0.004 (for Cr and Pb). Generally, the groundwater resources in the study area are not heavy metal polluted.

Table 4.6: Groundwater Sample Properties (In-Situ and Laboratory Analysis)

S/ N	Sample Code	In-Situ Parameters							Physico-Chemical Properties						Microbial				
		pH	Temp (°C)	E.C (µS)	TDS (mg/L)	Sal. (ppt)	Res. (kΩ)	DO (mg/L)	TSS (mg/L)	Turb. (NTU)	Hard- ness	COD	Cl ⁻	O&G	THB	THF	THUB	THUF	E.coli(MPN/ 100mL)
											(mg/L)			(cfu/mL)					
Groundwater																			
1	GW01	8.20	25.80	86.40	45.0	0.04	11.6	2.07	3.11	0.00	9.40	4.66	2.14	<0.001	1.8x10 ²	1.9x10 ¹	Nil	Nil	2.5x10 ¹
2	GW02	8.60	26.00	38.70	20.0	0.02	25.9	2.69	2.24	0.10	11.21	5.79	2.58	<0.001	1.7x10 ²	2.0x10 ¹	Nil	Nil	Nil
	Mean	8.40	25.9	62.55	32.5	0.03	18.75	2.38	2.67	0.05	10.30	5.22	2.36	<0.001	1.8x10 ²	2.0x10 ¹	-	-	2.6x10 ¹
	FME_{Env}/NSDWQ Limits	6.5-9.2	NS	NS	500***	NS	NS	NA	NS	1.0	500	8.5*	NS	NS	NA	NA	NA	NA	NA

WHO-World Health Organization; FME_{Env}-Federal Ministry of Environment, NSDWQ- National Standard for Drinking Water Quality; NA- Not Available, NS- Not Stated, BH- Borehole; *** WHO Limit, **NSDWQ Limits; *FME_{Env}. Limit

Table 4.7: Groundwater Sample Trace Metals, Anions and Nutrients

Sample Code	Metals(mg/L)											Anions and Nutrients(mg/L)						
	Fe	Zn	Cr	Pb	Cu	Cd	Ni	Mn	Hg	V	As	SO ₄ ²⁻	NO ₃ ⁻	PO ₄ ³⁻	Na ⁺	Ca ²⁺	Mg ²⁺	K ⁺
Groundwater																		
GW01	0.83	0.22	<0.04	<0.04	<0.001	<0.001	<0.001	<0.03	<0.001	<0.001	<0.001	13.17	0.42	0.08	51.04	27.02	15.84	5.05
GW02	0.24	1.01	<0.04	<0.04	<0.001	<0.001	<0.001	<0.03	<0.001	<0.001	<0.001	60.9	1.11	0.18	57.19	26.50	9.10	4.75
Mean	0.53	0.61	<0.04	<0.04	<0.001	<0.001	<0.001	<0.03	<0.001	<0.001	<0.001	37.03	0.76	0.13	54.11	26.76	12.47	4.9
WHO Limit	1.00	5.00	0.10	0.05	1.50	1.00	NS	NS	NS	NS	NS	400	50	NS	NS	75	30	NS

Source : Laboratory Results, November 2023

4.1.5.2 Surface Water Quality

The distribution of the surface water sampling locations is shown in Fig. 4.9 and Table 4.5 while the in-situ measurements and laboratory results of the sampled stream water draining the immediate project area are shown in **Tables 4.8 and 4.9**. The various components of the analysis (physical, chemical, anions/nutrients, metals, and microbial properties) are discussed thematically in the following sub headings.

4.1.5.2.1 Surface Water Physicochemical Properties

The mean stream water colour, temperature, and conductivity are 9.86 ctu, 25.00⁰C, and 40.87 μ S, respectively; while turbidity and pH average values are 1.61 NTU and 7.6. The pH values are all within the acceptable range of 6.5 to 8.5 for surface water. The water color and turbidity values are expected as a water body draining an urban area.

Also, the measured TDS, resistivity, and dissolved oxygen (DO) mean values are 21.70 mg/L, 258.33 k Ω , and 5.21 mg/L, respectively. Furthermore, respective total suspended solid (TSS), total hardness, chemical oxygen demand (COD), and chloride are 29.0 mg/L, 18.83.16 mg/L, 8.10 mg/L, and 18.37 mg/L. The measured physico-chemical parameters generally fall within the regulatory limit; however, anthropogenic inputs were noticed. Furthermore, O&G was observed in all the samples with a range of 0.02 mg/L to 0.07 mg/L and mean value of 0.07 mg/L, this is below the regulatory limit of 0.5 mg/L.

4.1.5.2.2 Anions and Nutrients

The measured anions in the surface water assessed are Nitrate (NO₃⁻), Sulphate (SO₄²⁻), and Phosphate (PO₄³⁻) and their respective mean values are 11.32 mg/L, 10.0 mg/L, and 0.15 mg/L and they do not show significant variation across samples. Furthermore, the exchangeable cations measured and their mean values are Sodium- Na (9.03 mg/L), Magnesium- Mg (6.45 mg/L), Calcium- Ca (13.36 mg/L), and Potassium-K (0.38 mg/L). As shown in Table 4.9, none of the anions and cations observed exceeded their regulatory limits where available and stated.

4.1.5.2.3 Heavy Metals Characteristics

Summary of the measured metals in the sampled surface water is presented in **Table 4.9**. As shown, eleven (11) metals were analysed for, and only four elements were detected. Observed metals therefore are Iron (Fe), Zinc (Zn), Lead (Pb), and Copper (Cu) and their respective averages are 0.07 mg/L, 0.27 mg/L, 0.09 mg/L, and 0.64 mg/L. The results show elevated values of Pb and Cu elements in the sampled surface water. The presence of Pb element in the samples are not unconnected to its abundance deposit of it in the State. Other metals such as Cadmium (Cd), Chromium (Cr), Manganese (Mn), Mercury (Hg), Vanadium (V), Arsenic (As) and Nickel (Ni) were not observed in the samples as their values were below their respective equipment resolution limits which range from <0.001 mg/L to <0.003 mg/L.

4.1.5.2.4 Surface Water Microbial Properties

The microbial characteristics of the sampled stream waters around the project area is presented in Table 4.8. Where obtainable and detected, values obtained for THB, THF, THUB, THUF, and E.coli are generally low.

Table 4.8: Surface Water Sample Properties (In-Situ and Laboratory Analysis)

Sample Code	In-Situ Parameters							Physico-Chemical Properties							Microbial				
	pH	Tem p. (°C)	E.C (µS)	TDS (mg/L)	Sal. (ppt)	Res. (kΩ)	DO (mg/L)	TSS (mg/L)	Colour	Turb. (NTU)	Hardness	COD	Cl ⁻	O&G	THB	THF	THUB	THUF	E.coli (MPN/100mL)
Surface Water																			
SW01	7.7	25.00	40.13	21.1	0.04	264	4.31	34.0	9.23	1.04	19.21	7.40	27.80	0.07	1.0 x10 ²	1.1 x10 ¹	Nil	Nil	2.7x10 ²
SW02	7.3	25.00	40.17	20.3	0.03	258	6.22	32.0	9.93	1.92	18.31	7.20	13.40	0.11	3.0x10 ²	3.3x10 ¹	3.0x10 ¹	Nil	3.4x10 ²
SW03	7.8	25.00	41.16	23.7	0.06	253	5.11	21.0	10.41	1.88	18.97	9.7	13.90	0.02	1.7x10 ²	1.3x10 ¹	2.1x10 ¹	Nil	2.1x10 ²
Mean	7.6	25	40.87	21.7	0.04	258.33	5.21	29	9.86	1.61	18.83	8.1	18.37	0.07	1.9x10 ²	1.9x10 ¹	1.7x10 ¹	-	2.73 x10 ²
FME _{Env} /NSDWQ Limits	6.5-8.5	< 40	1000*	500	NS	NS	7.5	75	50	5.0	200	30.0	NS	0.5	NA	NA	NA	NA	NA

SW-Surface Water; FME_{Env}-Federal Ministry of Environment, NSDWQ- National Standard for Drinking Water Quality; NA- Not Available, NS- Not Stated, BH- Borehole; *** WHO Limit, **NSDWQ Limits; *FME_{Env}. Limit

Table 4.9: Surface Water Sample Trace Metals, Anions and Nutrients

Sample Code	Metals(mg/L)											Anions and Nutrients(mg/L)						
	Fe	Zn	Cr	Pb	Cu	Cd	Ni	Mn	Hg	V	As	SO ₄ ²⁻	NO ₃ ⁻	PO ₃ ⁻	Na ⁺	Ca ²⁺	Mg ²⁺	K ⁺
Surface Water																		
SW01	0.11	0.28	<0.001	0.25	0.285	<0.001	<0.001	<0.03	<0.001	<0.001	<0.001	9.0	13.08	0.11	9.03	8.02	3.87	0.36
SW02	0.08	0.52	<0.001	0.03	1.098	<0.001	<0.001	<0.03	<0.001	<0.001	<0.001	11.0	9.02	0.23	12.05	17.03	8.22	0.37
SW03	0.02	0.01	<0.001	0.00	0.528	<0.001	<0.001	<0.03	<0.001	<0.001	<0.001	10.0	11.85	0.12	6.02	15.03	7.26	0.40
Mean	0.07	0.27	<0.001	0.09	0.64	<0.001	<0.001	<0.03	<0.001	<0.001	<0.001	10.0	11.32	0.15	9.03	13.36	6.45	0.38
WHO Limit	1.00	5.00	0.10	0.05	1.50	1.00	NS	NS	NS	NS	NS	400	50	NS	NS	75	30	NS

FME_{env} Limit	0.05	15	0.5	0.1	0.01	0.1	0.1	0.044	0.001	0.01	NS	500	10	3.5	120	180	40	50
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Source: Laboratory Results, April 2024

4.1.6 Soil Quality

Land availability and soil fertility are crucial to the proposed SAPZ project, hence, the need to assess and establish the soil environment of the selected farm clusters. Soil investigation for the planned project focused on its physio-chemical and microbial properties for the baseline study. The quality (chemical composition) of soil is particularly essential for agriculture/crop cultivation. The physio-chemical characteristics of soil reflect the nature, properties, as well as the degree of interaction with other environmental components. It also reflects the potentials and vulnerability of soil to extraneous factors. Generally, soil plays significant roles in man's quest for continuous agriculture/crop cultivation and sustainable development in the changing global climate reality.

4.1.6.1 Soil Sample Design and Field Activities

Soil sample was collected at nine locations/stations within the proposed site at two layers (top and bottom). The topsoil was taken from the soil surface down to 15 cm while the subsoil was taken from 15 cm to 30 cm using a calibrated(marked) stainless steel soil auger (Plate 4.5c).The soil sample code, location coordinates and description of the condition of the sampling station environment are presented in **Table 4.10**. Soil sampling spatial distribution is shown in **Fig. 4.13** while field sampling activities are presented in **Plates 4.4**.

Appropriate quality assurance and quality control (QA/QC) measures were implemented during the sampling activities. The QA/QC measures included: regular cleaning of the soil auger after each sampling event to avoid cross-contamination, wrapping of soil sample in foil paper and separation of sample meant for microbiology. In addition, soil samples were properly labelled with a unique code to avoid a possible mix-up while in-transit particularly during the transportation of sample to the laboratory. Analysis of the soil samples was conducted at an accredited laboratory by the Nigerian regulatory authorities including the Federal Ministry of Environment (FMEnv) among others.

Table 4.10: Soil Sample Code, Coordinates, and Description

Sample Code	Long. (^o E)	Lat. (^o N)	Remarks/Description of Environment
EBS/AIH/ESIA/SS1	8.089212	6.305640	Grassland within the project
EBS/AIH/ESIA/SS2	8.089512	6.307111	In a shrub plant within the site
EBS/AIH/ESIA/SS3	8.088677	6.309069	Wetalnd north of the site
EBS/AIH/ESIA/SS4	8.086271	6.310095	Wetland north of the site
EBS/AIH/ESIA/SS5	8.086189	6.306183	Open space within the site
EBS/AIH/ESIA/SS6	8.082387	6.306397	In shrub vegetation (alternative project site)
EBS/AIH/ESIA/SS7	8.086305	6.308156	By abandoned fish pond
EBS/AIH/ESIA/SS8	8.083358	6.309288	On grassland behind the training hall
EBS/AIH/ESIA/SS9	8.085245	6.304948	On a grassland

EBS-Ebonyi State; AIH- Agricultural Industrial Hub; ESIA- Environmental and Social Impact Assessment; SS-Soil Sampl;

Source: Fieldwork, April 2024



Plate 4.4: Soil Field Sampling Activities
Source: Fieldwork for Ebonyi SAPZ ESIA, April 2024

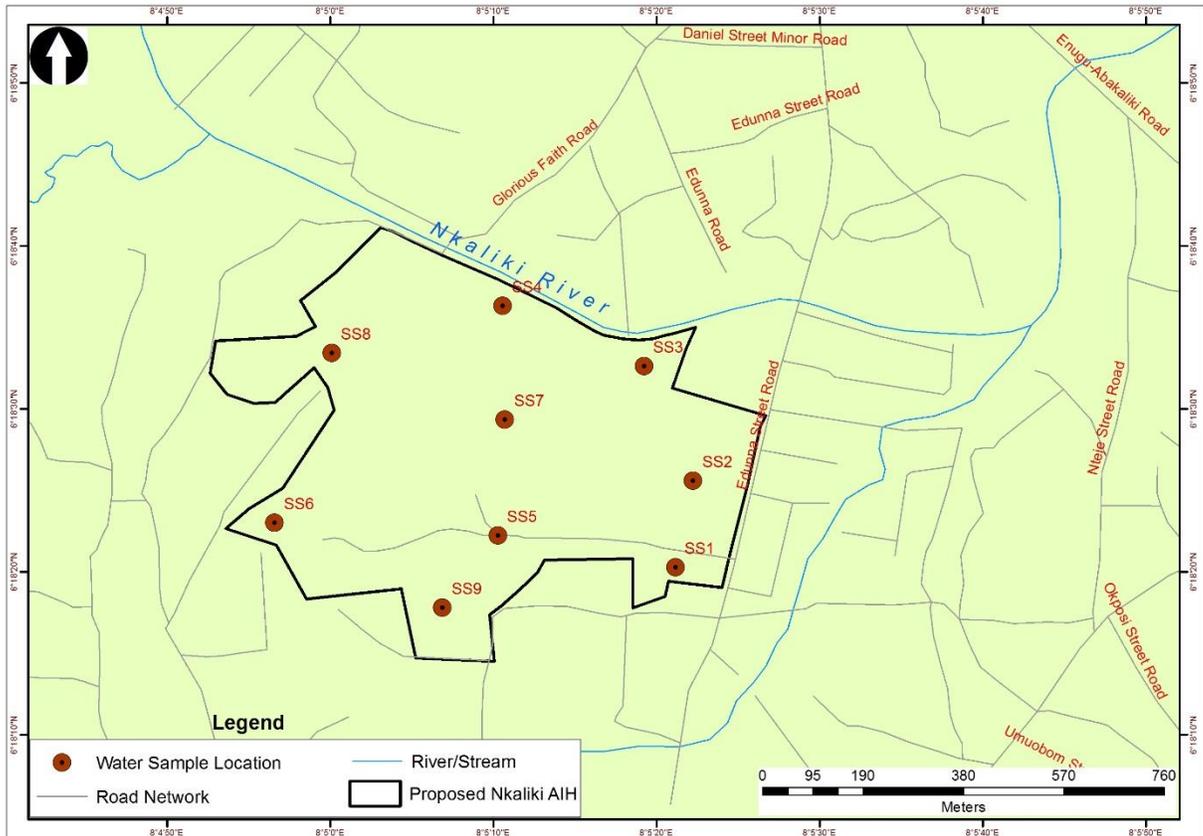


Fig.4.13: Soil sampling locations and distribution

4.1.6.2 Soil Results and Discussion

4.1.6.2.1 Physicochemical Properties

Results of the soil laboratory analysis are summarized and presented in **Table 4.13**. It was observed that the Hydrogen Ion Concentration (pH) ranged from 4.82 at SS2 to 6.17 at SS5 with a general mean of 5.43. Based on the soil general pH classification as shown in **Table**

4.9, the soil of the selected/proposed project sites ranged from very acidic to acidic; nonetheless, the observed pH values across the sites are all within the recommended range (4.5 to 9.0) in natural soil as stipulated by Alloway, 1991, and it supports plants growth/crop yield.

The electric conductivity (EC) values ranged from 14.9 to 35.0 $\mu\text{S}/\text{cm}$ with a mean of 23.58 $\mu\text{S}/\text{cm}$, the observed EC values could be said to be low when compared to maximum limit of 2000 $\mu\text{S}/\text{cm}$ stipulated by the FAO, 1974. Likewise, the soils total organic carbon (TOC) mean was 1.00%, the lowest TOC of 0.28 % was observed at SS5 while the highest value of 1.88 % was recorded at the SS9. As shown in Table 4.10, the study area soils TOC range from low to medium based on soil organic matter classification by Udoh (1986). In addition, the measured TOC values fall within a critical limit of 0.8% specified by Snapp (1998) for optimum yield in most arable crops. Organic matter plays a significant role in the dynamics of soils as it stores water, provides a living environment for organisms, and promotes structural stability, supplies and stores nutrients.

Furthermore, the moisture content (MC) value shows that selected sites for the proposed project are well drained and not waterlogged; the measured MC however ranged from 15.2 to 18.6 % with an overall mean of 18.11%, although soil MC is greatly influence by seasonal variations. Phenols, Ammonium, and oil & grease (O&G) was not observed in any of the samples as their values were below the detection limit of the analytical equipment (i.e <0.001 mg/kg). The absence of O&G in the samples indicates that the selected sites are not polluted with hydrocarbon, as at the study period.

4.1.6.2.2 Nutrients and Anions

The mean concentrations of exchangeable cations (macro nutrients) of Na^+ , Mg^{2+} , Ca^{2+} , and K^+ recorded in the sampled soils of the selected farm clusters are 33.99 mgkg^{-1} , 15.35 mgkg^{-1} , 11.84 mgkg^{-1} , and 32.47 mgkg^{-1} respectively. The project sites exchangeable cations are relatively low and are within the natural occurrence levels for tropical soils as stipulated by the Alloway (1991). Similarly, the mean ions concentrations (micronutrients) of SO_4^{2-} , PO_4^{3-} , NO_3^- , and Cl^- are 7.454 mgkg^{-1} , 2.38 mgkg^{-1} , 7.86 mgkg^{-1} , and 22.89 mgkg^{-1} , respectively and they do not exceed their respective limits where specified. The anions and cations concentration in the soils of the study area are not disproportionate to the statutory limits where available and specified. The selected sites soils are fertile and possess necessary nutrients for plant growth and crop production with or without fertilizer applications.

4.1.6.2.3 Metals Concentration/Properties

Nine trace metals were analysed to determine their pollution or otherwise in the soil samples. Of the nine (9) metals analysed, only Iron (Fe), lead (Pb), Cupper (Cu), Zinc (Zn) and Manganese (Mn) were observed in the soil samples. Chromium (Cr), Cadmium (Cd), Nickel (Ni) and Mercury (Hg) were not detected. The Fe values ranged from 9.16 to 36.7 mgkg^{-1} with a mean value of 16.97 mgkg^{-1} while the Cu concentrations ranged from 0.11 to 1.31 mgkg^{-1} with a mean value of 0.64 mgkg^{-1} . Furthermore, Mn values ranged from 0.54 to 1.29 mgkg^{-1} with a mean of 1.13 mgkg^{-1} while Zn mean value 21.29 mgkg^{-1} . The Pb concentration ranged from 0.04 to 4.31 mgkg^{-1} with an average of 1.55 mgkg^{-1} . The highest Pb concentration observed in SS3 is not unconnected to the abundance of this mineral

deposit in the entire region. Each location/site soil sample Pb concentration values are within the FMEnv limit of 3.0 mgkg⁻¹.

Generally, the mean concentrations of the observed heavy metals in the soil samples are all within the recommended limits for unpolluted soils. Other metals such as Cadmium (Cd), Chromium (Cr), Nickel (Ni), and Mercury (Hg) were below their respective equipment detection limits which ranged from <0.01 to <0.05 mgkg⁻¹(Table 4.13). This generally indicates that the soil environment of the study area is not polluted with heavy metals.

As observed during the field data gathering exercises, almost all the proposed project sites are cultivated with one economic plant or another such as rice, maize, cassava, plantain etc. In other words, the selected lands are productive for large scale farming/cultivation of crops, particularly cassava and rice. Details of plant species observed within and around the project sites are discussed under the biological environment (vegetation and wildlife) section.

4.1.6.4 Soil Microbial

The measured soil microbial properties are Total Heterotrophic bacteria (THB), Total heterotrophic fungi (THF), Hydrocarbon utilizing bacteria (HUB), and hydrocarbon utilizing fungi (HUF) and their mean values are 2.71x10⁴cfu/g, 2.34 x10³ cfu/g, 2.38 x10²cfu/g, and 2.11 x10¹ cfu/g respectively. Microbes are generally found in soil. The population of hydrocarbon degraders observed in the soil samples is relatively low this indicated an unpolluted environment.

Table 4.11: Soil pH Classification:

Range	Class
4.5-5.5	Very Acidic
5.5-6.0	Distinctly Acidic
6.0-7.0	Acidic
7.0	Neutral
7.0-7.5	Faintly Alkaline
7.5-8.0	Alkaline
8.0-8.5	Strongly Alkaline
8.5-9.0	Extremely Alkaline

Source : Alloway (1991)

Table 4.12: Organic Matter Classes

Organic (%)	Class
< 1.50	Low
1.50-2.50	Medium
>2.50	High

Udoh (1986).

Table 4.13: Physio-chemical and Microbial Properties of the study site Soil

Theme	Parameter	SS1	SS2	SS3	SS4	SS5	SS6	SS7	SS8	SS9	Mean	Limits	
	pH	5.17	4.82	5.26	6.11	6.17	5.95	4.88	5.12	5.39	5.43	4.5 –9.0*; 6-9****	
	E.C (μScm^{-1})	16.5	14.9	28.1	21.5	19.4	17.3	32.4	27.1	35.0	23.58	2000***	
	Phenols (mg/kg)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA
	Moisture Content (%)	15.2	16.3	17.3	18.6	15.8	15.2	16.4	16.6	18.11	16.61	NS	
	Ammonium (mg/kg)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NS
	O&G (mg/kg)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NS
	TOC (%)	0.8	1.17	1.87	1.7	0.82	0.46	0.53	0.32	1.88	1.00	NS	
Anions and Nutrients(mg/kg)	Ca ²⁺	11.69	8.81	9.31	7.10	6.02	8.37	8.55	13.88	32.81	11.84	NS	
	Mg ²⁺	16.18	10.70	10.11	14.65	12.67	19.04	13.89	22.18	18.70	15.35	NA	
	K ⁺	29.53	18.07	28.37	18.69	31.89	57.92	29.08	31.22	47.5	32.47	725***	
	Na ⁺	38.55	40.40	30.61	31.33	30.84	34.57	34.38	26.51	38.72	33.99	NA	
	SO ₄ ²⁻	5.60	16.40	9.12	5.40	6.20	5.50	6.51	6.34	5.98	7.45	300*; 500****	
	PO ₄ ³⁻	2.31	1.92	2.87	2.10	2.50	1.84	2.93	2.22	2.71	2.38	150*	
	NO ₃ ⁻	8.29	8.66	7.92	8.18	7.86	7.63	7.59	7.33	7.28	7.86	20****	
	Cl ⁻	35.79	26.55	18.43	22.89	25.79	13.69	20.52	25.79	16.55	22.89	250**	
Metals (mg/kg)	Fe	10.4	11.2	9.16	9.27	36.7	12.7	12.9	35.2	15.2	16.97	NS	
	Pb	0.08	1.27	4.31	1.42	0.04	1.71	1.70	1.70	1.71	1.55	0.3*;3.0***	
	Cd	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.3*;3.0***
	Cr	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	100****
	Cu	0.11	0.32	0.78	0.91	1.31	0.66	0.66	0.66	0.66	0.64	500*, 100****	
	Mn	1.29	2.07	0.54	1.10	1.07	1.02	1.02	1.02	1.02	1.13	NS	
	Zn	41.22	21.87	13.78	23.04	16.45	19.04	19.04	19.04	19.04	21.39	50*;70***	
	Ni	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	50*;70***
	Hg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NS
Microbial (cfu/g)	THB	2.64x10 ⁴	2.55x10 ⁴	2.80x10 ⁴	2.92x10 ⁴	2.71x10 ⁴	2.59x10 ⁴	2.75x10 ⁴	2.84x10 ⁴	2.60x10 ⁴	2.71x10 ⁴	NS	
	THF	1.88x10 ³	2.38x10 ³	2.36x10 ³	2.29x10 ³	2.40x10 ³	2.37x10 ³	2.40x10 ³	2.57x10 ³	2.39x10 ³	2.34x10 ³	NS	
	THUB	2.36X10 ²	2.26X10 ²	2.41X10 ²	2.45X10 ²	2.52X10 ²	2.30X10 ²	2.40X10 ²	2.42X10 ²	2.32X10 ²	2.38X10 ²	NS	
	THUF	1.63X10 ¹	2.15X10 ¹	1.88X10 ¹	2.07X10 ¹	2.19X10 ¹	2.29X10 ¹	2.35X10 ¹	2.25X10 ¹	2.16X10 ¹	2.11X10 ¹	NS	

NA- Not Available, NS- Not specified; *Alloway (1991); **Brady, (2002);***FAO, 1974, ****FMEnv

Source: Laboratory Analysis, April 2024

4.2 Biological environment

Vegetation and fauna assessment play a crucial role in the Environmental Impact Assessment (EIA) of a proposed project because it provides valuable information about the species diversity and its potential interactions with the project. The purpose of conducting the vegetation assessment was to provide valuable information regarding the ecological study within the project site with a focus on the fauna and floristic composition, vegetation types, species of conservation interest, and economic plants including any crops of medicinal value.

The project site was randomly sampled using the quadrat method with a quadrat size of 5m x 5m due to the vegetation pattern observed within the location. This method effectively captures all plant lifeforms and economic species within the study area. Furthermore, the conservation status of fauna taxa was investigated using the International Union for Conservation of Nature Web service (version 2022-2). In addition to what was observed within the proposed site, literature on flora and fauna of the state was also considered based on observations made at the proposed ATC Sites.

4.2.1 Flora

The physiognomic view of the study area shows a typical representation of open vegetation in locations with high level of disturbance and close vegetation in areas where vegetation is regenerating (**Plate 4.5**). The vegetation pattern is characterized by grasses, herbaceous species, and scanty shrubby/small tree species. Hence the vegetation type is a combination of grassland and shrubland ecosystems.

The Amagwu, Onuigbo, and Amika study area consists mainly of a grassland ecosystem with very few shrubs. Agricultural activities were observed to be ongoing within the environment, primarily focused on cultivation of *Manihot exculenta* species; while Ndiaabo Isiagwu and Ugwulangwu vegetation had been degraded although the species are undergoing regrowth. Agricultural practices observed within the area involve the cultivation of edible crops such as cassava, yam, cocoyam, pumpkin leaves, and pepper. Economic trees like *Mangifera indica*, and *Elaeis guineensis* were recorded (**Plates 4.5-4.7**).

Quantitatively, a total of twenty-nine (29) species belonging to seventeen (17) families (**Table 4.14**) were recorded within the study area. The frequent plant families identified were Poaceae (4 taxa) followed by Asteraceae (3 taxa), while other families have ≤ 2 taxa (**Figure 4.14**). The most dominant lifeform/habit was tree covering 31% (9 species), followed by shrub and herb with 17% (7 species each) while grass and climber covers $\leq 14\%$ with a representative of ≤ 4 species (**Figure 4.15**). It was evident that species diversity within the proposed study area has been altered/modified probably due to anthropogenic activities observed within the project site such as farming and wood harvesting activities (**Plates 4.5 & 4.8**) which have contributed to biodiversity loss within the site. Few taxa recorded within the site are of economic importance as they are used in treating various illnesses, use for beautification and as source of food for both man and animal (**Plate 4.6 & Table 4.15**).

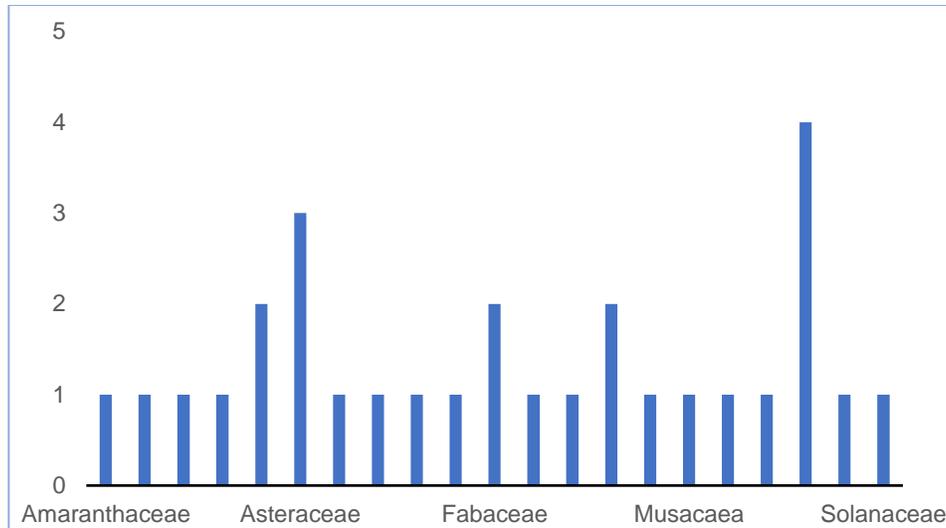


Figure 4.14: Family distribution within the study area

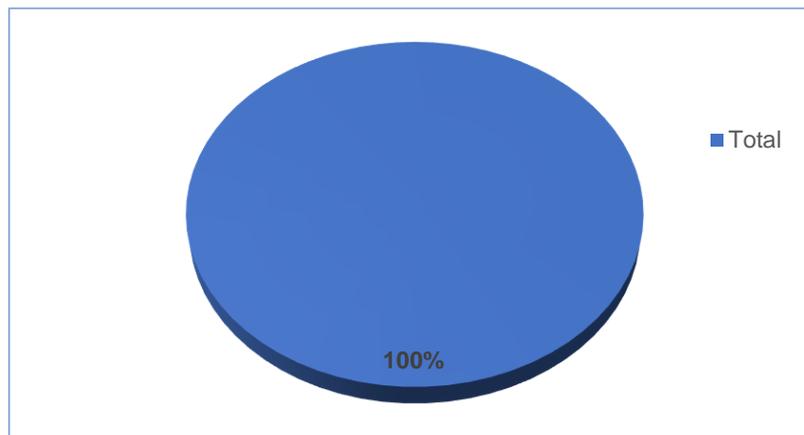


Figure 4.15: Life form/habit of species recorded at the project site

4.2.2 Conservation Status

Conservation status assessment is an important requirement when gathering ecological baseline data for an EIA exercise. Information from such process is valuable in decision-making in terms of project design, alternative project site consideration, mitigation strategy to minimize project impacts and biodiversity monitoring strategy development. Assessment does not only review the presence or absence of vulnerable plant taxa (endangered or critically endangered species) that are of conservation interest within a proposed project site, it well reviews critical habitats within such environment.

The conservation statuses of plant taxa recorded were determined using the International Union for Conservation of Nature (IUCN) Red List web-interface (version 2022-2). The IUCN categories against which the species were assessed include; Not Evaluated (**NE**), Data Deficient (**DD**), Least Concern (**LC**), Near Threatened (**NT**), Vulnerable (**VU**),

Endangered (**EN**), Critically Endangered (**CR**), Extinct in the Wild (**EW**), and Extinct (**EX**).

The assessment reviews that species recorded within the study area are classified into five IUCN categories (**Table 4.14**), of which *Tectona grandis* (**Plate 4.8**) (Endangered species) found in Onuigbo site was of conservation significance and recorded in the Onuigbo community which implies that conservation of this species should be considered during project development.

The findings of the assessment include;

- **Not Evaluated (NE)** species made up 66% (19 species);
- **Data Deficient (DD)** species made up 7% (2 species);
- **Least Concerned (LC)** species were 21% (6 species);
- **Near Threatened (NT)** species were 3% (1 species); while
- **Endangered (EN)** species were 3% (1 species).

Table 4.14: Qualitative Analysis of the species within the study area

S/N	Species	Family	Habit	Common Name	Location						IUCN
					1	2	3	4	5	6	
1	<i>Albemoschus esculenta</i>	Malvaceae	Herb	Okra	-	-	+	-	-	-	NE
2	<i>Anthocleista vogelii</i>	Gentianaceae	Tree	Cabbage tree	+	-	-	-	-	-	LC
3	<i>Aspilia africana</i>	Asteraceae	Herb	Bachelor's botton	-	-	+	-	-	-	NE
4	<i>Capsicum annum</i>	Solanaceae	Herb	Chili-pepper	-	-	+	-	-	-	LC
5	<i>Carica papaya</i>	Caricaceae	Tree	Pawpaw	-	-	+	-	+	-	DD
6	<i>Chromolaena odorata</i>	Asteraceae	Herb	Jack in the bush /Akintola	-	+	-	-	+	-	NE
7	<i>Colocasia exculenta</i>	Araceae	Shrub	Taro	-	-	+	-	-	-	NE
8	<i>Dioscorea cayenensis</i>	Dioscoreaceae	Climber	Yellow yam	-	-	+	-	-	-	LC
9	<i>Elaeis guineensis</i>	Arecaceae	Tree	African Oil Palm tree	-	-	+	+	+	+	LC
10	<i>Elusine indica</i>	Poaceae	Grass	Indian goosegrass	-	-	-	+	-	-	NE
11	<i>Eucalyptus camaldulensis</i>	Myrtaceae	Tree	River red gum	-	-	-	-	+	-	NT
12	<i>Ficus sp.</i>	Moraceae	Tree	-	-	-	-	-	-	-	NE
13	<i>Gomphrena globosa</i>	Amaranthaceae	Herb	Globe amaranth	-	+	+	+	-	-	NE
14	<i>Hibiscus sabdariffa</i>	Malvaceae	Herb	Indian-sorrel/Zobo leaves	-	+	-	-	-	-	NE
15	<i>Hyparrhenia sp.</i>	Poaceae	Grass	-	+	-	-	-	+	-	NE
16	<i>Ixora coccinea</i>	Rubiaceae	Shrub	Jungle geranium	-	-	-	+	-	-	NE

17	<i>Mangifera indica</i>	Anacardiaceae	Tree	Mango	-	-	-	+	+	-	DD
18	<i>Manihot exculentus</i>	Euphorbiaceae	Shrub	Cassava	+	-	+	+	+	+	NE
19	<i>Mimosa pudica</i>	Fabaceae	Shrub	Sensitive plant	-	-	-	-	+	-	NE
20	<i>Monoon longifolium</i>	Annonaceae	Shrub	Ashok	-	-	-	-	+	-	NE
21	<i>Musa sp.</i>	Musaceae	Shrub	Plantain	-	-	-	-	+	-	NE
22	<i>Panicum maximum</i>	Poaceae	Grass	Guinea grass	-	-	-	-	+	+	NE
23	<i>Pinus sp.</i>	Pinaceae	Tree	Pine tree	-	-	-	-	+	-	NE
24	<i>Raphia hookeri</i>	Arecaceae	Tree	Raffia palm	-	-	+	-	+	+	LC
25	<i>Senna occidentalis</i>	Fabaceae	Shrub	Coffee senna	-	-	+	-	-	-	LC
26	<i>Setaria sp.</i>	Poaceae	Grass	Marsh Bristlegrass	-	-	+	-	-	-	NE
27	<i>Tectona grandis</i>	Lamiaceae	Tree	Teak	-	-	-	-	+	-	EN
27	<i>Telfairia occidentalis</i>	Cucurbitaceae	Climber	Fluted gourd/Ugu	-	-	+	-	-	-	NE
29	<i>Tridax procumbens</i>	Asteraceae	Herb	Coat buttons	-	-	-	-	+	-	NE

IUCN Categorization- International Union for Conservation of Nature; Species present (+) & Species absent (-)

Source: Fieldwork, April 2024

*(Locations): Amagwu (1); Amika (2); Ndiaabo Isiagwu (3); Nkaliki (4); Onuigbo (5); and Ugwulangwu (6)

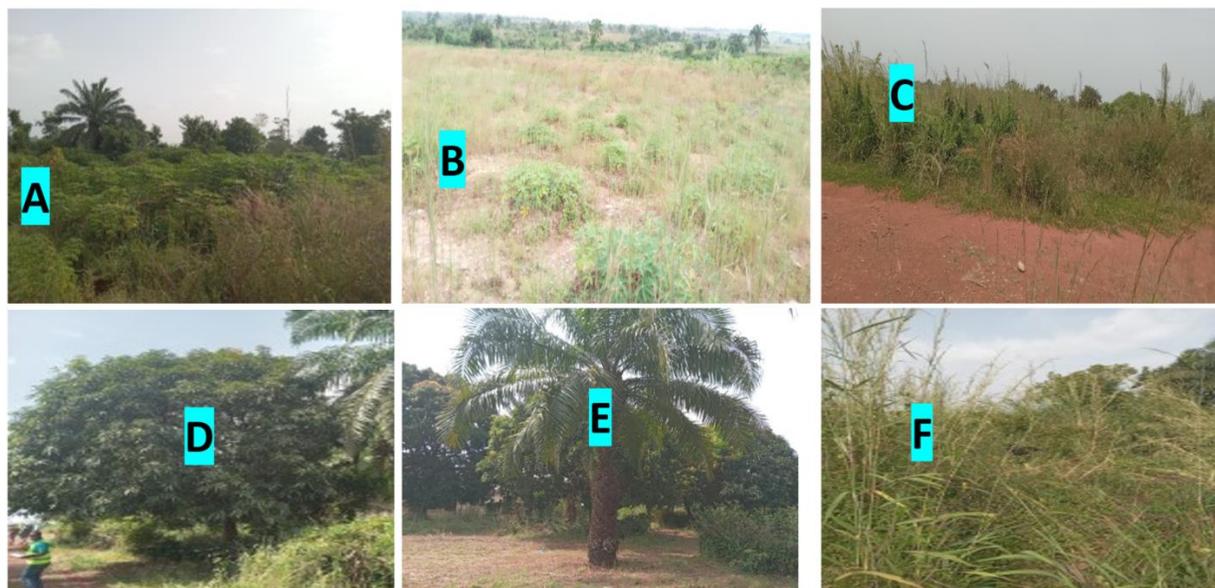


Plate 4.5: Physiognomic view of the study area, Degraded forest (A), Grassland with patches of evergreen tree species (B&C), *Mangifera indica* (D), *Elaeis guineensis* (E) & and *Setaria sp* (F)

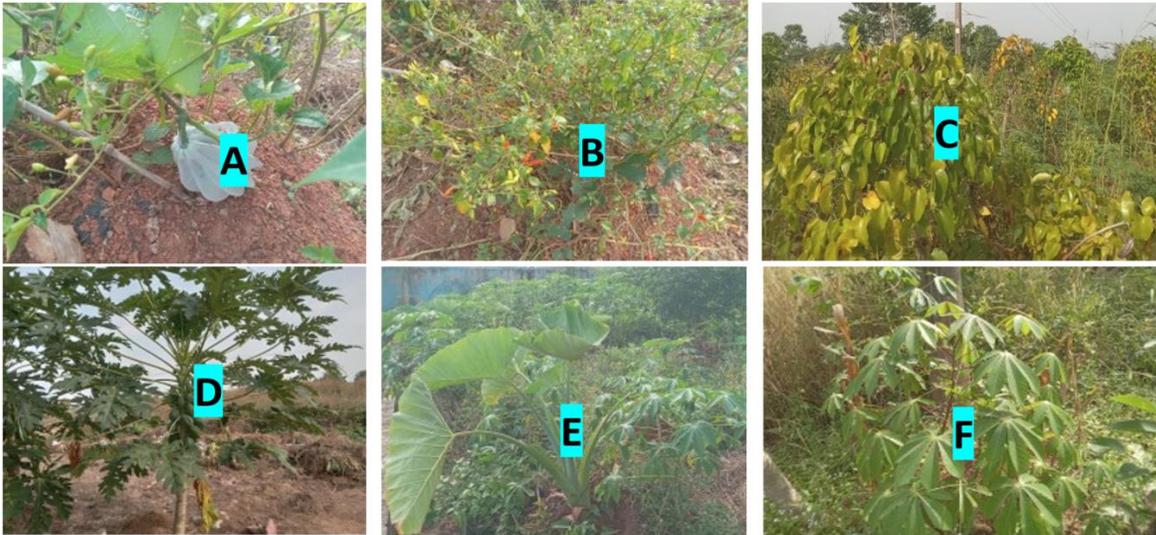


Plate 4.6: Some of the cultivated crops, *Telfairia occidentalis* (A); *Capsicum annum* (B); *Dioscorea cayensis* (C); *Carica papaya* (D); *Colocasia exculenta* (E) & *Manihot exculenta* (F)



Plate 4.7: Evidence of wood harvesting (A&B) and Endangered speices; *Tectona grandis* (C &D) within the study area



Plate 4.8: Some of the ornamental plants, *Ixora coccinea*(A); *Eucalyptus camaldulensis* (B), Edible Leave: *Hibiscus sabdariffa* (C), Cultivated area (D) and *Manihot exculenta* (E1&2)

Table 4.15: Economic uses of the species within the study area

S/N	Species	Family	Habit	Common Name	Economic Uses
1	<i>Albemoschus esculenta</i>	Malvaceae	Herb	Okra	Production of edible fruit
2	<i>Anthocleista vogelii</i>	Gentianaceae	Tree	Cabbage tree	Use in traditional medicinal for treating various diseases such as stomach ache, fever, constipation and inflammatory diseases.
3	<i>Aspilia africana</i>	Asteraceae	Herb	Bachelor's botton	Plant is used in herbal medicine and fodder for domesticated animals
4	<i>Capsicum annum</i>	Solanaceae	Herb	Chili-pepper	Crop is grown as source of food
5	<i>Carica papaya</i>	Caricaceae	Tree	Pawpaw	Tree produces edible fruit and medicinal leave for treating ailments
6	<i>Chromolaena odorata</i>	Asteraceae	Herb	Jack in the bush /Akintola	Common invasive species used for herbal medicinal purposes
7	<i>Colocasia exculenta</i>	Araceae	Shrub	Taro/Cocoyam	Cocoyam is grown as source of food
8	<i>Dioscorea cayenensis</i>	Dioscoreaceae	Climber	Yam leave	Plant produces edible tuber
9	<i>Elaeis guineensis</i>	Arecaceae	Tree	African Oil Palm tree	The products derived from oil palm tree serve as means of livelihood. Timber from the tree is used for construction
10	<i>Elusine indica</i>	Poaceae	Grass	Indian goosegrass	Serves a cover crop to prevent surface runoff.

11	<i>Eucalyptus camaldulensis</i>	Myrtaceae	Tree	River red gum	Essential oil from the leave and extract from the bark serves as antifungal and antibacterial for treating different ailments. Also, the wood is use in construction.
12	<i>Ficus sp.</i>	Moraceae	Shrub		They are extremely important food resources for wildlife
13	<i>Gomphrena globosa</i>	Amaranthaceae	Herb	Globe amaranth	Fodder crop for feeding animals. Leaves and flowers are used as a folk remedy for treating hypertension, cough, diabetes and kidney problems
14	<i>Hibiscus sabdariffa</i>	Malvaceae	Herb	Indian-sorrel/Zobo leave	The plant is one of the most important economic plants in food and pharmaceutical industries, its used as a refreshing drink, especially after it has been sweetened with sugar.
15	<i>Hyparrhenia sp.</i>	Poaceae	Grass		A valuable fodder
16	<i>Ixora coccinea</i>	Rubiaceae	Shrub	Jungle geranium	Plant is used for beautification
17	<i>Mangifera indica</i>	Anacardiaceae	Tree	Mango	The tree produce edible tree and leave is used for treating malaria alongside other plants.
18	<i>Manihot exculentus</i>	Euphorbiaceae	Shrub	Cassava	Plant is extensively cultivated to produce edible tuber which is a major source of livelihood.
19	<i>Mimosa pudica</i>	Fabaceae	Shrub	Sensitive plant	Common invasive species
20	<i>Monoon longifolium</i>	Annonaceae	Shrub	Ashok	Ornamental plant
21	<i>Musa sp.</i>	Musaceae	Shrub	Plantain	Source of food
22	<i>Panicum maximum</i>	Poaceae	Grass	Guinea grass	Fodder grass
23	<i>Pinus sp.</i>	Pinaceae	Tree	Pine tree	ornamental tree
24	<i>Raphia hookeri</i>	Arecaceae	Tree	Raffia palm	Source of palm wine
25	<i>Senna occidentalis</i>	Fabaceae	Shrub	Coffee senna	Used in traditional medicine for treating ailments
26	<i>Setaria sp.</i>	Poaceae	Grass	Marsh Bristlegrass	Plant is cultivated for fodder.
27	<i>Tectona grandis</i>	Lamiaceae	Tree	Teak	The wood obtained from the tree is of highest quality. It is used to make outdoor furniture and boat decks. It is also used for making cutting boards, indoor flooring, counter tops etc.
27	<i>Telfairia occidentalis</i>	Cucurbitaceae	Climber	Fluted gourd/Ugu	Plant produces edible vegetable and serves as livelihood
29	<i>Tridax procumbens</i>	Asteraceae	Herb	Coatbuttons	Fodder grass

Source: Fieldwork, April 2024

4.3 Socio-Economic Characteristics and Consultation with Stakeholders

This section discusses themes and topics on population, land use, planned development activities, settlement and community structures, employment, distribution of income, goods, and services, recreation, health, and cultural properties as they are concerned with the project area. Specifically, the chapter entails a detailed discussion of the following:

- Demographic Assessment: Analysis of existing livelihood opportunities, income, gender characteristics, age profile, health, transport access, existing community structures at the watershed, community, household, and individual levels etc.
- Gender-Based Violence: Analysis of the status of GBV/SEA in the project community and related issues;
- Grievance Redress Mechanism: Analysis of existing formal and informal grievance redress mechanisms in and around the intervention area;
- Public Consultation: Presentation of consultations with relevant stakeholders and affected persons.

Methods employed in gathering data on the socioeconomic characteristics of the project community to ensure adequate and wide coverage are highlighted as follows:

- Reconnaissance survey;
- Preparation/design of survey material;
- Field data collection (structured questionnaire administration);
- Consultations with groups and stakeholders;
- Consultation with community health facility personnel;
- Field/direct observation; and
- Literature review (secondary data collection).

4.3.1 Population Characteristics of the Project Area

According to the 2006 census, Ebonyi State has a population of 2,176,947 (NBS, 2012), with a projected population of 3,242,500 for the year 2022. The population growth has a rate of about +2.5%/year (2006-2022), with a density of approximately 499.8 persons per sq. km and a total land area of 6,488km². Table 4.16 and 4.17 shows the 2006 and 2022 projected population figures of Ebonyi State.

TABLE 4.16: EBONYI STATE POPULATION SIZE (ESTIMATION) AND PROJECTION

	Year	Total
Ebonyi State	2006	2,176,947
	2022	3,242,500

Source : National Bureau Statistics (2012)

Table 4.17: Population of Ebonyi State Local Government Area – 2006, 2022

S/N	LGA	2006	2022
1	Abakaliki	149,683	223,000
2	Afikpo North	156,649	233,300
3	Afikpo South	157,542	234,700
4	Ebonyi	127,226	189,500
5	Ezza North	146,149	217,700
6	Ezza South	133,625	199,000
7	Ikwo	214,969	320,200
8	Ishielu	152,581	227,300
9	Ivo	121,363	180,800
10	Izzi	236,679	352,500
11	Ohaozara	148,317	220,900
12	Ohaukwu	195,555	291,300
13	Onicha	236,609	352,400

Source : National Bureau Statistics (2012)

4.3.1.1 Common Demographic Characteristics of Sampled Population

Table 4.18 gives a description of the most common demographic characteristics of the respondents in the study community. Demographic variables such as respondent's gender, age, marital status, religion, household size, occupation and ethnic group are described. This information would present an understanding of the profile of the respondents in the project community.

Table 4.18: Respondent's Demographic Characteristics

Indicators	Options	Respondents (%)								Summary of Findings
		Nkaliki	Ndiabo Isiagwu	Onuigbo	Amagwu	Ugwulangu	Amika	Amaleze	Average	
Gender	Male	70.0	60.0	70.0	80.0	70.0	70.0	80.0	71.4	Male(71.4%) respondents outnumber female respondents (28.6%) across the project sites, reflecting the predominance of males in farming and field cropping operations, while females are limited to the processing of produce.
	Female	30.0	40.0	30.0	20.0	30.0	30.0	20.0	28.6	
Age (years)	18-45	40.0	50.0	60.0	40.0	60.0	50.0	60.0	55.4	Respondents within the age bracket of 18-35 years (55.4%) account for the highest proportion in the sample population.,
	46-65	40.0	40.0	30.0	50.0	40.0	40.0	40.0	40.0	

	Above 66years	20.0	10.0	10.0	10.0	0.0	10.0	0.0	4.6	followed by a few within 36-65 years (40%) and above 66 years (4.6%) This implies that there is a youth population in the project area and the potential availability of an active workforce.
Marital status	Married	100	100	90.0	100	100	90.0	90.0	95.7	Married respondents make up 95.7%, and widowed individuals constitute 4.3%. The dominance of married individuals signals stability, potential population growth, and maturity in the project area, reducing the likelihood of youth-related challenges during project implementation.
	Widowed	0.0	0.0	10.0	0.0	0.0	10.0	10.0	4.3	
Religion	Christianity	100	80.0	100	100	80.0	100	70.0	90.0	Christianity prevails at 90% in the communities, with traditional worship at 5.7% and Islam at 4.3%. This diverse religious landscape highlights the need for fostering understanding and respect among community members to promote social cohesion and prevent conflicts.
	Islam	0.0	10.0	0.0	0.0	10.0	0.0	10.0	4.3	
	Traditional	0.0	10.0	0.0	0.0	10.0	0.0	20.0	5.7	
Household size	Less than 5	20.0	20.0	10.0	20.0	30.0	0.0	10.0	15.7	Respondents report common household sizes, with 41.4% falling in the range of 6-10 members, 28.6% in the range of 11-15, 15.7% having less than 5, and 14.3% having above 16 members. This suggests the potential for a substantial labour force within families, enabling distributed farm work and increased productivity. However, caution is advised to safeguard the family's livelihood sources, considering the project's potential impact on a large number of individuals
	6-10	30.0	60.0	40.0	50.0	30.0	40.0	40.0	41.4	
	11-15	40.0	10.0	30.0	20.0	30.0	30.0	30.0	28.6	
	16 and above	10.0	10.0	20.0	10.0	10.0	20.0	20.0	14.3	
Ethnic	Igbo	100	100	100	100	100	100	100	100	The community is exclusively made up of the Igbo ethnic group (100%), with variations in the Igbo dialect tailored to each community. This homogeneity indicates robust cultural cohesion, streamlined communication channels, and potential for unity. Planning a project in this community requires cultural sensitivity, effective communication, and alignment with Igbo values to ensure successful implementation.
Education	No formal education	10.0	20.0	10.0	10.0	10.0	20.0	10.0	12.9	A person's level of education ensures his or her awareness and necessary knowledge of basic projects and activities carried out in one's environment. Most respondents (27.1%) have obtained tertiary degrees (OND/HND/NCE). Respondents with senior secondary school leaving certificates account for 25.7% while those with primary school leaving certificates and university graduates account for 21.4% and 12.9% respectively. Those with no formal education account for 12.9%. High literacy level in the project areas will enable the farmers understand new techniques and improvement related to their operations. Also, the high literacy level in the project area could be exploited for ease of communication that could facilitate mutual understandings.
	Primary school	20.0	30.0	10.0	30.0	30.0	20.0	10.0	21.4	
	Secondary school	20.0	20.0	20.0	30.0	30.0	30.0	30.0	25.7	
	Tertiary (Excluding university)	30.0	30.0	40.0	20.0	20.0	20.0	30.0	27.1	
	University Graduate	20.0	0.0	20.0	10.0	10.0	10.0	20.0	12.9	

Occupation	Farmers	60.0	70.0	70.0	80.0	70.0	80.0	70.0	71.4	The main occupation of respondents in the project communities is farming (71.4%). Their farming practices involve livestock and cultivation of crops such as rice oil palm, yams and cassava amongst others. Proper care must be taken to reduce the impact of the project on farms as it is the main source of livelihood to most respondents.
	Artisans	20.0	20.0	20.0	10.0	10.0	10.0	10.0	12.9	
	Trading & Shop keeping	10.0	10.0	10.0	10.0	20.0	10.0	10.0	12.9	
	Civil Servants	10.0	0.0	0.0	10.0	10.0	0.0	10.0	4.3	
Residency period/ Status	Permanent resident	100	100	100	100	100	100	100	100	The respondents (100%) are permanent residents in the project communities and have lived more than 10 years in their communities. This implies that they have stayed long enough to provide reliable information regarding the socio-economic condition of the project communities.

Source: Fieldwork, November 2023

4.3.1.2 Common Demographic Characteristics of Sampled Population

The study indicates that 30% of respondents in Nkaliki community earn between N91,000 and N100,000 monthly, while 20% earn between N41,000 and N50,000. Another 20% fall in the income range of N51,000 to N60,000 and above N100,000 respectively, and 10% earn between N71,000 and N80,000 monthly. Additionally, 20% of respondents receive monthly remittances, usually above N10,000, from family members living outside the communities, while 80% rely primarily on their own income. In Ndiabo Isiagwu community, 20% of respondents each earn monthly incomes falling within the ranges of N91,000 to N100,000, N61,000 to N70,000, and N71,000 to N80,000, while 10% earn between N81,000 and N90,000. Notably, 30% of respondents face challenges estimating their monthly income, possibly due to a lack of financial records or a cultural hesitancy to disclose income. Regarding additional income sources, 10% receive monthly remittances ranging from N10,000 to N20,000 from relatives residing elsewhere, while the majority (90%) do not receive such remittances.

According to the respondents, in Onuigbo, 40% of respondents earn monthly incomes ranging from N91,000 to N100,000, and 30% reported incomes between N81,000 and N90,000. Those earning between N41,000 and N50,000, as well as N71,000 and N80,000, make up 20%, while those with incomes above N100,000 represent 10%. Regarding additional income sources, 10% receive between N10,000 and N15,000 from family members residing elsewhere, while the majority (90%) do not have such additional income streams. In Amagwu, around 30% of respondents report earning between N61,000 and N70,000 monthly. Those earning between N21,000 and N30,000, as well as N41,000 and N50,000, constitute 20% each, while those with incomes between N31,000 and N40,000, N10,000 and N20,000, and above N100,000 monthly make up 10% each. Notably, all respondents in the sampled population rely solely on their monthly income, with no identified additional sources. They all state that they do not receive remittances from family members residing elsewhere.

A significant portion of respondents in Ugwulangwu (40%) did not disclose their monthly income, citing a lack of financial record-keeping. Meanwhile, 20% of respondents each reported earning between N10,000 and N20,000 and between N61,000 and N70,000, while

another 20% indicated incomes above N100,000. The unanimous response from all respondents (100%) is a reliance on their monthly income as the primary source, with none receiving remittances from family members residing elsewhere. In Amika, 30% of respondents reported monthly earnings between N61,000 and N70,000, with an additional 20% earning between N51,000 and N60,000. Those earning between N41,000 and N50,000, as well as those with incomes above N100,000, make up 10% each. Another 20% earn between N81,000 and N90,000 monthly. This suggests that farming is a lucrative venture in the state. Notably, respondents rely solely on their monthly income, as none receive remittances from family members elsewhere.

In Amaleze, a majority (50%) of residents earn less than N50,000 per month from the sale of farm produce, highlighting that they are predominantly low-income earners. Additionally, 10% of respondents reported monthly earnings between N71,000 and N80,000, and another 10% between N91,000 and N100,000. About 30% did not disclose their personal income. Notably, no other sources of income were identified by the respondents, and all respondents in the sampled population rely primarily on their monthly income, with none receiving remittances from family members residing elsewhere.

4.3.1.3 Housing Characteristics

In, Nkaliki 60% of residents use cement for walls while 40% of residents use plastered mud blocks, suggesting a significant portion of the community utilizes more durable and modern building materials. The roofing materials indicated are corrugated iron (60%), aluminium (30%), asbestos (10%). A high proportion (60%) of the respondents indicated that their floors were made of concrete, while others stated tiles (20%) and (30%) earthen materials. Water closets and pit latrines are equally prevalent, each accounting for 70% and 30% respectively. As for the Number of rooms in each household, 3-4 represent 70% while those living in 1-2 represent 30%. Other structures on the plot are animal granaries (10%) while 90% indicated the contrary. Regarding housing tenure, 80% of the sampled population in indicated they own the land and houses they live in, 10% live on rented land and live in rented apartments while 10% occupy rent-free.

In Ndiabo Isiagwu, 50% of residents use plastered mud for walls, while 50% prefer cement blocks, indicating a balanced choice between traditional and modern building materials. The majority of roofs are made of corrugated iron (50%), followed by aluminium (40%) and aluminium (10%). Notably, 50% of respondents have concrete floors, with 40% opting to use earthen materials and 10% using tiles. In terms of toilet facilities, pit latrines and water closets share a prevalence at 40% each, while 0% have facilities outside the dwelling and 10% use pier latrines. Regarding household size, 3-4 rooms are predominant at 70%, with 30% representing 1-2 rooms. Other structures on the plot include animal granaries (10%), while 90% indicate the absence of additional structures. Housing tenure reveals that 80% of the sampled population owns both land and houses, 10% rent both land and apartments and 10% enjoy rent-free accommodation.

In Onuigbo, 30% of residents opt for plastered mud walls, while a majority of 70% prefer the durability of cement blocks. Roofing materials consist mostly of corrugated iron (50%), with 30% using asbestos and 20% opting for aluminium. A significant portion (60%) of residents enjoy concrete floors, while 10% have tiles and 30% utilize earthen materials. Pit latrines and water closets are equally prevalent at 40%, with 0% having facilities outside

the dwelling, and 0% using pier latrines. The distribution of household sizes indicates that 3-4 rooms are common at 70%, while 30% represent 1-2 rooms. Only a minor percentage (10%) has an animal granary, and the majority (90%) lacks additional structures. Concerning housing tenure, 80% of the sampled population owns both land and houses, 10% rent both land and apartments and 10% enjoy rent-free accommodation.

In Amagwu, 40% of residents use plastered mud for walls, while a majority of 60% use cement blocks. Roofing materials are predominantly corrugated iron (60%), with 40% choosing aluminium. The majority (70%) of respondents have concrete floors, while 10% use tiles and 20% prefer earthen materials. Pit latrines and water closets share prevalence at 50% each. In terms of household sizes, 3-4 rooms are prevalent at 70%, while 30% represent 1-2 rooms. Additional structures such as animal granaries are present in 10% of cases, while 90% indicate the absence of other structures. Regarding housing tenure, 80% of the sampled population owns both land and houses, 10% rent both land and apartments, and 10% occupy rent-free accommodation.

In Ugwulangwu, 70% of the respondents use plastered mud while 30% use cement for their walls. Roofing materials are mostly corrugated iron (50%), with 40% using aluminium. A significant proportion (60%) of residents has concrete floors, while 40% use earthen materials. Pit latrines and water closets are common with 90% having facilities outside the dwelling, and 10% water closets. Concerning household sizes, 3-4 rooms are prevalent at 70%, while 30% represent 1-2 rooms. Additional structures like animal granaries and kiosks are present in 20% of cases, while 90% indicate the absence of other structures. Regarding housing tenure, 80% of the sampled population owns both land and houses, 10% rent both land and apartments, and 10% enjoy rent-free accommodation.

In Amika, 70% of residents use cement while 30% prefer the durability of plastered mud. Roofing materials are predominantly corrugated iron (70%), with 30% choosing aluminium. The majority (60%) of respondents have concrete floors, while 20% have tiles, and 20% use earthen materials. Pit latrines and water closets are equally prevalent at 70% and 30% respectively. In terms of household sizes, 3-4 rooms are prevalent at 70%, while 30% represent 1-2 rooms. Additional structures like kiosks are present in 30% of cases, while 70% indicate the absence of other structures. Regarding housing tenure, 80% of the sampled population owns both land and houses, 10% rent both land and apartments, and 10% enjoy rent-free accommodation.

In Amaleze, 50% of residents use cement and plastered mud for walls, respectively. Roofing materials are predominantly corrugated iron (50%), with 30% using asbestos and 20% choosing aluminium. The majority (70%) of respondents have concrete floors, while 30% use earthen materials. Respondents with pit latrines accounts for 60% while 40% use water closets. In terms of household sizes, 3-4 rooms are prevalent at 70%, while 30% represent 1-2 rooms. Additional structures like kiosks are present in 20% of cases, while 80% indicate the absence of other structures. Regarding housing tenure, 80% of the sampled population owns both land and houses, 10% rent both land and apartments, and 10% enjoy rent-free accommodation.

4.3.1.4 Household Solid Waste Management

Figure 4.1 shows the various household waste management methods adopted in the project communities. For waste management in Nkaliki, 40% of respondents prefer burning waste

after gathering and dumping in community refuse, respectively while 20% opt for the services of a waste collector. Burning safe refuse in the community poses environmental risks, releasing harmful pollutants and contributing to health hazards and climate change. To mitigate these issues, promoting waste segregation proper waste disposal services is crucial for fostering sustainable and eco-friendly waste management practices in Nkaliki community. Ndiabo Isiagwu shows a preference for burning waste after gathering, with 60% of respondents adopting this method. Additionally, 40% prefer employing the services of a waste collector. This reflects a balanced utilization of both individual and professional waste management practices. All respondents in Onuigbo (100%) follow the practice of burning their waste after gathering. This suggests a uniform waste disposal method within the community, emphasizing the prevalence of poor waste management practices.

In Amagwu, 60% of respondents favour burning waste after gathering, while the remaining 40% utilize the community dumpsite for waste disposal. Waste management in Ugwulangwu is diverse, with 50% of respondents preferring burning after gathering waste, 30% dump in community refuse and the other 20% opting for the services of a waste collector. Amika residents employ different waste management methods, with 60% burning waste after gathering and the remaining 40% utilizing the services of a waste collector. In Amaleze, half of the respondents (50%) adopt the method of burning waste after gathering, while the other 50% prefer dumping in community refuse dump. This indicates a balanced utilization of both individual and professional waste management practices within the community.

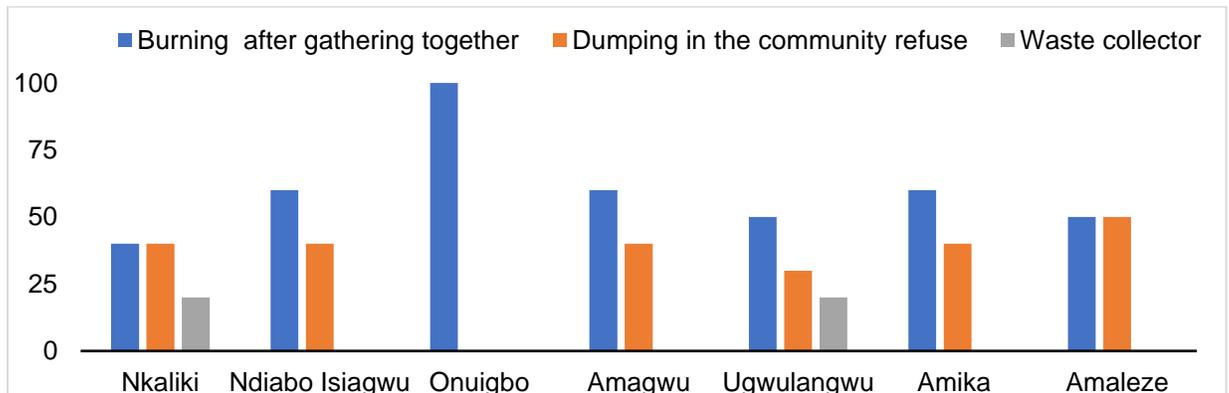


Figure 4.16: Solid Waste Management

Source: Fieldwork, November 2023

4.3.1.5 Sources of Energy

The sources of energy for various uses is not the same everywhere. Figure 4.2 and Figure 4.3 show the sources of energy for lighting and cooking in the project communities. In Nkaliki, 40% of respondents rely on the Enugu Electricity Distribution Company (EEDC) for lighting, while 30% use torchlight batteries, and 30% use generators. Given the unstable EEDC power supply, residents often utilize multiple sources for lighting. For cooking, respondents adopt a varied approach with 40% using gas, 30% relying on firewood, and 30% choosing kerosene.

Ndiabo Isiagwu exhibits a diverse energy usage pattern, with 50% of respondents relying on EEDC for lighting, 40% using torchlight batteries, and 10% using generators. Due to the unreliability of EEDC power, residents often incorporate multiple sources for lighting. For cooking, respondents show flexibility with 40% using gas, 40% relying on firewood, and 20% choosing kerosene. In Onuigbo, residents cope with the unstable EEDC power supply by diversifying their energy sources. 30% of respondents use EEDC for lighting, 30% rely on torchlight batteries, and 40% use generators. The use of multiple energy sources is evident, reflecting the community's adaptability. For cooking, respondents showcase a varied approach with 30% using gas, 50% relying on firewood, and 20% choosing kerosene.

Amagwu residents adapt to the challenges of EEDC power instability by using a mix of energy sources. 40% of respondents depend on EEDC for lighting, 30% use torchlight batteries, and 30% use generators. This highlights the community's flexibility in managing energy needs. For cooking, respondents show a diverse approach with 10% using gas, 60% relying on firewood, and 30% choosing kerosene. In Ugwulangwu, 50% of respondents rely on EEDC for lighting, 30.0% use torchlight batteries, and 20.0% use generators. The fluctuating EEDC power supply prompts residents to adopt multiple sources for lighting. For cooking, respondents predominantly use gas (50%), followed by firewood (30%) and kerosene (20%).

Amika residents navigate the challenges of EEDC power by diversifying their lighting sources. 40% of respondents use EEDC, 30% rely on torchlight batteries, and 30% use generators. The community's adaptability is evident in the varied energy sources. For cooking, respondents showcase a varied approach with 40% using gas, 30% relying on firewood, and 30% choosing kerosene. In Amaleze, 40% of respondents use EEDC for lighting, 30% use torchlight batteries, and 30% use generators, showcasing the community's reliance on multiple energy sources due to the unpredictable EEDC power supply. For cooking, respondents predominantly use gas (50%), followed by firewood (40%) and kerosene (10%).

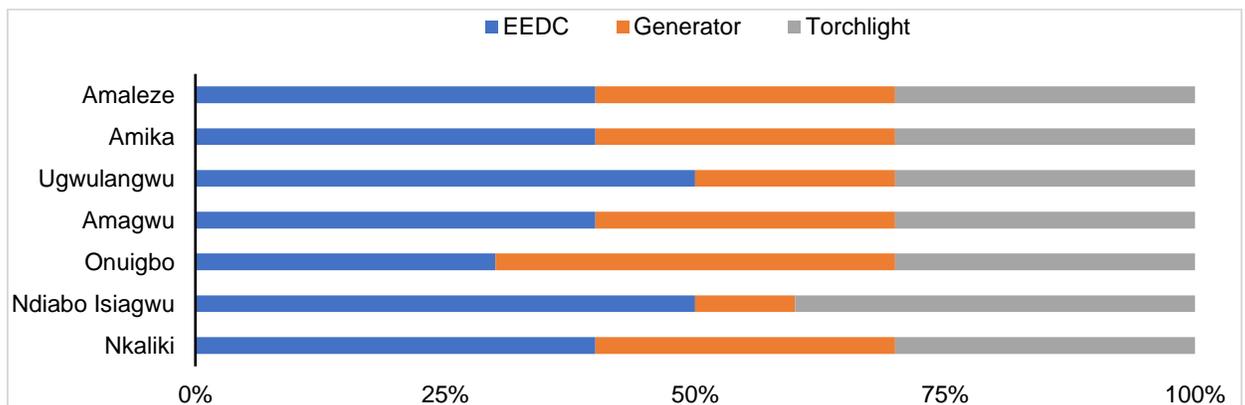


Figure 4.17: Sources of Energy for Lighting

Source: Fieldwork, November 2023

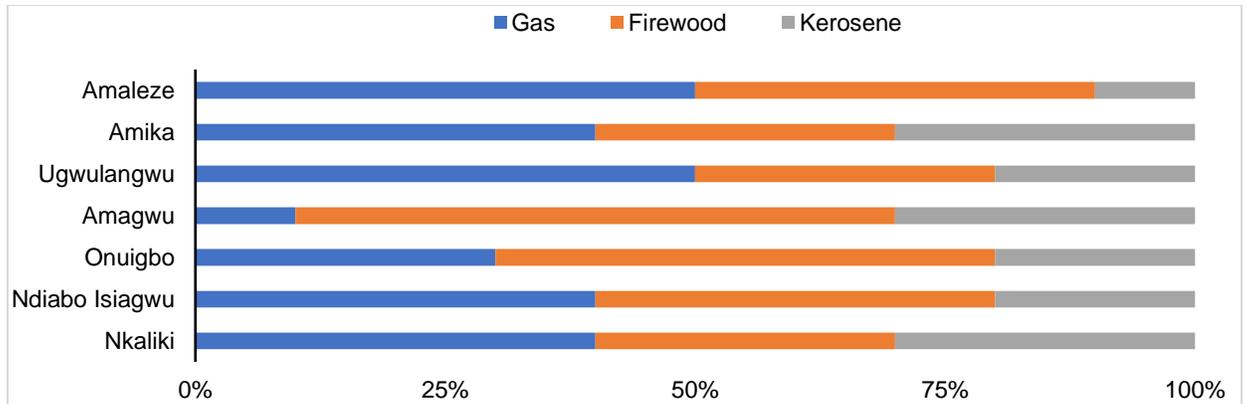


Fig. 4.18: Sources of Energy for Cooking

Source: Fieldwork, November 2023

4.3.1.6 Sources of Water

Figure 4.4. shows the availability and accessibility of domestic and portable water to the residents in the project communities. The study reveals that hand-dug wells, water pumps and community taps are the common sources of domestic water supply in the project communities. In Nkaliki, the availability and accessibility of domestic and portable water are facilitated primarily through hand-dug wells (40%) and water pumps (60%). These sources cater to the various needs such as drinking, cooking, bathing, and washing within the community. Ndiabo Isiagwu residents have access to domestic water supply through hand-dug wells (50%) and boreholes/water pumps (50%). These sources contribute to meeting the essential needs of the community, including drinking, cooking, bathing, and washing. In Onuigbo, domestic water supply for drinking, cooking, washing, and bathing primarily comes from hand-dug wells (60%) and water pumps (40%). These sources collectively ensure the accessibility of water for various household purposes.

Amagwu relies on hand-dug wells (40%) and water pumps (60%) as common sources of domestic water supply for drinking, cooking, washing, and bathing. These sources play a crucial role in meeting the water needs of the community. In Ugwulangwu, hand-dug wells (60%) and boreholes (40%) serve as the primary sources of domestic water supply for residents. This diverse set of sources ensures accessibility for drinking, cooking, bathing, and washing within the community. Amika residents depend on boreholes/water pumps (60%) and hand-dug wells (40%) for their domestic and portable water supply. These sources contribute to the accessibility of water for drinking, cooking, bathing, and washing within the community. Similarly, in Amaleze, the main sources of domestic and portable water supply include water pumps (50%) and hand-dug wells (50%). These sources contribute to the accessibility of water for drinking, cooking, bathing, and washing within the community.

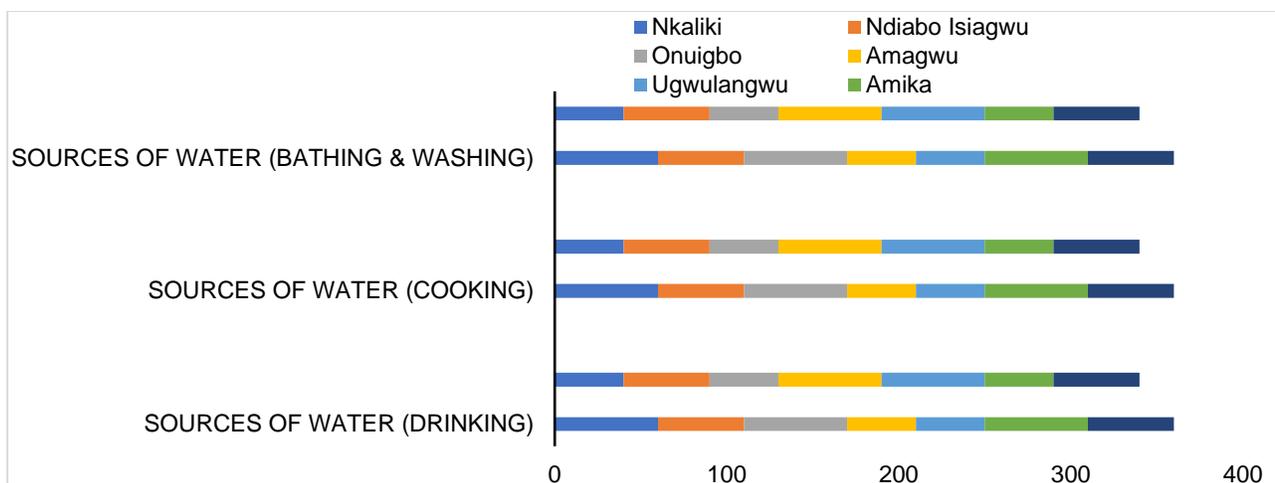


Figure 4.19: Sources of Water for Domestic Uses

4.3.1.7 Health Status

Table 4.19 show the health management methods frequently employed for the treatment of illness amongst respondents in the project areas. It also shows the frequency of visit to health facilities.

Table 4.19: Respondents Health Characteristics

Project areas	Common ailment/Management methods	Frequency of visits to health facilities
Nkaliki	<ul style="list-style-type: none"> Common ailments include malaria (40%), typhoid fever (30%), and asthma and eye pain (30% collectively). Health management methods adopted by residents involve attending clinics/hospitals (70%), buying drugs from nearby chemists (20%), and the use of traditional medicine (10%). 	<ul style="list-style-type: none"> Of those that visit the hospital, 60% visited within the last six months, 30% visited in the last five years, and 10% visited in the last year. Notably, all respondents (100%) affirmed that their present health condition will not be worsened by the proposed SAPZ intervention.
Ndiabo Isiagwu	<ul style="list-style-type: none"> Residents of Ndiabo Isiagwu commonly suffer from malaria (50%), typhoid fever (30%), and pile (20%). Health management methods predominantly include attending clinics/hospitals (60%), buying drugs from nearby chemists (30%), and the use of traditional medicine (10%). 	<ul style="list-style-type: none"> When assessed on the frequency of the visit to health facilities, Of those that visit the hospital, 50% visited within the last six months, 40% visited in the last five years, and 10% visited in the last year. Furthermore, All respondents (100%) affirmed that their present health condition will not be worsened by the proposed SAPZ intervention.
Onuigbo	<ul style="list-style-type: none"> In Onuigbo, prevalent ailments are malaria (40%), typhoid fever (30%), and asthma and eye pain (10% respectively). Health management methods adopted include attending clinics/hospitals (60%), buying drugs from nearby chemists (30%), and the use of traditional medicine (10%). 	<ul style="list-style-type: none"> For those who visit the hospital, 20% visited within the last six months, 50% visited in the last five years, and 30% visited in the last year. All the respondents affirmed that their health conditions will not be worsened by the proposed intervention. All respondents (100%) affirmed that their present health condition will not be worsened by the proposed SAPZ intervention.

Amagwu	<ul style="list-style-type: none"> • Amagwu residents commonly suffer from malaria (30%), typhoid fever (40%), and cholera (30%) • Health management methods involve attending clinics/hospitals (70%), buying drugs from nearby chemists (20%), and the use of traditional medicine (10%). 	<ul style="list-style-type: none"> • On the frequency of visits to health facilities, 50% visited within the last six months, 40% visited in the last five years, and 10% visited in the last year. • 20% of respondents fear that their health conditions may worsen as a result of contamination of groundwater while 80% stated the contrary. Hence, there is need for mitigation to that effect.
Ugwulangwu	<ul style="list-style-type: none"> • In Ugwulangwu, common ailments include malaria (40%), typhoid fever (40%), and eye pain (20%). • Health management methods predominantly include attending clinics/hospitals (70%), buying drugs from nearby chemists (20%), and the use of traditional medicine (10%). 	<ul style="list-style-type: none"> • Among those who visit the hospital, 60% visited within the last six months, 30% visited in the last five years, and 10% visited in the last year • All the respondents affirmed that their health conditions will not be worsened by the proposed intervention.
Amika	<ul style="list-style-type: none"> • Residents of Amika commonly suffer from malaria (40%), typhoid fever (30%), and eye pain (30%). • Health management methods adopted involve attending clinics/hospitals (60%), buying drugs from nearby chemists (30%), and the use of traditional medicine (10%). 	<ul style="list-style-type: none"> • For those who visit the hospital, 50% visited within the last six months, 30% visited in the last five years, and 20% visited in the last year. • 10% of respondents fear that their health conditions may worsen as a result of air pollution during construction while 90% stated the contrary. Hence, there is a need for mitigation to that effect.
Amaleze	<ul style="list-style-type: none"> • In Amaleze, prevalent ailments are malaria (50%) and typhoid fever (50%). • Health management methods include attending clinics/hospitals (60%), buying drugs from nearby chemists (30%), and the use of traditional medicine (10%). 	<ul style="list-style-type: none"> • Of those that visit the hospital, 40% visited within the last six months, 40% visited in the last five years, and 20% visited in the last year. • All respondents (100%) affirmed that their present health condition will not be worsened by the proposed SAPZ intervention.

Source: Fieldwork, November 2023

4.3.1.8 Community Environmental Concerns

Existing environmental challenges within the project communities were assessed and these challenges vary from one cluster/community to another. The summary of responses is given in Table 4.20 below.

Table 4.20: Respondents Community Environmental Concerns

Project areas	Existing environmental challenges	Problems envisaged during construction and operation
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<p>Nkaliki</p>	<ul style="list-style-type: none"> • The current environmental challenge affecting their community is: <ul style="list-style-type: none"> o Bad road (60%) o Poor drainage system (30%) o Environmental degradation (10%) 	<ul style="list-style-type: none"> • Challenges envisaged during construction are: <ul style="list-style-type: none"> o Encroachment of farms (80%) o Pollution; groundwater, noise, and air (20%) • Notably, 100% of respondents do not think the proposed SAPZ intervention will pose any threat to the community during operation • Also, all respondents claim the proposed intervention will pose no environmental threat to the community during the operational stage.
<p>Ndiabo Isigwu</p>	<ul style="list-style-type: none"> • The current environmental challenge affecting their community is: <ul style="list-style-type: none"> o Bad road (50%) o Pollution (40%) o Environmental degradation (10%) 	<ul style="list-style-type: none"> • 70% of respondents believe the proposed intervention will not pose any threat to the community during construction, while the remaining 30% stated the contrary. • Challenges envisaged during construction are: <ul style="list-style-type: none"> o Encroachment of farms (40%) o Pollution; groundwater, noise, and air (30%) o Poor drainage system (30%). • Notably, the respondents stated there is no major environmental threats that the community might likely experience during project operation.
<p>Onuigbo</p>	<ul style="list-style-type: none"> • The current environmental challenge affecting their community is <ul style="list-style-type: none"> o Bad road (50%) o Poor drainage system (30%) o Pollution (20%) 	<ul style="list-style-type: none"> • 60% of respondents believe the proposed intervention will pose any threat to the community during construction while others (40%) stated the contrary. Challenges envisaged are: <ul style="list-style-type: none"> o Encroachment of farms (70%); o Pollution; groundwater, noise and air (30%). • Challenges envisaged during operation are: <ul style="list-style-type: none"> • Groundwater pollution (40%); • Other respondents (60%) claim the proposed intervention will pose no environmental threat to the community during the operational stage.
<p>Amagwu</p>	<ul style="list-style-type: none"> • Current environmental challenges affecting their community are <ul style="list-style-type: none"> o Bad road (30%) o Poor drainage system (30%) • Other respondents (40%) could not ascertain if the community had any major environmental challenges. 	<ul style="list-style-type: none"> • Challenges envisaged during construction are: <ul style="list-style-type: none"> o Pollution; groundwater, noise and air (60%) o Destruction of infrastructure (40%); • Challenges envisaged during operation are: <ul style="list-style-type: none"> • Destruction of infrastructure (30%); • Other respondents (70%) claim the proposed intervention will pose no environmental threat to the community during the operation.
<p>Ugwulangwu</p>	<ul style="list-style-type: none"> • Current environmental challenges affecting their community are <ul style="list-style-type: none"> o Pollution (30%) o Poor drainage system (20%) • Other respondents (50%) could not ascertain if the community had any major environmental challenges. 	<ul style="list-style-type: none"> • 80% of respondents believe the proposed intervention will not pose any threat to the community during construction, while the remaining 20% stated the contrary. Challenges envisaged include flooding • Challenges envisaged during operation are: <ul style="list-style-type: none"> • Destruction of infrastructure (10%) • Pollution (20%) • Other respondents (70%) claim the proposed intervention will pose no environmental threat to the community during the operation.

Amika	<ul style="list-style-type: none"> • The current environmental challenge affecting their community is <ul style="list-style-type: none"> o Bad road (60%) o Poor drainage system (30%) o Pollution (10%) 	<ul style="list-style-type: none"> • While 60% of respondents believe the proposed intervention will pose any threat to the community during construction, others (40%) stated the contrary. Challenges envisaged are: <ul style="list-style-type: none"> o Air and noise pollution (50%); o Encroachment of farms (50%); • Challenges envisaged during operation are: <ul style="list-style-type: none"> • Destruction of infrastructure (10%); • Noise pollution (20%). • Other respondents (70%) claim the proposed intervention will pose no environmental threat to the community during the operational stage.
Amaleze	<ul style="list-style-type: none"> • Current environmental challenges affecting their community are <ul style="list-style-type: none"> o Pollution (40%) o Poor drainage system (20%) • Other respondents (40%) could not ascertain if the community had any major environmental challenges. 	<ul style="list-style-type: none"> • Challenges envisaged during construction are: <ul style="list-style-type: none"> o Pollution; groundwater, noise and air (40%) o Destruction of farms (40%); • Challenges envisaged during operation are: <ul style="list-style-type: none"> • Noise and air pollution (20%); • Other respondents (80%) claim the proposed intervention will pose no environmental threat to the community during the operation.

Source: Fieldwork, November 2023

4.3.1.9 Perception of the Respondents

Respondent awareness of the project was assessed through major sources which include community meetings and the media. In Nkaliki, it was reported that all respondents (100%) have heard about the proposed project. Hence, the community is largely aware of the proposed project. 60% of the respondents indicated their source of information was through their various association meetings and 40% have heard directly from the SAPZ officials in the state. All the respondents indicated that the proposed project would not cause restiveness in the community. However, during the activities of SAPZ, all respondents indicated they expect the contractors to recruit labourers from the communities.

Turning to Ndiabo Isiagwu, the community's awareness of the proposed project was assessed through community meetings and media sources. Results indicate that all respondents (100%) are knowledgeable about the project, reflecting a widespread awareness within the community. Among those informed, 80% cited association meetings and 20% heard directly from SAPZ officials. All respondents expressed confidence in the project not causing unrest. Noteworthy is that 70% of respondents expect the contractors to involve local labourers during the SAPZ activities.

In Onuigbo, the assessment of project awareness involved community meetings and word of mouth. The outcome reveals that all respondents (100%) in Onuigbo are well-aware of the proposed project, underlining a comprehensive understanding within the community. Among those informed, 70% mentioned association meetings and 30% received information through word of mouth. Confidence prevails as all respondents believe the

project won't lead to unrest. Of significance, 60% of respondent compensation for those whose properties will be affected during the proposed project activities while 30% envisaged the employment of locals during the construction phase

In the case of Amagwu, understanding of the proposed project was evaluated through community meetings and media exposure. The findings indicate that all respondents (100%) in Amagwu are informed about the project, emphasizing a widespread awareness. Among those aware, 80% attributed their knowledge to association meetings, and 30% by word of mouth. Most respondents (50%) envisaged the employment of locals during the construction phase and 50% indicated compensation for those whose properties will be affected during the proposed project activities.

Shifting attention to Ugwulangwu, the assessment of project awareness considered community meetings and media channels. The results reveal that all respondents (100%) in Ugwulangwu possess knowledge about the proposed project, signifying a widespread understanding within the community. Among those informed, 40% indicated association meetings, 40% direct information from SAPZ officials, and 20% by word of mouth. All respondents express confidence that the project won't cause unrest, All the respondents (100%) indicated that their expectations on the activities of SAPZ intervention are mainly employment of locals during construction.

The findings highlight that all respondents (100%) in Amika are well-aware of the project via association meetings, indicating a comprehensive understanding within the community. the respondents (100%) further indicated that the proposed project would not cause restiveness in the community and that no habitat or animals will be affected during the project activities. Most respondents (50%) envisaged the employment of the local people during the construction phase, 70% indicated compensation for those whose properties will be affected during the proposed project activities while 30% indicated capacity building for maintenance during project implementation.

In Amaleze, the assessment of project awareness involved community meetings and word of mouth. All respondents (100%) are well-aware of the proposed project, underlining a comprehensive understanding within the community. Among those informed, 80% mentioned association meetings and 20% received information through word of mouth. All respondents stated that the project will not lead to unrest in the community. Of significance, 50% of respondents compensation for those whose properties will be affected during the proposed project activities while 50% envisaged the employment of locals during the construction phase

4.3.1.10 Perceived Impacts of the Proposed Intervention Project

The project is envisaged to have a range of positive and social impacts on the livelihood and environment of the project communities. The respondents were assessed based on this understanding and a summary of their responses is given below in Table 4.21.

Table 4.21: Perception of Respondents and Impacts Envisaged

Project areas	Positive impacts	Negative
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Nkaliki	<ul style="list-style-type: none"> The envisaged positive impact of the proposed project on the community includes: <ul style="list-style-type: none"> Minimized agricultural product losses (60%) Enhanced accessibility to markets (30%) increased profitability through greater buying power (10%); 	<ul style="list-style-type: none"> All respondents (100%) believe that any adverse effect from the project will be duly minimal.
Ndiabo Isiagwu	<ul style="list-style-type: none"> The envisaged positive impact of the proposed project on the community includes: <ul style="list-style-type: none"> Reduced loss of farm produce due to better storage facilities (40%) Improved linkage of produce to the markets (40%); Improved pricing of farm produce (40%) 	<ul style="list-style-type: none"> All respondents (100%) believe that any adverse effect from the project will be duly minimal.
Onuigbo	<ul style="list-style-type: none"> The envisaged positive impact of the proposed project on the community includes: <ul style="list-style-type: none"> Better exchange of goods and services (50%); Reduction in loss through better storage facilities (50%) Better standard of living as a result of increased income (10%); 	<ul style="list-style-type: none"> All respondents (100%) believe that any adverse effect from the project will be duly minimal.
Amagwu	<ul style="list-style-type: none"> The envisaged positive impact of the proposed project on the community includes: <ul style="list-style-type: none"> Increased rice production (50%); Improvement in the livelihood of rice farmers (40%); Improved farming system (10%); 	<ul style="list-style-type: none"> All respondents (100%) believe that any adverse effect from the project will be duly minimal.
Ugwulangwu	<ul style="list-style-type: none"> The envisaged positive impact of the proposed project on the community includes: <ul style="list-style-type: none"> Increased cassava farming (57.1%); Overall business growth (28.6%); Affordable prices for dairy products (14.3%); 	<ul style="list-style-type: none"> All respondents (100%) believe that any adverse effect from the project will be duly minimal.
Amika	<ul style="list-style-type: none"> The envisaged positive impact of the proposed project on the community includes: <ul style="list-style-type: none"> Increased productivity (50%); job opportunity (30%); Improved livelihood of farmers (20%); 	<ul style="list-style-type: none"> All respondents (100%) believe that any adverse effect from the project will be duly minimal.
Amaleze	<ul style="list-style-type: none"> The envisaged positive impact of the proposed project on the community includes: <ul style="list-style-type: none"> Increased productivity (40%); Better storage to reduce waste (20%); Improved livelihood of farmers (20%); Community development (20%) 	<ul style="list-style-type: none"> All respondents (100%) believe that any adverse effect from the project will be duly minimal.

Source: Fieldwork, November 2023

4.3.2 Analysis of the Status of GBV/SEA in the Project Community and Related Issues

Gender-based violence, or GBV, is one of the oppressive forms of gender inequality, posing a fundamental barrier to the equal participation of women and men in social, economic, and political spheres (World Bank, 2019). GBV affects both men and women, but women are much more vulnerable because violence reflects and reinforces existing interchangeably. GBV according to (Arango et al. 2014) includes among others:

- Intimate partner violence,
- Non-partner sexual assault,
- Female genital mutilation,
- Sexual exploitation and abuse,
- Child abuse,
- Child marriage

Such violence impedes gender equality and the achievement of a range of development outcomes. Gender violence precludes individuals from contributing to or benefiting from development initiatives by limiting their choices and ability to act (UN General Assembly 2006).

Gender-Based Violence (GBV) continues to be a persistent issue in Nigeria, with 31% of Nigerian women aged 15 to 49 experiencing physical violence, including 6% encountering violence during pregnancy, as per the 2018 Nigeria Demographic and Health Survey by the National Population Commission. It is crucial to note the uncertainty associated with these figures and their evolving trends over time. The data reveals a concerning rise in the percentage of women facing physical violence since age 15, increasing from 28% in 2008 to 31% in 2018. Furthermore, the prevalence of GBV varies significantly by region and state.

The 2018 Nigeria Demographic and Health Survey reports that 50% of women and girls aged 15 and above in Ebonyi have encountered physical violence. In USAID Momentum report on GBV Services mapping in Ebonyi state, the most common forms are physical assault, IPV, and sexual violence. Sexual abuse of children, early childbearing, early marriage, and female genital mutilation are not widely reported, despite recent support given by state agencies to report these forms of GBV. Also, Ebonyi exhibits notably high levels of sexual violence compared to the national average, with 20.8% of women in the state experiencing sexual violence, in contrast to the national estimate of 9.1%. Furthermore, within Ebonyi State, 10.6% of women reported incidents of sexual violence in the 12 months leading up to the survey. The International Growth Centre reports a significant surge in cases of rape and domestic violence in Ebonyi State, with a 26% increase in rape cases and a notable 30% increase in domestic violence cases between 2017 and 2020. Moreover, Benue, Ebonyi, and Cross River States experienced an even more substantial rise in domestic violence cases during the same period, witnessing a staggering 53% increase.

Remarkably, a majority of sexual assault perpetrators are known to the victims, with only 9.7% being strangers. Among these known perpetrators, neighbours (25.8%) and acquaintances (19.4%) emerge as the most common offenders. When considering married women, 53.9% have encountered some form of spousal or intimate partner violence (IPV). The prevalent types of IPV include emotional (44.4%), physical (41.5%), and sexual

(15.6%) violence. Additionally, 8% of ever-married women admitted to committing violence against their husbands in the past year (USAID MOMENTUM, 2022).

Despite these alarming statistics of GBV in Ebonyi, only 61% of women who experienced GBV sought help (WI-HER, 2022). Shockingly, a mere 2% of those seeking assistance for both sexual and physical GBV turned to medical providers. This is not surprising as GBV is often denied or silenced by under-reporting, societal stigmatization of victims or by institutional weakness/failure in terms of absence of effectual and accessible reporting mechanisms and protection services at community level (Para-Mallam, 2018).

The existing government structure for social services through the social welfare departments is skeletal and not properly coordinated. The GBV service mapping exercise in Ebonyi (USAID MOMENTUM, 2022) exposed the absence of standard operating procedures. A majority of GBV service providers operate without established policies or SOPs. Government ministries, international organizations, and civil society organizations play pivotal roles in addressing GBV, while security providers exhibit a lack of follow-up with GBV survivors, often necessitating survivors to bear the costs of case investigation and safety planning. Furthermore, many healthcare providers in the region have not undergone sufficient GBV training. Although most GBV services offered at health facilities are free, some survivors find themselves compelled to cover associated expenses. The strong socio-cultural factors surrounding GBV also make isolated medical care inadequate therefore, there is the need to strengthen the capacity of the service providers on GBV case management and massive sensitization of all stakeholders and multi-sectoral collaboration amongst GBV actors to ensure optimal health outcome of GBV survivors.

It can be concluded from the above analysis that GBV is prevalent in the project area and will probably rise due to the influx of migrants. There is therefore the need to provide measure to mitigate and manage this risk.

4.3.2.1 Gender-Based Violence/Sexual Exploitation and Abuse

Respondents’ views (knowledge) on the prevalence of gender-based violence within the project community were thus assessed. A summary of their responses is shown in Tables (4.22 – 4.26).

4.3.2.2 Provisions restricting women access to health and other social services

There are existing customs, traditions and common practices that restrict women from access to health and social services in the community. A summary of their responses in Table 4.22 below shows that women in the proposed project communities are restricted to certain health services and often need permission from their husbands or a male figure to access health services.

Table 4.22: Provisions restricting women access to health and other social services

Are there restrictions which....	Nkaliki		Ndiabo Isiagwu		Onuigbo		Amagwu		Ugwulang u		Amika		Amaleze	
	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)

require the consent of a male relative/husband for a married woman's medical examination or treatment or access to contraceptives or abortion;	80.0	20.0	100	0.0	80.0	20.0	70.0	30.0	80.0	20.0	80.0	20.0	70.0	30.0
require parental consent in case of adolescents' access to contraceptives or abortion;	80.0	20.0	60.0	40.0	70.0	30.0	80.0	20.0	100	0	80.0	20.0	60.0	40.0
allow medical practitioners to refuse provision of a legal medical service on grounds of conscientious objection	70.0	30.0	60.0	40.0	70.0	30.0	50.0	50.0	80.0	20.0	50.0	50.0	50.0	50.0
prohibit certain medical services, or require that they be authorized by a physician, even where no medical procedure is required; in particular	80.0	20.0	70.0	30.0	60.0	40.0	50.0	50.0	70.0	30.0	60.0	40.0	60.0	40.0
are allowed to undergo IUDs (intrauterine devices) or hormonal contraceptives	20.0	80.0	20.0	80.0	30.0	70.0	20.0	80.0	20.0	80.0	20.0	80.0	60.0	40.0
are allowed emergency contraceptives, including the morning-after pill,	0.0	100	20.0	80.0	20.0	80.0	20.0	70.0	40.0	60.0	30.0	70.0	30.0	70.0
are allowed sterilization on request;	50.0	50.0	70.0	30.0	60.0	40.0	80.0	20.0	70.0	30.0	60.0	40.0	50.0	50.0
request on early abortion (in first trimester of pregnancy) are granted;	30.0	70.0	70.0	30.0	80.0	20.0	60.0	40.0	40.0	60.0	40.0	60.0	40.0	60.0
medically assisted or allowed on reproduction (e.g., in vitro fertilization)	80.0	20.0	70.0	30	50.0	50.0	60.0	40.0	60.0	40.0	70.0	30.0	60.0	40.0

4.3.2.3 Sexual Exploitation and Abuse

As shown in Table 4.23, certain acts such as home births by obstetricians or midwives and transmission of HIV or other venerable diseases by women are generally not criticized in the project communities while child marriage, female genital mutilation, adultery, abortion, prostitution, sexual orientation and gender identities, are not encouraged in the communities.

Table 4.23: Sexual Exploitation Criminalization

Are the following criminalized in the project area:	Nkaliki		Ndiabo Isiagwu		Onuigbo		Amagwu		Ugwulang u		Amika		Amaleze	
	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)

transmission of HIV or other venereal diseases by women only	30.0	70.0	30.0	70.0	20.0	80.0	20.0	80.0	30.0	70.0	40.0	60.0	30.0	70.0
female genital mutilation	60.0	40.0	50.0	50.0	40.0	60.0	30.0	70.0	70.0	30.0	80.0	20.0	70.0	30.0
child marriage	20.0	80.0	20.0	80.0	30.0	70.0	30.0	70.0	40.0	60.0	30.0	70.0	40.0	60.0
home births with an obstetrician or midwife	20.0	80.0	20.0	80.0	30.0	70.0	40.0	60.0	60.0	40.0	20.0	80.0	30.0	70.0
Abortion	70.0	30.0	60.0	40.0	50.0	50.0	60.0	40.0	50.0	50.0	60.0	40.0	50.0	50.0
Adultery	60.0	40.0	30.0	70.0	60.0	40.0	50.0	50.0	40.0	60.0	60.0	40.0	50.0	50.0
Prostitution	60.0	40.0	50.0	50.0	70.0	30.0	80.0	20.0	70.0	30.0	80.0	20.0	80.0	20.0
sexual orientation and gender identity (homosexuality, lesbianism, transgender, etc.)	60.0	40.0	80.0	20.0	70.0	30.0	60.0	40.0	70.0	30.0	60.0	40.0	70.0	30.0
violations of modesty or indecent assault (e.g., not following dress code)	40.0	60.0	40.0	60.0	20.0	80.0	60.0	40.0	60.0	40.0	50.0	50.0	30.0	70.0

4.3.2.4 Respondents' Views on Purpose of Criminalizing Gender-Based Violence

As shown in Table 4.24 below, most respondents across the project communities indicated that sexual exploitation is criminalized to prevent sexually transmitted diseases (STD), unwanted pregnancies, and promote a healthy lifestyle for teenage girls.

Table 4.24: Purpose of Criminalization

Criminalized to:	Nkaliki		Ndiabo Isiagwu		Onuigbo		Amagwu		Ugwulang u		Amika		Amaleze	
	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)
prevent of sexually transmitted diseases (STD)	50.0	50.0	60.0	40.0	20.0	80.0	50.0	50.0	20.0	80.0	30.0	70.0	30.0	70.0
prevent unwanted pregnancies	70.0	30.0	50.0	50.0	50.0	50.0	80.0	20.0	70.0	30.0	60.0	40.0	40.0	60.0
promote a healthy lifestyle, including prevention of dietary disorders of teenage girls, including anorexia and bulimia	20.0	80.0	50.0	50.0	50.0	50.0	40.0	60.0	30.0	70.0	20.0	80.0	30.0	70.0
promote psychological/psychiatric training on self-control of aggression, including sexual aggression	20.0	80.0	30.0	70.0	50.0	50.0	50.0	50.0	20.0	80.0	30.0	70.0	20.0	80.0

4.3.2.5 Measures and Programmes for Women

Most respondents in the sampled population indicated there are no measures and programs undertaken to increase women’s safety (e.g., in public urban spaces, in public transportation, etc.) in their communities. Also as shown in Table 4.25, most respondents indicated there are some specific training programs in place for medical and legal professionals on the issue of gender-based discrimination in the area of health and safety.

Table 4.25: Measures and Programs for Women

Measure and Programs for Women	Nkaliki		Ndiabo Isiagwu		Onuigbo		Amagwu		Ugwulan gu		Amika		Amaleze	
	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)
Any measures and programs undertaken in order to increase women safety (e.g., in public urban spaces, in public transportation)	40.0	60.0	60.0	40.0	50.0	50.0	40.0	60.0	20.0	80.0	60.0	40.0	50.0	40.0
Are there specific training programs for medical and legal professionals on the issue of gender-based discrimination in the area of health and safety?	70.0	30.0	50.0	50.0	20.0	80.0	50.0	50.0	60.0	40.0	50.0	50.0	50.0	50.0
Do they cover the issues connected with specific women’s needs in the area of health?	30.0	70.0	30.0	70.0	20.0	80.0	30.0	70.0	20.0	80.0	40.0	60.0	30.0	70.0
Specific women’s vulnerability to be victims of gender-based violence or specific crimes	30.0	70.0	0	100	20.0	80.0	50.0	50.0	60.0	40.0	30.0	70.0	40.0	60.0
The nature of gender-based violence	60.0	40.0	70.0	30.0	50.0	50.0	70.0	30.0	60.0	40.0	60.0	40.0	60.0	40.0
Its occurrences and symptoms	30.0	70.0	60.0	40.0	50.0	50.0	60.0	40.0	50.0	50.0	70.0	30.0	80.0	20.0
Methods of detection	60.0	40.0	70.0	30.0	50.0	50.0	20.0	80.0	20.0	80.0	30.0	70.0	10.0	90.0
Medical protocols	20.0	80.0	40.0	60.0	20.0	80.0	40.0	60.0	50.0	50.0	30.0	70.0	20.0	80.0
Influence of gender-based violence, in particular, sexual violence on the future behaviours of victims (post-traumatic stress symptoms etc.)	50.0	50.0	40.0	60.0	30.0	70.0	40.0	60.0	50.0	50.0	20.0	80.0	10.0	90.0

4.3.2.6 Gender Equity

There are several approaches to ensure gender equity in a society. This may include female engagement in local politics, women participation in leadership programmes amongst others. Table 4.26 below shows the responses of the respondents in the project communities. The study reveals that in the project areas, gender equity is ensured through giving women equal opportunities and access to education and employment. In other words, both males and females are sponsored or given equal opportunities in education and employment. Also, respondents indicated that women are elected in public offices represented and quotas on genders are ensured in leadership positions in the community.

Table 4.26: Gender Equity

How do you ensure gender equity:	Nkaliki	Ndiabo Isiagwu	Onuigbo	Amagwu	Ugwulang u	Amika	Amaleze
Women are elected in public office	20.0	20.0	30.0	10.0	10.0	20.0	10.0
Females are given equal opportunity and access to education and employment	60.0	50.0	50.0	60.0	80.0	60.0	80.0
Quotas on genders are ensured in leadership of community-based organizations.	20.0	30.0	20.0	30.0	10.0	20.0	10.0

CHAPTER FIVE

POTENTIAL ENVIRONMENTAL/SOCIAL IMPACT IDENTIFICATION AND EVALUATION

This chapter presents information on the assessment of the potential environmental and socio-economic impacts of the proposed programme. As indicated in previous chapters, the Ebonyi state government intend focusing on 3 value chains for which it has comparative advantage (rice, cassava and livestock). These value chains are currently cultivated and processed in different parts of the state as presented below

• Nkaliki	Livestock	AIH
• Ishiagwu Ndiebor	Rice	ATC
• Onuigboji-Ikwo	Rice	ATC
• Amangwu	Rice	ATC
• Ugwulanwu	Cassava	ATC
• Amata Ugwulangwu	Cassava	ATC
• Amika 135	Cassava	ATC
• Amaleze	Cassava	ATC
• Ezillo	Cassava	ATC

The environmental and social impact assessment was carried taking into cognizance the unique characteristics of the value chains and the role of the AIH as processing zone. 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 impacts that are likely to arise as a result of the Ebonyi State SAPZ programme were assessed by harmonizing the programme components with the surrounding environmental, social and cultural resources. A combination of methods was employed in assessing the potential impacts of the proposed intervention across Ebonyi State. These methods include: the use of checklists, matrix, consultations, professional experience and judgment. The phases of impacts assessment include:

- i. Impact Identification: to specify the impacts associated with each phase of the programme 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 programme activities was used to develop a list of the potential impacts of the programme. The following were thus appraised:

- The source and/or the cause of the problem (programme activity/environment aspect);

- The receptor of the impact (environment component i.e., existing ecological and socioeconomic condition of the programme 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 programme 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 programme 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 programmes 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 programme 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. Thus, impact evaluation is based on the following:

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

- o The extent is regional if an impact on a component is felt over a vast territory or affects a large portion of its population;
- o 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;
- o 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:
 - o The intensity of an impact is qualified as strong when it is linked to very significant modifications of a component;
 - o 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 irreversibly;
 - o 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

			Sensitivity/Vulnerability of Receptor		
			Low	Medium	High
Magnitude of Impact	Negligible	Negligible	Negligible	Negligible	
	Small	Negligible	Minor	Moderate	
	Medium	Minor	Moderate	Major	
	Large	Moderate	Major	Major	

- o Major Impact: An impact of major significance, hereafter referred to as a ‘major 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.
- o Moderate Impact: An impact of moderate significance hereafter referred to as a ‘moderate impact’, will be within the accepted limits and standards. Moderate impacts may cover a broad range, from a threshold below which the impact is minor, up to a level that might be just short of breaching an established (legal) limit. Repercussions on the environment are substantial but can be reduced through specific measures.
- o Minor Impact: An impact of minor significance, hereafter referred to as a ‘minor 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.

The following environmental indicators, receptors or resources affected by potential impacts were also considered:

The Biophysical Environment:

- Air quality;
- Noise, vibration;
- Soils and geology;
- Water resources;
- Ecology.

The Socio-economic Environment:

- Visual amenities;
- Community level impacts;
- Gender;
- Vulnerable;
- Community health, safety and security;
- Resettlement;
- Labour and working conditions;
- Infrastructure;
- Employment and economy; and
- Cultural Heritage.

5.2 Programme Activities of Environmental and Social Concern

The Special Agro-Industrial processing Zone (SAPZ) programme as stated earlier is designed to transform the existing large expanse of agricultural land (brown field) into an agricultural production / processing zone. The programme activities have been divided into three which include; Agricultural activities, Agro-Processing facilities and Infrastructural development as outlined below:

- Enhancement of Agricultural Production and Productivity in Proximity to Agro-Industrial Clusters: This entails crop and livestock production that would lead to
 - o Development and operation of agricultural fields:
 - Site clearing and/or levelling;
 - Compacting;
 - Use of heavy equipment and hazardous materials;
 - Material Extraction/quarrying, Slope stability/Excavation, cutting, and filling;
 - Hazardous materials storage and disposal;
 - Waste management;
 - Construction camp and crew set up.
- Agro-Processing activities: These entail crop and livestock processing and value addition leading to:
 - o Dealing with waste;
 - o Treatment technologies for wastes from processing.
- Processing Infrastructure development/Construction and/or upgrading of Agro-Industrial Hub infrastructures such as:
 - o Transmission and distribution of electricity;

- o Water supply system;
- o Access Roads:
 - Site clearing and/or levelling;
 - Compacting;
 - Use of heavy equipment and hazardous materials;
 - Material Extraction/quarrying, Slope stability/Excavation, cutting, and filling;
 - Hazardous materials storage and disposal;
 - Waste management;
 - Construction camp and crew set up.

5.3 Evaluation of Potential Impacts of the Proposed SAPZ Programme

5.3.1 Potential Positive Environmental and Social Impact

The potential positive impacts of the proposed Ebonyi SAPZ AIH are listed below and evaluated in Table 5.2.

- Improved crop and livestock productivity of farmers;
- Increased farm incomes from crop output and ensuring dignity in farming practices;
- Elevation of rural income and national economy;
- Employment creation for community members;
- Improved infrastructure;
- Employment generation for youth and women;
- Enhanced income and livelihoods of farmers; and
- Improvement in the revenue base of key institutions and regulatory bodies

Table 5.2: Evaluation of Potential Positive Impacts

S/N	Potential Impact	Key Receptors	Evaluation	Significance
1	Improved crop and livestock productivity of farmers;	Farmers	Improved methods of crop production and less dependence on rainfall will reduce production losses. Provision of 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 crop output and ensuring dignity in farming practices;	Farmers	The proposed SAPZ programme 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	<p>The local and national economy will be boosted through the following:</p> <ul style="list-style-type: none"> • direct and indirect job creation; • increased income for workers; • increase in business activities in the communities; • increased food production will reduce food cost; • payment of taxes will improve the revenue base of the economy. <p>On the national front, the expected increment in food productivity can contribute to reducing the nation's food importation bill. The impact will be regional and permanent, lasting throughout the duration of the programme. The magnitude is large and the sensitivity is high.</p>	Major
4	Employment creation for community members;	Farmers, Community members, people from other communities	<p>The proposed programme will result in the engagement of skilled and unskilled labour for the planning, construction, operation, maintenance phases of the programme. The programme will also improve the capacity of farmers to employ more hands on their farms owing to the increase in productivity.</p> <p>The programme will therefore have a major positive impact on the socio-economic conditions of the local communities in and around the programme 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.</p>	Major

5	Improved infrastructure;	Farm, community	The proposed programme in improving infrastructure 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 programme. In the long term, this will have more positive benefits to local economic development. The impact will be major and of regional extent. The magnitude is large and the sensitivity is high	Major
6	Employment generation for youth and women;	Neighbouring community	It is anticipated that 35 percent of the total direct beneficiaries will be women. By design, the programme 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 and Community members	<p>The incomes and livelihoods of the participating farmers will be enhanced through the following:</p> <ul style="list-style-type: none"> • 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; • increased crop productivity of farmers will boost their incomes and livelihoods; • women will participate in the programme earning some income to support their families. <p>The implementation of the programme will inspire</p>	Major

			commercial activity in the programme area 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	
8	Improvement in the revenue base of key institutions and regulatory bodies	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. The impact will be permanent, lasting throughout the duration of the programme. The magnitude is large and the sensitivity is Medium	Major

5.3.2 Potential Negative Impact

The potential negative impacts of the programme activities by the Ebonyi State SAPZ with a focus on the three value chains (Livestock, Rice, and Cassava) processing at the AIH are consistent with category 1 programmes. While the potential negative impacts that could emanate from the programme activities are outlined below, evaluation of their potential impacts are presented in Tables 5.3, 5.4, and 5.5 based on the value chain.

The programme activities and the potential negative impacts include the following:

Enhance Agricultural Production and Productivity in Proximity to Agro-Industrial Clusters

Environmental impact

- o disturbance of flora and fauna;
- o loss of vegetation and impacts on flora and fauna;
- o air quality deterioration;
- o vibration & noise nuisance;
- o water quality issues;
- o changes in soil nutrient cycles;
- o soil impacts and sediment transport.

Social impact

- o generation and disposal of solid waste;
- o elimination of smallholder farmers;
- o increasing demand for lands for farming/ settlements by fringe communities because productive lands not available;
- o chance finds of cultural resources;
- o interference with local cultural identity and heritage
- o occupational health & safety issues;
- o public safety;
- o restriction and outright loss of land;
- o increase in Gender Based Violence;
- o increase in Child labour incidents;
- o social exclusion of women or the vulnerable persons;
- o influx of workers and migrants resulting in spread of communicable diseases.

Crop processing

Environmental impact

- o impacts on natural habitats;
- o impacts from air emissions;
- o soil quality degradation;
- o impact from water abstraction;
- o pollution of environment due to processing with high concentration of organic matter, cyanide and processing chemicals;
- o pollution of water sources;
- o dust emissions from milling operations
- o noise and vibration;
- o water quality impacts.

Social impact

- o impacts of waste generation and disposal;
- o occupational health and safety;
- o sanitation issues and public health;
- o impacts on livelihood;
- o visual intrusion;
- o conflicts over land and water use and plot allocation;
- o fire risk;
- o pest and rodent infestation;
- o post-harvest losses;
- o impacts on Physical Cultural Resources
- o impact on nearby communities; and
- o sustainability of the farming venture.

Infrastructure Support

Environmental impact

- o impact on sensitive terrestrial ecosystems;
- o alterations in local natural water cycles/ hydrology;

- o degradation due to vehicular movement, mobilization of equipment, construction activities such as earthworks;
- o deterioration from burning of biomass from clearing and addition of carbon into atmosphere;
- o damage local habitat, compact soil, and create erosion via building and occupation of construction camp;
- o contaminate surface water;
- o obstruction of access ways to communities;
- o road impacts & traffic issues.

Social impact

- o generation of construction and other types of waste;
- o utility disruption;
- o impacts on Physical Cultural Resources;
- o impact on nearby communities;
- o alteration of socio-cultural values and the stability of communities adversely affected by the programme;
- o exposure to rapid social change or tourism;
- o accidents from operation of construction equipment;
- o social tension due to the exclusion of local people from the programme activities;
- o pastoralists loss of feed for their livestock;
- o failure of equipment and facilities.

Table 5.3: Evaluation of Potential Negative Impacts (Livestock – Poultry, Cattle, Piggery, Aquaculture) – Nkaliki Hatchery, Abakaliki, Ebonyi State (Agro-Industrial Hub (AIH))

S/N	Proposed Project Activities	Livestock Value Chain			
		Environmental Impacts	Key Receptors	Evaluation	Significance
1	Enhance Agricultural Production and Productivity in Proximity to Agro-Industrial Clusters	Increased livestock droppings and escalation of waste problem.	Air, Water and land	Solid waste from Livestock dropping and other farm operations have an implication on environment and social lives of the affected people. Though the impacts are less significant but requires an improvement on the air quality. The magnitude is medium and the sensitivity is high.	Major

2	General waste management issues.	Air, Water and land	The Livestock typically generates large volumes of solid waste. The effluents contain high organic loads, cleansing and blanching agents, salt, and suspended solids such as fibres and soil particles. They may also contain pesticide residues washed from the raw materials. Odour problems can occur with poor management of solid wastes and effluents. The magnitude is medium and the sensitivity is high.	Major
3	Water pollution and negative effects on surrounding ecosystem;	Water aquatic life and humans	<p>Wastewater from Livestock farms may result in:</p> <ul style="list-style-type: none"> o Pollution of surface water sources through the transport of agrochemicals; o eutrophication of surrounding water bodies through transport of nutrient rich sediments; o the use of chemicals (antibiotics) which enter the water bodies through runoff may decrease the quality of the water overtime; o possible pollution of groundwater through the percolation of agrochemicals through the soil. <p>Impacts may occur throughout the lifespan of the programme. The magnitude is large and the sensitivity is high.</p>	Major
5	Impacts on water quality	Community members downstream users	Improper use of antibiotics may contaminate underlying groundwater and move along ground water paths to surface water over a period of time. This may result in health impacts and alteration of aquatic life. Data on groundwater pollution in developing countries, resulting from excess chemical input and irrigation, is not well documented, but it is likely to show an increasing trend. The magnitude is large and the sensitivity is high.	Major
6	Depletion of groundwater due to increased extraction for Livestock management	Groundwater aquifer	Water abstraction by the programme will not compromise the State of the aquifer. The magnitude is small and the sensitivity is medium.	Minor
Social Impacts				

7		Sustainability of the Livestock farming venture	Workers, public	<p>Inadequate workforce and/or machinery may derail the plan of the farmer, which subsequently may affect the long-term viability of the programme in the following ways:</p> <ul style="list-style-type: none"> o Flooding of The Farm area may occur from continuous heavy rainfall resulting in pools of water in low lying areas of the field; o Unavailability of ready market and low prices may affect revenue generation; o Pest and disease infestation may also adversely affect productivity; o Failure of the storage facilities may also reduce the shelf life of the Livestock product; o Emergency situations may arise from various activities within and outside of the farm. For example, vehicular accidents, power failures, etc. may have disastrous consequences if no emergency response plans are put in place. The losses could be higher and result in joblessness of the farmers if appropriate measures are not put in place; o Lack of human resources, technical know-how and logistics to implement environmental and social safeguards could also significantly hamper the successful implementation of the proposed programme; o The magnitude is medium and the sensitivity is high. 	Major
8		Lack of space for proper rearing of birds and farm	Farmers	<p>The risk of concentrating large number of birds within a small space could lead to the escalation of Livestock disease;</p> <p>Pressure on available space and risk of death of birds due to over concentration of birds within limited space;</p> <p>Poor management of space could lead to low Livestock productivity. The magnitude is medium and the sensitivity is high.</p>	Major
9		Conflict with neighbours due to air pollution and improper disposal of waste	Air, Land, water bodies	<p>Neighbouring individuals/communities may be affected by increase in productivity if the increasing Livestock droppings and associated waste is not properly managed. The magnitude is medium and the sensitivity is high.</p>	Major

10	Occupational health and safety;	Farmers	Workers may be exposed to injury from machines and equipment as well as bites from dangerous reptiles and other animals such as snakes, scorpions, bees, ants, etc. The impact is temporary lasting during these activities. The magnitude is small and the sensitivity is medium.	Low
11	Sanitation issues and public health;	Air, Land, water bodies	<p>Indiscriminate disposal of farm generated waste will create unsightly conditions.</p> <ul style="list-style-type: none"> o Poor sanitation conditions may pollute nearby water sources; o Indiscriminate disposal of used agrochemical containers may pose serious health risk to members of the public who reuse them; o Additionally, bushy areas and stagnant water in canals will provide favourable breeding grounds for mosquitoes and could lead to an increase in malaria occurrence. <p>Failure to provide appropriate latrine facilities at vantage points within the programme area may encourage, and to some extent leave no option than, open defecation in the fields. The magnitude is medium and the sensitivity is high.</p>	Major
12	Increased spate of GBV due to the need and participation of more women	Farmers, women	The influx of labour from other communities and towns during the programme implementation will potentially escalate the spate of GBV cases especially incidence of non-partner sexual assault, sexual exploitation and abuse, child abuse and child marriage within the programme area. The magnitude is medium and the sensitivity is high.	Major
	Labour Influx leading to the transmission of diseases	Farmers, neighbouring communities	New comers from within and outside the State in search of employment opportunities will come to the programme site, with the possible implication that negative social behaviours (including the expansion of sex immorality, drug use, alcohol abuse, insecurity, banditry, theft, COVID-19, STD, HIV/AIDS etc.) will become rampant. The magnitude is medium and the sensitivity is high.	Major
Environmental Impacts				

13	Agro-Processing activities o Dealing with waste, o Treatment technologies for wastes from processing	Impact on air quality	Air, workers, public	Livestock processing activities, mainly roasting may be the main sources of air emissions that may result from increased particulate matter in the air. Any impacts from air emissions is therefore likely to be within the FMEEnv's acceptable limits. The magnitude is medium and the sensitivity is low.	Minor	
14		Noise pollution	Workers, public	All Livestock processing and services equipment produce various levels of noise. This has insignificant impact on environment and communities. The magnitude is however medium and the sensitivity is medium	Moderate	
15		Waste management		All plants and processing facilities with steam or hot water boilers or heating systems using solid fuel (coal, wood etc.) produce solid waste from ash and clinker. The magnitude is large and the sensitivity is high.	Major	
16		Fire Risk	Farmers, public property, workers	Processing plants are highly susceptible to fires which could result in death, burns and loss of property. The fires could emanate from within the plant (through uncontrolled smoking, cooking and/or electrical faults) or spread from outside the plant. The magnitude is medium and the sensitivity is high.	Major	
		Social Impacts				
17		Sustainability of the Livestock processing plant	Farmers, Workers	<p>The sustainability of the Livestock processing plant may be hampered by inadequate workforce/or machinery.</p> <p>Lack of human resources, technical know-how and logistics to operate and maintain the plants could also significantly hamper the successful implementation of the proposed programme.</p> <p>Failure of the storage facilities may also reduce the shelf life of Livestock and result in high postharvest losses.</p>	Major	
18	Occupational health & safety	Processing plant workers	Machine operators will be exposed to noise, dust and vibrations especially without the use of appropriate PPEs. There is also a high risk of accidents and injury from the use of machinery and equipment if safety procedures are not followed.	Major		

				The use of appropriate PPEs and adherence to safety and operational procedures will reduce this impact. The magnitude is medium and the sensitivity is high.	
19		Post-harvest losses	Farmers	<p>Post-harvest losses may arise from disease infestation, pests and rodent infestation and improper storage conditions which reduce the shelf life of the produce. Improper storage conditions such as poor ventilation, poor housekeeping and power outage without alternative power supply may lead to the degradation of Livestock products.</p> <p>These will lead to loss in market value and investment losses. Any spoilt produce will be permanently impacted and the investment losses to farmers could be major. The magnitude is large and the sensitivity is high.</p>	Major
20		Waste generation and disposal	Soil, water bodies	<p>Servicing and maintenance of machinery and equipment may also generate waste such as scrap metal, empty lubricant containers, waste lubricants, rubber seals, etc. Domestic/office wastes such as used polythene bags, food wastes, food wrappers, used water sachets and bottles, office wastes and human wastes will be generated etc. The impact is local and will last through the agricultural development and operations phase. The magnitude is medium and the sensitivity is high.</p>	Major
21		Sanitation issues and public health	Land, water bodies	<p>Failure to provide appropriate latrine facilities at vantage points within the programme area may encourage, and to some extent leave no option than, open defecation in the fields. Women suffer more in this respect as it puts their dignity at risk and predispose them to rape.</p>	Major

22		Pest/rodent infestation and contamination of stored Livestock	Stored Livestock, farmers, public	<p>Stored Livestock are susceptible to attacks from rodents and reptiles (snake and rat) if the necessary management practices and storage conditions for the produce are not diligently followed.</p> <p>They may feed on stored Livestock, and this may result in losses in the quantity and quality of produce and consequently investment losses which could be high.</p> <p>In addition to feeding on the Livestock, rodents may also contaminate stored produce through their droppings, urine, hairs and may spread human diseases. This could have health implications for the public.</p> <p>The impact on health could be high and of regional extent. The magnitude is large and the sensitivity is high.</p>	Major
	Processing Infrastructure development/Construction and/or upgrading of Agro-Industrial	Environmental Impacts			

23	Hub infrastructure	Air quality deterioration	Project affected communities, construction workers, farmers	<p>Dust generation will arise from site preparation, excavations, general construction works and topsoil handling by mechanical equipment and portable auxiliary equipment. Vehicular/truck movements and transport of materials/equipment to and from site on the untarred routes/roads and cleared will also generate dust.</p> <p>Loading, haulage and dumping of sand/stone aggregates as well as cement handling will also generate dust that can increase the air borne particulate in the vicinity.</p> <p>Use of construction vehicles, trucks and generators will generate fumes/gaseous emissions from combustion of diesel engines of such equipment.</p> <p>Inhaling of fumes and gaseous emissions such as carbon monoxide, sulphur oxides and nitrous oxides can affect the health of persons exposed to these gases for prolonged periods.</p> <p>The impact is direct, temporary and likely, lasting during the constructional phase; the impact is also local in extent i.e. limited to the programme site and adjacent properties.</p> <p>However, based on the scale of the proposed infrastructure development (small and medium), The magnitude is medium and the sensitivity is medium.</p>	Moderate
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24		Vibration and noise nuisance	Workers, public	<p>Activities that will contribute to increased noise levels during the construction phase include; vehicular and truck movement, site clearing and preparation, dredging works, piling, construction of breakwater, underwater blasting, subsea trenching for pipeline installation, etc.</p> <p>Typical noise level from construction activities ranges from 80 dBA to 112 dBA (BS 5228-1:2009) within the operation areas and is expected to significantly reduce to 30 dBA to 62 dBA at a distance of about 80 m from the site.</p> <p>The impact is direct, temporary and likely, moderate in scale; the impact is also local in extent i.e., limited to the programme site and adjacent properties. • The application of standard noise control measures will assist in ensuring that these issues are reduced.</p> <p>However, based on the scale of the proposed infrastructure development (small and medium), The magnitude and the sensitivity are medium.</p>	Moderate
25		Loss of vegetation and impacts on flora and fauna	Flora and fauna, within access road and other infrastructure RoW	<p>The proposed intervention by the Ebonyi SAPZ programme is meant for brown and green fields. In essence, most of the sites can be classified as Modified habitat deficient in fauna largely due to the degradation of the original habitat by human activities and therefore impact on terrestrial fauna will be limited. Disturbed fauna can migrate to nearby bushes. The magnitude and the sensitivity are both medium.</p>	Minor

26		Surface water contamination/ impact on aquatic organisms	Streams, Rivers and Lagoon	<p>Site preparation, comprising clearance of vegetation in the RoW as well as grading and trenching works for the road and drainages will result in loosening and exposure of top soil. This will facilitate their erosion and sediment transport into nearby streams and the Lagoon.</p> <p>Disposal of discharge construction wastewater into the natural water bodies may also adversely affect the flow regime of the affected water bodies and its aquatic life.</p> <p>The impact is direct, temporary and likely, lasting during the constructional phase; the impact is also local in extent i.e. limited to the programme site and nearby stream/creeks and river, and moderate in scale. The magnitude is medium and the sensitivity is high.</p>	Major
		Social Impacts			
27		Risk of flooding	Farmers, Neighbouring communities,	<p>Since the proposed programme intends to construct access roads, excavation to construct the new drains and the blockage of the existing drains may lead to flooding around the programme area. This will however be limited to the rainy season. The magnitude is medium and the sensitivity is medium.</p>	Moderate
		Increase in Crime and insecurity issues	Neighbouring communities,	<p>Some concerns raised during Consultation with the people in this respect showed that some communities are currently experiencing upsurge in criminal activities such as kidnapping, stealing and burglary. This will possibly increase during the construction phase with the influx of new comers. The magnitude is medium and the sensitivity is medium.</p>	Moderate
28		Sanitation Issues	Neighbouring communities,	<p>Some of the significant sanitation and health concerns associated with the new programmes include shortage of facilities like toilets and catering facilities for construction workers. It was actually revealed during the town hall meeting that the programme site is currently experiencing waste management problems. This may be escalated by the proposed programme if adequate provisions of waste management facilities are not made. The magnitude is medium and the sensitivity is high.</p>	Major

29		Interference from local community causing disruptions to work	Farmers	Inadequate consultation and poor management of community issues may lead to undue interference that may disrupt the intervention programme. This may also be caused by poor management of the compensation process and non-adherence to the cultural norms of the community. The magnitude and the sensitivity are both medium.	Moderate
		Labour influx and risk of disease transmission	Neighbouring communities, contractor	<p>Speculative job seekers, mainly unskilled youth and some skilled persons will throng the programme area to look for jobs and may end up residing in the local communities. This may put pressure on the existing social facilities and could induce anti-social behaviours (including the expansion of sex immorality, drug use, alcohol abuse, insecurity, banditry, theft, COVID-19, STD, HIV/AIDS etc.)</p> <p>Non-locals, mainly unskilled youth, who will be engaged are likely to reside in the nearby local communities due to proximity to programme sites, and this will put pressure on the existing social amenities and environmental resources in the communities</p> <p>Indirect labour influx will result from mainly non-local traders, especially women who will bring food/water and goods to sell to construction workers could generate some conflict between them and the locals</p> <p>The magnitude is medium and the sensitivity is high.</p>	Major

30		Occupational health, safety and labour issues	Construction workers,	<p>Workers will be exposed to risks during construction works. The risks include hazards from the operation of construction machinery/equipment, transportation of construction materials, inhalation of dust and fumes, drowning from marine works, accidents from falling objects, etc.</p> <p>Unhygienic working conditions, discriminatory practices, engagement of child labour could bring about social and labour conflicts and may trigger labour rights concerns.</p> <p>Poor management of waste could also significantly affect safety in the workplace.</p> <p>Risk of accidents from the materials management at the work camps, including accidents from poorly managed workspace and fire from fuel storage facilities, overtopping of trucks during breakwater extension works.</p> <p>The improper handling of hazardous materials is also a health threat to workers.</p> <p>Site preparatory activities such as vegetation clearance exposes workers to dangerous reptiles such as snakes and other animals.</p> <p>The impact is direct, temporary and likely, lasting during the construction phase; the impact is local and may also involve foreign nationals as well. In terms of number of people to engaged, the scale could range from minor to severe.</p> <p>The magnitude is medium and the sensitivity is high.</p>	Major
		Road rehabilitation and traffic impact	Commercial and private vehicles	<p>The existing road across the intervention areas mostly untarred and in deplorable State are used by taxis and other commercial vehicles as well as private vehicles to access the farms and neighbouring communities. The rehabilitation of these roads can generate minor to moderate traffic impacts.</p> <p>The impact is likely, direct, temporary, local and minor to moderate in scale. The magnitude is medium and the sensitivity is medium.</p>	Moderate
31		Impact on cultural heritage	Neighbouring communities	<p>No major culturally sensitive issue was identified to be potentially affected by the proposed programme.</p> <p>However, a chance find procedure will be put in place to ensure that any cultural resource</p>	Minor

			<p>chanced upon is retrieved, identified and appropriately accounted for.</p> <p>The impact is unlikely, direct and local, and of a minor scale.</p> <p>The magnitude and the sensitivity are medium.</p>	
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CHAPTER SIX

MITIGATION AND ENHANCEMENT MEASURES

Mitigation measures against the potential adverse impacts are proposed in Table 6.1. The measures are highlighted to ensure that the programme impacts are managed within reasonable and acceptable limits. The general rules followed in designing the mitigation measures are listed below:

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

6.1 Types of Mitigation Measures

The mitigation measures adopted may be categorized as:

- preventive measures;
- control measures; and
- compensatory measures.

6.1.1 Preventive Measures

These are measures adopted during the design and pre-construction phase. The measures are aimed at avoiding or minimizing the potential major impacts at source. Avoiding or reducing an impact at source is essentially about ‘designing’ the programme so that a feature causing an impact is designed (e.g. site selection to avoid sensitive areas) or altered (e.g. working at night where necessary) or avoided (e.g. community sensitization programmes to avoid conflicts or confrontations).

6.1.2 Control Measures

These are measures adopted to abate or remedy the impacts occurring during the construction and operation/maintenance phases. Impacts can be abated on site or at receptor end. Repair or remedy of impacts involves unavoidable damage to a resource, e.g., vegetation clearing during land preparation. In this case repair will essentially involve the re-vegetation of the affected parts.

6.1.3 Compensatory Measures

Where other mitigation measures are not possible or fully effective, compensation when required, will be provided in accordance with the national standards as set down by the relevant entities.

6.2 Summary of Significant Potential Adverse Impacts

The significant potential adverse impacts (rated as moderate or major) identified from the analysis and evaluation of the potential impacts from the proposed programme based on the value chain in the preceding chapter are summarized below.

6.2.1 Livestock Value Chain

Enhanced Agricultural Production and Productivity in Proximity to Agro-Industrial Clusters

Environmental and Social Impacts

- Increased Livestock droppings and escalation of waste problem;
- General waste management issues;
- Water pollution and negative effect on surrounding ecosystem;
- Impacts on water quality; and
- Depletion of groundwater due to increased extraction for Livestock management
- Sustainability of the Livestock farming venture;
- Lack of space for proper rearing of birds and farm;
- Conflict with neighbours due to air pollution and improper disposal of waste;
- Occupational health and safety;
- Sanitation issues and public health;
- Increased spate of GBV due to the need and participation of more women; and
- Labour Influx leading to the transmission of diseases.

Agro-Processing Activities

Environmental and Social Impacts

- Impact on air quality;
- Noise pollution;
- Waste management; and
- Fire Risk.
- Sustainability of the Livestock processing plant;
- Occupational health & safety;
- Post-harvest losses;
- Waste generation and disposal;
- Sanitation issues and public health; and
- Pest/rodent infestation and contamination of stored Livestock.

Processing Infrastructure development/Construction and/or upgrading of Agro-Industrial Hub infrastructure

Environmental and Social Impacts

- Air quality deterioration;
- Vibration and noise nuisance;
- Loss of vegetation and impacts on flora and fauna; and
- Surface water contamination/ impact on aquatic organisms.
- Risk of flooding;
- Increase in Crime and insecurity issues;
- Sanitation Issues;
- Interference from local community causing disruptions to work;

- Labour influx and risk of disease transmission;
- Occupational health, safety and labour issues;
- Road rehabilitation and traffic impact; and
- Impact on cultural heritage.

6.2.2 Rice Value Chain

Enhanced Agricultural Production and Productivity in Proximity to Agro-Industrial Clusters

Environmental and Social Impacts

- Deforestation in the process of land preparation for rice cropping;
- Alterations of local natural water cycles / Depletion of groundwater for irrigation purposes;
- Soil quality degradation;
- Surface and ground water pollution;
- Air pollution due to increased mechanized farming, vehicular movement and increased burning of biomass of cleared forest post-harvest waste;
- Improper disposal of agricultural waste, fertilizer and chemical containers;
- Pest and rodent infestation of matured crop;
- Noise and vibration;
- Impacts on water quality; and
- Fire risk.
- Land Use Rights;
- Increasing demand for lands for farming;
- Loss of fallow and other agricultural land;
- Elimination of smallholder farmers;
- Occupational health & safety;
- Increased spate of GBV due to the need and participation of more women;
- Conflicts over land and water use and plot allocation;
- Sanitation issues and public health;
- Impacts on Communities; and
- Sustainability of the farming venture.

Agro-Processing Activities

Environmental and Social Impacts

- Noise and vibration;
- Impact on air quality; and
- Fire Risk.
- Sustainability of the processing plant;
- Occupational health & safety;
- Sanitation issues and public health;
- Pest/rodent infestation and contamination of stored rice; and
- Post-harvest losses.

Processing Infrastructure development/Construction and/or upgrading of Agro-Industrial Hub infrastructure

Environmental and Social Impacts

- Air quality deterioration;
- Vibration and noise nuisance;
- Loss of vegetation and impacts on flora and fauna; and
- Surface water contamination/ impact on aquatic organisms.
- Obstruction of access ways to communities;
- Influx of workers and migrants;
- Public safety;
- Road impacts & traffic issues;
- Occupational health & safety;
- Waste generation and disposal; and
- Sanitation issues and public health.

6.2.3 Cassava Value Chain

Enhanced Agricultural Production and Productivity in Proximity to Agro-Industrial Clusters

Environmental and Social Impacts

- Deforestation in the process of land preparation for cassava cropping;
- Soil quality degradation;
- Surface and ground water pollution;
- Air pollution due to increased mechanized farming, vehicular movement and increased burning of biomass of cleared forest post-harvest waste;
- Improper disposal of agricultural waste, fertilizer and chemical containers;
- Pest and rodent infestation of matured crop;
- Noise and vibration;
- Impacts on water quality; and
- Fire risk.
- Land Use Rights;
- Increasing demand for lands for farming;
- Loss of fallow and other agricultural land;
- Elimination of smallholder farmers;
- Occupational health & safety;
- Increased spate of GBV due to the need and participation of more women;
- Conflicts over land and water use and plot allocation;
- Sanitation issues and public health;
- Impacts on Communities; and
- Sustainability of the farming venture.

Agro-Processing Activities

Environmental and Social Impacts

- Noise and vibration;
- Impact on air quality; and
- Fire Risk.
- Sustainability of the processing plant;
- Occupational health & safety;

- Sanitation issues and public health;
- Pest/rodent infestation and contamination of stored cassava; and
- Post-harvest losses.

Processing Infrastructure development/Construction and/or upgrading of Agro-Industrial Hub infrastructure

Environmental and Social Impacts

- Air quality deterioration;
- Vibration and noise nuisance;
- Loss of vegetation and impacts on flora and fauna; and
- Surface water contamination/ impact on aquatic organisms.
- Obstruction of access ways to communities;
- Influx of workers and migrants;
- Public safety;
- Road impacts & traffic issues;
- Occupational health & safety;
- Waste generation and disposal; and
- Sanitation issues and public health.

6.3 Mitigation Measures for Significant Potential Adverse Impacts

Table 6.1, 6.2 and 6.3 provide summaries of the significant environmental and social impacts, based on the evaluation, the impact receptors and the recommended mitigation measure for each impact for the livestock, rice, and cassava value chains respectively. The application of the mitigation measures in general is expected to reduce major and moderate impacts to minor or negligible impacts that may not require further mitigation.

Table 6.1: Mitigation Measures for Significant Potential Adverse Impacts (Livestock)

S/N	Proposed Project Activities	Livestock Value Chain		
		Environmental Impacts	Key Receptors	Proposed Mitigation Measures
1	Enhanced Agricultural Production and Productivity in Proximity to Agro-Industrial Clusters	Increased Livestock droppings and escalation of waste problem	Air, Water and land	<ul style="list-style-type: none"> • Conversion of Livestock droppings to biofuel; • Conversion of Livestock droppings for use as farm manure; • Regular cleaning of the environment and tidiness of the surroundings; • Waste bins for Livestock droppings should be placed at pivotal points within the battery cage for collection of Livestock waste; • Ensure timely disposal of Livestock waste and general environmental cleaning.
2		General waste management issues	Air, Water and land	<ul style="list-style-type: none"> • The farm managers and farmers will provide adequate waste bins on the farm for the collection of plastic and polythene material such as drinking water sachets for proper disposal at approved dump sites; • Farmers will provide separate labelled bins on site for collection of agrochemical containers, foil seals, lids and fertilizer sacks for return to the suppliers for recycling/proper disposal, as per FAO guidelines; • Farmers will also be trained on handling empty agrochemical bottles/containers, triple-washing and puncturing prior to being stored in the separate labelled bins for returning to the suppliers. This will ensure they cannot be reused; • Farmers will ensure that bins containing used agrochemical containers are stored safely and are securely under cover prior to their safe disposal; they will not be used for other purposes.

3		Water pollution and negative effect on surrounding ecosystem;	Water aquatic life and humans	<ul style="list-style-type: none"> • Minimization of waste water must be the principle governing programme activities • All grey water run-off or discharges should be contained and properly channelled away from water sources -Water containing cement, lime or concrete should not be discharged on site; • Wash areas should be placed in areas where there is no infiltration of waste water into the groundwater resources; • Pollution incidences on site should be acted upon speedily.
5		Impacts on water quality	Community members downstream users	<ul style="list-style-type: none"> • The use of agrochemicals including, antibiotics herbicide and pesticides will be reduced as much as possible on farms; • Where possible, mechanical weed and pest control will be considered.
6		Depletion of groundwater due to increased extraction for Livestock management	Groundwater aquifer	<ul style="list-style-type: none"> • Use metering methods to abstract water; • Develop a water monitoring strategy and a rota for water distribution; • Develop means of storing rainwater through proper rainwater harvesting modes; • Release pond wastewater into nearby wastewater drains with adequate dilution and dispersal capability; • Use shorter retention time in water ponds i.e. more frequent exchange and flushing of pond water; • Dilute pond water prior to release; • Consider using pond bottom sludge as agricultural fertilizer if properly decomposed and nontoxic.
		Social Impacts		

7		Sustainability of the Livestock farming venture	Water, Land, Public, Workers, farmers	<ul style="list-style-type: none"> • Well trained and experienced personnel will be employed by the Ebonyi SAPZ programme to oversee the operations and effectiveness of the programme; • Efficient use of resources such as water, agrochemicals, etc. will be adopted by the Ebonyi SAPZ programme and farmers to minimize economic losses; • The Ebonyi SAPZ programme will ensure regular maintenance of The Farm implements and machineries for higher efficiency • Training will be regularly provided by the Ebonyi SAPZ programme for farmers on improved agronomic practices; • The Ebonyi SAPZ programme will ensure that farmers are provided with improved and certified seed varieties to enhance productivity; • The Ebonyi SAPZ programme will ensure adequate machinery and inputs are available to ensure the agricultural activities are maintained and implemented successfully; • Proper marketing strategies will be put in place for farmers to be able to sell produce and reduce loss of revenue; • Drainage channels and canals will be regularly desilted and cleared of weeds to allow free flow of water; • The Ebonyi SAPZ programme and value chain clusters will prepare an emergency response plan to cater for the flood and water pollution.
8		Lack of space for proper rearing of birds and farm	Farmers	<ul style="list-style-type: none"> • Regular cleaning of the environment and tidiness of the surroundings; • Waste bins for Livestock droppings should be placed at pivotal points within the battery cage for collection of Livestock waste; • Ensure timely disposal of waste in the cage and general environmental cleaning; • Control the number of birds within a cage to curb overcrowding issues; • Birds should be immunized based on their level of development.
9		Conflict with neighbours due to air pollution and improper disposal of waste	Air, Land, water bodies	<ul style="list-style-type: none"> • Stakeholder consultation and involvement in decision making at all levels; • Regular cleaning of the environment and tidiness of the surroundings; • Waste bins for Livestock droppings should be placed at pivotal points within the battery cage for collection of Livestock waste; • Ensure timely disposal of Livestock waste and general environmental cleaning.
10		Occupational health and safety;	Farmers	<ul style="list-style-type: none"> • The farm manager will be mandated to adopt a Health & Safety Policy to guide the land preparation and construction activities; • The manager will ensure that only qualified machine operators with requisite skills and experience be employed to operate the machines; • The farm manager will ensure regular maintenance and servicing of its bulldozers, excavators and tractors as well as other machinery to ensure they are in good condition.

				<ul style="list-style-type: none"> • The farm manager will ensure that farm equipment is in good condition and is well-maintained to reduce frequent breakdowns, noise nuisance and smoke emissions which could affect the operator's and other workers' health and safety; • The farm manager will regularly carry out training on standard operational procedures. Health & safety training will also be provided for machine operators and workers; • The manager must provide first aid training for its workers and provide first aid kits at the programme site during land preparation and construction activities to treat minor ailments. However, major cases will be referred to the nearest hospital or health post; • The manager will also provide and enforce the use of appropriate Personal Protective Equipment (PPE) such as safety boots, reflective jackets, hand gloves, earplugs and nose masks. Sanctions will be implemented where workers do not use the PPEs provided; • The manager will organise weekly toolbox meetings for workers and brief them on EHS issues and what to do to safeguard the environment and avoid accidents or injuries.
11		Sanitation issues and public health;	Air, Land, water bodies	<ul style="list-style-type: none"> • The manager will provide temporary sanitation facilities at the programme site for use by the construction workers; • The workers will be educated against "free range" defecation; • The manager will provide adequate waste bins at the programme site to minimize indiscriminate disposal of plastic and polythene material, cans and food waste by workers; • These bins will be frequently emptied at approved dump sites to prevent littering with cans and bottles which could collect water and breed mosquitoes.

12		Increased spate of GBV due to the need and participation of more women	Farmers, women	<ul style="list-style-type: none"> • Commitment / policy to cooperate with law enforcement agencies investigating perpetrators of gender-based violence; • Ensure a copy of the code of conduct is presented to all workers and signed by each worker; • Ensure workers are trained on the content of the code of conduct in English and local language; • Provide cultural sensitisation training to improve awareness and sensitivity of workers to local cultures, traditions and lifestyles; • Prohibit child and forced labour; • Establish and implement the GBV-GRM.; • Engage competent security personnel; • Develop a clear SAPZ programme specific internal “Reporting and Response Protocol” to guide relevant stakeholders in case of GBV/SEA incidents; • Strengthen operational processes of SAPZ GBV/SEA programme in Ebonyi State ; • Identify development partners and cultivating pragmatic partnership on GBV/SEA prevention measures and referral services; • Provide financial support implementation of the GBV/SEA actions described herein, including training and awareness building for various stakeholders.
		Labour Influx leading to the transmission of diseases	Farmers, neighbouring communities	<ul style="list-style-type: none"> • The Ebonyi SAPZ programme will ensure the contractor(s), together with opinion leaders and traditional leaders, sensitise migrant workers on societal norms, taboos and other cultural practices in the area; • The Contractor shall submit for the approval of the Supervising Engineer a labour influx plan; • Implement awareness creation of eminent social evils such as COVID 19, HIV/AIDS and other STDs; • Organizing community sensitization drives on the prevention and management of the HIV/AIDS; • Liaising with the local NGOs and CBOs for the training and education on the right prevention mechanisms; • Contraceptives should be provided at acceptable locations;
		Environmental Impacts		

13	Agro-Processing activities o Dealing with waste, o Treatment technologies for wastes from processing	Impact on air quality	Air, workers, public	<ul style="list-style-type: none"> • Provide dust masks to workers; • Control speed of working machinery.
14		Noise pollution	Air, workers, public	<ul style="list-style-type: none"> • Abate noise by regular maintenance of machineries; • Use manual labour as much as possible; • Restriction of activities to daytime; • Workers within the vicinity of high-level noise to be provided with adequate PPE; • No idling of machinery if not in use, they should be switched off; • Control speed and noise of construction machinery; • Insulate noisy machines and activities to minimize noise impact to neighbouring communities.
15		Waste management	Soil, water bodies	<ul style="list-style-type: none"> • Wastewater and waste products generated from Livestock processing must be properly disposed. • Minimization of waste water must be the principle governing programme activities • All grey water run-off or discharges should be contained and properly channelled away from water sources. • The farm managers and farmers will provide adequate bins on The Farm for the collection of plastic and polythene material such as drinking water sachets for proper disposal at approved dump sites; • The farmers will provide separate labelled bins on site for collection of agrochemical containers, foil seals, lids and fertilizer sacks for return to the suppliers for recycling/proper disposal, as per FAO guidelines; • Farmers will also be trained on handling empty agrochemical bottles/containers, triple-washing and puncturing prior to being stored in the separate labelled bins for returning to the suppliers. This will ensure they cannot be reused; • Farmers will ensure that bins containing used agrochemical containers are stored safely and are securely under cover prior to their safe disposal; they will not be used for other purposes
16		Fire Risk	Farmers, public property, workers	<ul style="list-style-type: none"> • Burning will not be employed as a farm management practice; • The Ebonyi SAPZ programme prohibits burning as a farm management practice and will ensure all programmes it supports comply with this directive; • The Ebonyi SAPZ programme will educate all farmers and workers on potential causes of fire on the farms e.g., smoking, cooking and burning; • All farmers and workers will be trained on fire prevention and control; • The Ebonyi SAPZ programme and farmers will ensure all equipment and machinery are regularly serviced and maintained.

		Social Impacts	
17		Sustainability of the Livestock processing plant	Farmers, Workers <ul style="list-style-type: none"> • Well-trained and experienced personnel will be employed by the Ebonyi SAPZ programme to oversee the operations and effectiveness of the processing plant; • Efficient use of resources will be adopted by the Ebonyi SAPZ programme and farmers to minimize economic losses; • The Ebonyi SAPZ programme will ensure regular maintenance of the machineries for higher efficiency • The Ebonyi SAPZ programme will ensure adequate machinery and inputs are available to ensure the agricultural activities is maintained and implemented successfully; • Proper marketing strategies will be put in place for farmers to be able to sell produce and reduce loss of revenue. • Drainage channels and canals will be regularly desilted and cleared of weeds to allow free flow of water; • The Ebonyi SAPZ programme and value chain clusters will prepare an emergency response plan to cater for the flood and water pollution;

18		Occupational health & safety	Processing plant workers	<ul style="list-style-type: none"> • The plant operator should have a comprehensive health and safety policy; • Ensure there is compliance to various health and safety regulations; • Carry out regular risk assessments of the workplace; • Establish a standard code of practice for the programme workers including drivers and suppliers so as to promote safety of the public during the operation; • Install fully equipped first aid kits at strategic points at the working areas; • Ensure there is adequate sanitation facilities to be installed on sites; • Warning signs/bumps to be erected and/or placed at risky points; • There should be insurance covers for the workers under the workman’s compensation Act; • Provide adequate emergency procedures for the facility staff; • Arrange regular emergency drills for staff and Install enough firefighting equipment at strategic points; • Appropriate PPEs such as gloves, nose masks, coveralls, goggles, safety boots, etc. will be provided for staff and farmers; • The use of PPEs will be enforced especially during the handling of agrochemicals such as during spraying of weedicides; • Safety procedures, particularly with the operation of machines and the handling and use of agrochemicals will be enforced by the SAPZ programme and sanctions applied when not adhered to; • Farm stores at different sections should be built to encourage farmers purchase approved chemicals and PPEs;
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19		Post-harvest losses	Farmers	<ul style="list-style-type: none"> • The farm managers will adopt an integrated pest management system to control insects and rodent infestation; • This will include: <ul style="list-style-type: none"> ○ good housekeeping practices such as regular cleaning inside storage rooms and proper packing of produce for ease of inspection; ○ keeping the surroundings of storage rooms clean and free from weeds; ○ preventing insects and rodents from entering storage rooms by regularly inspecting all doors, walls, windows and roof for any openings and repairing them; ○ use of biological control, such as cats, to keep mice and rodents from the storage rooms; ○ use of rodent traps; ○ Chemical control/fumigation through the use of approved agrochemicals to control pests and rodents; ○ Ebonyi SAPZ programme will ensure the processed Livestock are frozen to standard; ○ All aggregation centre will have proper ventilation and will be regularly inspected for defects e.g. roof leakages; ○ The farm managers will adopt “first in first out” practices to ensure that old produce is always sold first; ○ Any infested Livestock will be immediately removed and destroyed to prevent infestation of other produce.
20		Waste generation and disposal	Soil, water bodies	<ul style="list-style-type: none"> • The farm managers and farmers will provide adequate bins on the farm for the collection of plastic and polythene material such as drinking water sachets for proper disposal at approved dump sites; • The farmers will provide separate labelled bins on site for collection of agrochemical containers, foil seals, lids and fertilizer sacks for return to the suppliers for recycling/proper disposal, as per FAO guidelines; • Farmers will also be trained on handling empty agrochemical bottles/containers, triple-washing and puncturing prior to being stored in the separate labelled bins for returning to the suppliers. This will ensure they cannot be reused; • Farmers will ensure that bins containing used agrochemical containers are stored safely and are securely under cover prior to their safe disposal; they will not be used for other purposes
21		Sanitation issues and public health	Land, water bodies	<ul style="list-style-type: none"> • The farm managers will provide sanitation facilities at the programme site for use by the farmers; • The workers will be educated against “free range” defecation; • The farm managers will provide adequate waste bins at the programme site to minimise indiscriminate disposal of plastic and polythene material, cans and food waste by workers;

				<ul style="list-style-type: none"> • These bins will be frequently emptied at approved dump sites to prevent littering with cans and bottles which could collect water and breed mosquitoes.
22		Pest/rodent infestation and contamination of stored Livestock	Stored Livestock, farmers, public	<ul style="list-style-type: none"> • Develop a training programme for farmers especially on integrated pest management; • Field sanitation should be adequately maintained.
	Processing Infrastructure development/Construction and/or upgrading of Agro-Industrial Hub infrastructure <ul style="list-style-type: none"> o Transmission and distribution of electricity, o Water supply system, o Access Roads <ul style="list-style-type: none"> ▪ Site clearing and/or levelling, ▪ Compacting , ▪ Use of heavy equipment and hazardous materials ▪ Material Extraction, Slope stability/Excavation, cutting, and filling ▪ Hazardous materials 	Environmental Impacts		
23		Air quality deterioration	Project affected communities, construction workers, farmers	<ul style="list-style-type: none"> • Suppress dust emissions by appropriate methods such as spraying water on soil; • Ensure vehicles are in good working condition; • Ensure exhaust fumes from vehicles conform to applicable National standards and specifications.
24		Vibration and noise nuisance		<ul style="list-style-type: none"> • Abate noise by regular maintenance of machineries; • Use manual labour as much as possible; • Restriction of activities to daytime; • Workers within the vicinity of high-level noise to be provided with adequate PPE; • No idling of machinery if not in use, they should be switched off; • Control speed and noise of construction machinery; • Insulate noisy machines and activities to minimize noise impact to neighbouring communities.
25		Loss of vegetation and impacts on flora and fauna	Flora and fauna, within access road and other infrastructure RoW.	<ul style="list-style-type: none"> • The construction works contractor will sensitize its machine operators to carry out vegetation clearance in sections and limit vegetation clearance to portions of the land to be developed; • This is to allow fauna to migrate to adjoining bushes; • Limit construction activities to designated areas;

	<p>storage and disposal,</p> <ul style="list-style-type: none"> ▪ Waste management, ▪ Construction camp and crew set up 			<ul style="list-style-type: none"> • Movement of crews and equipment within the rights-of-way and over routes provided for access to the work shall be performed in a manner to minimize damage to vegetation and fauna within the programme area; • The clearing of vegetation in sections by the contractor(s) will ensure only areas of the land to be developed at a particular time are exposed to agents of erosion; • This will also ensure the cleared areas of the land are not left bare over long periods as development at the cleared areas will be carried out immediately; • This will minimize erosion and sediment transport from the programme site.
26		Surface water contamination/ impact on aquatic organisms	Streams, Rivers and creeks	<ul style="list-style-type: none"> • The Contractor(s) will immediately collect any excess excavated soils to minimize the potential for erosion into water bodies and such excess or unusable materials will be used to fill existing borrow pits; • The contractor will ensure appropriate spill control measures are provided at the vehicle maintenance area and fuel storage areas to reduce the potential impact from spills.eg. sand buckets, cemented platforms, etc. These will include provision of bunds to contain spills, installation and servicing of fuel dispensers; • Workers will be trained on how to contain and manage spills; • Heaps of excavated soils suitable for reuse during construction will be utilized in the shortest possible time to minimize exposure; • Where the material is unsuitable for backfilling, it may be used to fill borrow pits or it will be disposed at an approved dump site.
		Social Impacts		
27		Risk of flooding	Farmers, Neighbouring communities,	<ul style="list-style-type: none"> • Desilting of drainage channels; • Enlighten the populace on proper disposal of domestic waste; • Enhance proper handling and disposal of wastes (especially contaminated soil or water, concrete, demolition materials, oils, grease, lubricants, metals, etc.).
		Increase in Crime and insecurity issues	Neighbouring communities,	<ul style="list-style-type: none"> • Engage competent security personnel; • Provide adequate training of security personnel; • Disclose site security arrangements to the Police and host communities.
28		Sanitation Issues	Neighbouring communities,	<ul style="list-style-type: none"> • The Contractor will provide temporary sanitation facilities at the programme site for use by the construction workers. • The workers will be educated against “free range” defecation;

				<ul style="list-style-type: none"> • The Contractor will provide adequate waste bins at the programme site to minimize indiscriminate disposal of plastic and polythene material, cans and food waste by workers. • These bins will be frequently emptied at approved dump sites to prevent littering with cans and bottles which could collect water and breed mosquitoes.
29		Interference from local community causing disruptions to work	Farmers	<ul style="list-style-type: none"> • Engage members of communities in stakeholder consultation throughout the Lifecycle of the programme; • Involve local community and opinion leaders in planning process; • To minimize the number of foreign workers being brought to the site, the contractor will be required to hire skilled/unskilled labour from local people if they wish to be hired.
		Labour influx and risk of disease transmission and disrespect to cultural norms	Neighbouring communities, contractor	<ul style="list-style-type: none"> • The Ebonyi SAPZ programme will ensure the contractor(s), together with opinion leaders and traditional leaders, sensitise migrant workers on societal norms, taboos and other cultural practices in the area; • The Contractor shall be required to submit for the approval of the Supervising Engineer a labour influx management plan which will include a social and cultural orientation plan.
30		Occupational health, safety and labour issues	Construction workers,	<ul style="list-style-type: none"> • The Contractor(s) will be required to adopt a Health & Safety Policy to guide the land preparation and construction activities; • The Contractor will ensure that only qualified machine operators with requisite skills and experience be employed to operate the machines; • The Contractor will ensure regular maintenance and servicing of its bulldozers, excavators and tractors as well as other machinery to ensure they are in good condition; • Good conditioned and well-maintained equipment will reduce frequent breakdowns, noise nuisance and smoke emissions which could affect the operator's and other workers' health and safety; • The Contractor will regularly carry out training on standard operational procedures. Health & safety training will also be provided for machine operators and workers; • The Contractor will provide first aid training for its workers and provide first aid kits at the programme site during land preparation and construction activities to treat minor ailments. However, major cases will be referred to the nearest hospital or health post; • The Contractor will also provide and enforce the use of appropriate Personal Protective Equipment (PPE) such as safety boots, reflective jackets, hand gloves, earplugs and nose masks. Sanctions will be implemented where workers do not use the PPEs provided; • The Contractor will organise weekly toolbox meetings for workers and brief them on EHS issues and what to do to safeguard the environment and avoid accidents or injuries.

		Road rehabilitation and traffic impact	commercial and private vehicles	<ul style="list-style-type: none"> • Announcement and notification of work by the contractor. The communities must be informed at least seven days before start of work • Warning signs shall be provided at the junction on entering the programme area • Transport of materials (such as quarry products and concrete) will as much as possible be carried out during off-peak traffic hours to minimise the impact on traffic. • Speed limits of between 20-30 km/hour will be enforced along the route for all trucks; • Trucks transporting quarry products and other friable materials to the site will be covered; • All temporary traffic controls will be done in consultation with , FRSC and the traffic Police; • The Contractor shall ensure that all the vehicles to be used for the programme and especially in transporting equipment and materials will be serviced regularly and all the drivers to be engaged/ assigned would be required to hold the requisite driver’s license as prescribed by the Licensing Authority; • In an unfortunate incident of any truck failure, such trucks will be towed within 24 hours; • The Contractor will repair and maintain damaged sections of the road network due to construction activities. • No vehicle shall be parked at unauthorised places to reduce the risk of accidents.
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31		Impact on cultural heritage	Neighbouring communities	<ul style="list-style-type: none"> • Involve local community and opinion leaders in the programme planning process; • Develop an induction programme including a code of conduct for all workers; • Provide cultural sensitization training to improve awareness and sensitivity of workers to local cultures, traditions and lifestyles. (Implement the PCRMP); • Minimize disruption as a result of the relocation and removal of sacred sites; • Where possible, design or re-design programme components to avoid or minimize impacts to known physical-cultural heritage resources based on input from cultural heritage specialists; • Avoidance of shrines determined to be very important to the local community; • If shrines considered important to the local community cannot be avoided, consultation with the local community will occur to offer compensation for the loss of the cultural resource or to inquire about the possibility of relocating the resource; • Sensitize all workers on the restriction around Shrine; • Educational, awareness-raising and information programmes aimed at the general public in particular construction workers from other communities; • Identify and define the various elements of this intangible cultural heritage with the participation of communities and relevant non-governmental organizations; • Consultation with chief priest and community elders on the required compensation; • Adopt a general policy of respect aimed at promoting the function of these intangible cultural heritages and at integrating the safeguarding of such heritage into programme planning programmes. The impact on cultural artefacts will be further examined through the RAP study.
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Table 6.2: Mitigation Measures for Significant Potential Adverse Impacts (Rice)

S/N	Proposed Project Activities	Rice		
		Environmental Impacts	Key Receptors	Evaluation
1	<p>Enhanced Agricultural Production and Productivity in Proximity to Agro-Industrial Clusters</p> <ul style="list-style-type: none"> o Development and operation of agricultural fields, o Construction of small dams, dykes and weirs 	Deforestation in the process of land preparation for rice cropping	Flora, fauna	<ul style="list-style-type: none"> • Trees should be planted in the open farm access roads; • The landscape should be permitted to regrow based on application of some control mechanism to prevent wildlife intrusion into residential and administrative quarters.
2	<ul style="list-style-type: none"> ▪ Site clearing and/or levelling, ▪ Compacting, ▪ Use of heavy equipment and hazardous materials ▪ Material Extraction, Slope 	Alterations of local natural water cycles / Depletion of groundwater for irrigation purposes	Groundwater aquifer	<ul style="list-style-type: none"> • Avoid conflicting water use through proper segmentation of water availability through the use of dedicated storages for rice farming purposes; • Pipe-borne water should be provided in the long term to all rice farmers;

3	<p>stability/Excavation, cutting, and filling</p> <ul style="list-style-type: none"> ▪ Hazardous materials storage and disposal, ▪ Waste management, ▪ Construction camp and crew set up 	Soil degradation	quality Soil, fauna, water bodies	<ul style="list-style-type: none"> • Farmers will be encouraged to adopt integrated weed and pest management practices for weed and pest control such as use of certified and disease tolerant seed varieties, use of early maturing seed varieties, proper land preparation, early planting, following recommended planting space between rows and plants, timely/early weeding, suitable water management practices and the use of agrochemicals where necessary. This will minimize the rate of agrochemical use; • The Ebonyi SAPZ programme will encourage the use of diammonium phosphate fertilizer (DAP) as a nitrogen source to slow down acidification caused by fertilizers such as ammonium sulphate; • Farmers will adopt minimum tillage during planting seasons to reduce the susceptibility of the soil to erosion and also hard pan formation associated with continuous ploughing at the same depth; • After harvesting, crop residue comprising process residue (straw, husks, skins, trimmings, cobs and bran of cereals) and field residue (stalks and stubble/stems, leaves of crops) will be tilled into the soil to improve the soil structure and soil organic matter content; • Farmers will utilise cover crops at erosion prone areas; • The Ebonyi SAPZ programme will, preferentially, advise and train farmers on selective pesticides with low Environmental Impact Quotient (EIQ) where appropriate, rather than broad-spectrum products, to minimize impacts on non-target species.
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4		Surface and ground water pollution	Water, aquatic life	<ul style="list-style-type: none"> • The contractor will immediately collect any excess excavated soils to minimize the potential for erosion into water bodies and such excess or unusable materials will be used to fill existing borrow pits; • The contractor will ensure appropriate spill control measures are provided at the vehicle maintenance area and fuel storage areas to reduce the potential impact from spills.eg. sand buckets, cemented platforms, etc. These will include provision of bunds to contain spills, installation and servicing of fuel dispensers; • Workers will be trained on how to contain and manage spills; • Heaps of excavated soils suitable for reuse during construction will be utilized in the shortest possible time to minimise exposure. Where the material is unsuitable for backfilling, it may be used to fill borrow pits or it will be disposed at an approved dump site.
5		Air pollution due to increased mechanized farming, vehicular movement and increased burning of biomass of cleared forest post-harvest waste	Air, workers, public	<ul style="list-style-type: none"> • The farm manager will incorporate the Air Quality Management Plan into standard operations. The plan will include the following: <ul style="list-style-type: none"> o dust from vehicular movement; o dust from burning of biomass; o exhaust emission from vehicles and machinery; o VOCs from fuel storage and dispensing areas; o noise from operation of machinery; o monitoring; o Regular maintenance of machinery/equipment in accordance with manufacturer specifications to ensure minimum levels of emission from the terminal operations.
6		Improper disposal of agricultural waste, fertilizer and chemical containers	Soil, water bodies	<ul style="list-style-type: none"> • Residents should be advised to use appropriate waste dump sites and to stop indiscriminate waste dumping; • Official waste dump sites should be established and waste management operators should be contacted on the prompt clearing of waste deposited.
7		Pest and rodent infestation of matured crop	Matured crop, farmers, public	<ul style="list-style-type: none"> • Develop a training programme for farmers especially on integrated pest management; • Field sanitation should be adequately maintained.

8	Noise and vibration;	Air, workers, neighbouring communities	<ul style="list-style-type: none"> • Abate noise by regular maintenance of machineries; • Use manual labour as much as possible; • Restriction of activities to daytime; • Workers within the vicinity of high-level noise to be provided with adequate PPE; • No idling of machinery if not in use, they should be switched off; • Control speed and noise of construction machinery; • Insulate noisy machines and activities to minimize noise impact to neighbouring communities.
9	Impacts on water quality	Community members downstream users, soil	<ul style="list-style-type: none"> • The Ebonyi SAPZ programme and farmers will ensure that any pesticides used are manufactured, formulated, packaged, labelled, handled, stored, disposed of, and applied according to the FAO's International Code of Conduct on Pesticide Management; • The Ebonyi SAPZ programme and farmers will ensure that pesticides that fall under the World Health Organization's (WHO) Recommended Classification of Pesticides by Hazard Classes 1a (extremely hazardous) and 1b (highly hazardous) are not purchased, stored or used; • The use of agrochemicals including, antibiotics herbicide and pesticides will be reduced as much as possible on farms; • Where possible, mechanical weed and pest control will be considered.
10	Fire risk	Farmers, public property, workers	<ul style="list-style-type: none"> • Burning of wastes will not be utilised as a farm management practice; • Ebonyi SAPZ programme prohibits burning of wastes as a farm management practice and will ensure all programmes it supports comply with this directive; • The Ebonyi SAPZ programme will educate all farmers and workers on potential causes of fire on the farms e.g., smoking, cooking and burning; • All farmers and workers will be trained on fire prevention and control. • The Ebonyi SAPZ programme and farmers will ensure all equipment and machinery are regularly serviced and maintained.
	Social Impacts		
11	Land Use Rights	Farmers, Neighbouring communities	<ul style="list-style-type: none"> • The Ebonyi SAPZ programme will ensure that no loss of farmland is allowed.
12	Increasing demand for lands for farming;	Farmers, Neighbouring communities	<ul style="list-style-type: none"> • The Ebonyi SAPZ programme will ensure that no loss of farmland is allowed.

13		Loss of fallow and other agricultural land	Farmers	<ul style="list-style-type: none"> • The Ebonyi SAPZ programme will ensure that no loss of farmland is allowed.
14		Elimination of smallholder farmers	Farmers	<ul style="list-style-type: none"> • The Ebonyi SAPZ programme will ensure that no loss of farmland is allowed.
15		Occupational health & safety	Workers	<ul style="list-style-type: none"> • The farm manager should have a comprehensive health and safety policy; • Ensure there is compliance to various health and safety regulations; • Carry out regular risk assessments of the workplace; • Establish a standard code of practice for the programme workers including drivers and suppliers so as to promote safety of the public during the operation; • Install fully equipped first aid kits at strategic points at the working areas; • Ensure there is adequate sanitation facilities to be installed on sites; • Warning signs/bumps to be erected and/or placed at risky points; • There should be insurance covers for the workers under the workman's compensation Act; • Provide adequate emergency procedures for the facility staff; • Arrange regular emergency drills for staff • Install at strategic points enough fire-fighting equipment; • Appropriate PPEs such as gloves, nose masks, coveralls, goggles, safety boots, etc. will be provided for staff and farmers; • The use of PPEs will be enforced especially during the handling of agrochemicals such as during spraying of weedicides; • Safety procedures, particularly with the operation of machines and the handling and use of agrochemicals will be enforced by the SAPZ programme and sanctions applied when not adhered to; • Farm stores at different sections should be built to encourage farmers purchase approved chemicals and PPEs.

16		Increased spate of GBV due to the need and participation of more women	Farmers, women	<ul style="list-style-type: none"> • Commitment / policy to cooperate with law enforcement agencies investigating perpetrators of gender-based violence; • Ensure a copy of the code of conduct is presented to all workers and signed by each worker; • Ensure workers are trained on the content of the code of conduct in English and local language; • Provide cultural sensitisation training to improve awareness and sensitivity of workers to local cultures, traditions and lifestyles; • Prohibit child and forced labour; • Establish and implement the GBV-GRM. • Engage competent security personnel; • Develop a clear SAPZ programme specific internal “Reporting and Response Protocol” to guide relevant stakeholders in case of GBV/SEA incidents; • Strengthen operational processes of SAPZ GBV/SEA programme in Ebonyi States ; • Identify development partners and cultivating pragmatic partnership on GBV/SEA prevention measures and referral services; • Provide financial support implementation of the GBV/SEA actions described herein, including training and awareness building for various stakeholders.
17		Conflicts over land and water use and plot allocation;	Farmers, Neighbouring communities	<ul style="list-style-type: none"> • Sensitize farmers on the new efficient farming techniques so that they can be fully involved in the transition process; • Stakeholder consultation and involvement in decision making at all levels.
18		Sanitation issues and public health;	Soil, Water, Workers	<ul style="list-style-type: none"> • The farm managers will provide sanitation facilities at the programme site for use by the farmers; • The workers will be educated against “free range” defecation; • The Farm managers will provide adequate waste bins at the programme site to minimise indiscriminate disposal of plastic and polythene material, cans and food waste by workers; • These bins will be frequently emptied at approved dump sites to prevent littering with cans and bottles which could collect water and breed mosquitoes.

19		Impacts on Communities	Neighbouring communities	<ul style="list-style-type: none"> • In order to ensure peaceful coexistence and prevent the incidence of conflicts, the Ebonyi SAPZ programme together with Farm clusters leaders will continue to extensively consult the programme communities throughout the programme implementation to ensure their free, prior informed consent for programme developments.
20		Sustainability of the farming venture	Farmers	<ul style="list-style-type: none"> • Well trained and experienced personnel will be employed by the Ebonyi SAPZ programme to oversee the operations and effectiveness of the programme; • Efficient use of resources such as water, agrochemicals, etc. will be adopted by the Ebonyi SAPZ programme and farmers to minimize economic losses; • The Ebonyi SAPZ programme will ensure regular maintenance of The Farm implements and machineries for higher efficiency; • Training will be regularly provided by the Ebonyi SAPZ programme for farmers on improved agronomic practices; • The Ebonyi SAPZ programme will ensure that farmers are provided with improved and certified seed varieties to enhance productivity; • The Ebonyi SAPZ programme will ensure adequate machinery and inputs are available to ensure the agricultural activities is maintained and implemented successfully; • Proper marketing strategies will be put in place for farmers to be able to sell produce and reduce loss of revenue; • Drainage channels and canals will be regularly desilted and cleared of weeds to allow free flow of water; • The Ebonyi SAPZ programme and value chain clusters will prepare an emergency response plan to cater for the flood and water pollution.
Agro-Processing activities		Environmental Impacts		

21	<ul style="list-style-type: none"> o Crop processing o Dealing with waste, o Treatment technologies for wastes from processing 	Noise and vibration	Air, workers, public	<ul style="list-style-type: none"> • Provide workers with dust mask, • Milling plants will be sited away from residential areas; • Abate noise by regular maintenance of machineries; • Use manual labour as much as possible; • Restriction of activities to daytime; • Workers within the vicinity of high-level noise to be provided with adequate PPE; • No idling of machinery if not in use, they should be switched off; • Control speed and noise of construction machinery; • Insulate noisy machines and activities to minimize noise impact to neighbouring communities. 	
22		Impact on air quality	Air, workers, public	<ul style="list-style-type: none"> • Milling plants will be sited away from residential areas; • Provide dust masks to workers; • Abate dust by suppressants; • Control speed of working machinery. 	
23		24	Fire Risk	Farmers, public property, workers	<ul style="list-style-type: none"> • Burning of wastes will not be utilised as a farm management practice; • The Ebonyi SAPZ programme prohibits burning of wastes as a farm management practice and will ensure all programmes it supports comply with this directive • The Ebonyi SAPZ programme will educate all farmers and workers on potential causes of fire on the farms e.g., smoking, cooking and burning; • All farmers and workers will be trained on fire prevention and control; • The Ebonyi SAPZ programme and farmers will ensure all equipment and machinery are regularly serviced and maintained;

25		Sustainability of the processing plant	Farmers, Workers	<ul style="list-style-type: none"> • Well trained and experienced personnel will be employed by the Ebonyi SAPZ programme to oversee the operations and effectiveness of the processing plant; • Efficient use of resources to be adopted by the Ebonyi SAPZ programme and farmers to minimize economic losses; • The Ebonyi SAPZ programme will ensure regular maintenance of the machineries for higher efficiency; • The Ebonyi SAPZ programme will ensure adequate machinery and inputs are available to ensure the agricultural activities is maintained and implemented successfully; • Proper marketing strategies will be put in place for farmers to be able to sell produce and reduce loss of revenue; • Drainage channels and canals will be regularly desilted and cleared of weeds to allow free flow of water; • The Ebonyi SAPZ programme and value chain clusters will prepare an emergency response plan to cater for flood and water pollution.
26		Occupational health & safety	Processing plant workers	<ul style="list-style-type: none"> • The plant operator should have a comprehensive health and safety policy; • Ensure there is compliance to various health and safety regulations; • Carry out regular risk assessments of the workplace; • Establish a standard code of practice for the programme workers including drivers and suppliers so as to promote safety of the public during the operation; • Install fully equipped first aid kits at strategic points at the working areas; • Ensure there is adequate sanitation facilities to be installed on sites; • Warning signs/bumps to be erected and/or placed at risky points; • There will be insurance covers for the workers under the workman’s compensation Act; • Provide adequate emergency procedures for the facility staff; • Arrange regular emergency drills for staff and install at strategic points enough firefighting equipment; • Appropriate PPEs such as gloves, nose masks, coveralls, goggles, safety boots, etc. will be provided for staff and farmers; • The use of PPEs will be enforced especially during the handling of agrochemicals such as during spraying of weedicides; • Safety procedures, particularly with the operation of machines and the handling and use of agrochemicals will be enforced by the SAPZ programme and sanctions applied when not adhered to; • Farm stores at different sections should be built to encourage farmers purchase approved chemicals and PPEs.

27		Sanitation issues and public health	Land, water bodies	<ul style="list-style-type: none"> • The farm managers will provide toilet facilities at the programme site for use by the farmers. • The workers will be educated against “free range” defecation; • The farm managers will provide adequate waste bins at the programme site to minimise indiscriminate disposal of plastic and polythene material, cans and food waste by workers. These bins will be frequently emptied at approved dump sites to prevent littering with cans and bottles which could collect water and breed mosquitoes.
28		Pest/rodent infestation and contamination of stored rice	Stored rice, farmers, public	<ul style="list-style-type: none"> • Develop a training programme for farmers especially on integrated pest management; • Field sanitation should be adequately maintained;
29		Post-harvest losses	Farmers	<p>The farm managers will adopt an integrated pest management system to control insects and rodent infestation. This will include:</p> <ul style="list-style-type: none"> • Good housekeeping practices such as regular cleaning inside storage rooms and proper packing of produce for ease of inspection; • Keeping the surroundings of storage rooms clean and free from weeds; • Prevention of insects and rodents from entering storage rooms by regularly inspecting all doors, walls, windows and roof for any openings and repairing them; • Use of biological control, such as cats, to keep mice and other rodents from the storage rooms; • Use of rodent traps; • Chemical control/fumigation through the use of approved agrochemicals to control pests and rodents; the Ebonyi SAPZ programme will ensure harvested rice is properly dried to about 13-14% moisture content to make them suitable for storage. • All storage rooms at the programme area will have proper ventilation and will be regularly inspected for defects e.g., roof leakages; • The Farm managers will ensure the storage room and the surrounding environment is always kept clean and free from weeds; • Bags of rice will be properly arranged on pallets and the pallets will be arranged in rows with adequate spacing in between to ensure ease of cleaning the storage room and inspection of produce for rodents and insects; • The Ebonyi SAPZ programme will ensure new produce from the farm/mill are not mixed with old produce in the storage room by storing the new produce at a different section in the storage room; • The aggregation centres managers will adopt “first in first out” practices to ensure that old produce is always sold first; • Any infested produce will be immediately removed and destroyed to prevent infestation of other produce;

				<ul style="list-style-type: none"> • Chemical treatment/fumigation, by using only EPA approved agrochemicals, will be used by The Farm manager to control pest/rodents and diseases where necessary
	<p>Processing Infrastructure development/Construction and/or upgrading of Agro-Industrial Hub infrastructure</p> <ul style="list-style-type: none"> o Transmission and distribution of electricity, o Water supply system, o Access Roads <ul style="list-style-type: none"> ▪ Site clearing and/or levelling, ▪ Compacting, 	<p>Environmental Impacts</p>		

30	<ul style="list-style-type: none"> ▪ Use of heavy equipment and hazardous materials ▪ Material Extraction, Slope stability/Excavation, cutting, and filling ▪ Hazardous materials storage and disposal, ▪ Waste management, ▪ Construction camp and crew set up 	Air deterioration	Project affected communities, construction workers, farmers	<ul style="list-style-type: none"> • Dust emissions from trucks, will be controlled and minimized by the use of designated routes in order to minimize impacts to residents, construction workers, port workers/users and institutions along the transport route. • Provide dust masks to workers; • Sprinkle water on the soil during excavation and land filling; • Control speed of working machinery; • The proposed road construction and road upgrade works will be done using mitigation and control techniques, such as standard dust suppression measures e.g. dampening of unpaved surfaces; • Ensure vehicular speed limits of 30mph over any unpaved landscape to minimise dust generation. Material dumping will be regulated to reduce dust emissions; • Owners / operators of construction equipment and vehicles will implement the manufacturer recommended engine maintenance programmes to minimize the emission of fumes into the environment; • The Contractor will monitor dust and remedial action will be taken whenever dust generating activities take place; • Dust-related grievances will be investigated and managed as part of the Grievance Redress Mechanism;
31		Vibration and noise nuisance	Workers/ Local communities and road users	<ul style="list-style-type: none"> • The Contractor will employ standard noise abatement measures and engineering best practices to ensure that the impact of these issues is minimized and reduced to acceptable limits. • The Contractor will ensure that earthworks and other construction activities will be phased out or controlled to reduce noise generation during construction. • All equipment shall be operated and maintained in accordance with appropriate industry and equipment standards including specifications for noise levels and manufacturer's specifications (including regular checks and maintenance); • Machines in intermittent use shall be shut down in the intervening periods between works or throttled down to a minimum.

32		Loss of vegetation and impacts on flora and fauna	Flora and fauna, within access road and other infrastructure RoW	<ul style="list-style-type: none"> • The construction works contractor will sensitize its machine operators to carry out vegetation clearance in sections and limit vegetation clearance to portions of the land to be developed. This is to allow fauna to migrate to adjoining bushes; • Insulate noisy machines and activities during construction to minimize noise impact to neighbouring communities • Unnecessary hooting is to be avoided as much as possible • Limit construction activities to designated areas; • Movement of crews and equipment within the rights-of-way and over routes provided for access to the work shall be performed in a manner to minimize damage to vegetation and fauna within the programme area. • Clearing of vegetation in sections by the contractor(s) will ensure only areas of the land to be developed at a particular time are exposed to agents of erosion. This will also ensure the cleared areas of the land are not left bare over long periods as development at the cleared areas will be carried out immediately. This will minimize erosion and sediment transport from the programme site.
		Surface and groundwater contamination/ impact on aquatic organisms	Streams, Rivers and creeks	<ul style="list-style-type: none"> • The Contractor(s) will immediately collect any excess excavated soils to minimize the potential for erosion into water bodies and such excess or unusable materials will be used to fill existing borrow pits; • The Contractor will ensure appropriate spill control measures are provided at the vehicle maintenance area and fuel storage areas to reduce the potential impact from spills.eg. sand buckets, cemented platforms, etc. These will include provision of bunds to contain spills, installation and servicing of fuel dispensers; • Workers will be trained on how to contain and manage spills; • Heaps of excavated soils suitable for reuse during construction will be utilized in the shortest possible time to minimize exposure; • Where the material is unsuitable for backfilling, it may be used to fill borrow pits or it will be disposed at an approved dump site.
		Social Impacts		
33		Obstruction of access ways to communities	Community members	<ul style="list-style-type: none"> • The Contractor(s) will provide safe alternative access routes for access ways that are obstructed/destroyed during construction works; • The Contractor(s) will erect sign posts at vantage points to guide community members through safe alternative access ways during construction works.

		Influx of workers and migrants	Workers, public, neighbouring communities	<p>The Ebonyi SAPZ programme will implement a stakeholder engagement plan that will include:</p> <ul style="list-style-type: none"> • Informing stakeholders of increases in workforce and potential for influx; • Engaging with local government/traditional authorities on issues, risks and opportunities regarding labour influx; • Engage local communities to understand their concerns, raise awareness of risks and opportunities, and identify solutions to issues relating to labour influx; • Developing a feedback on grievance redress mechanism to collect any feedback or complaints related to labour influx associated with the programme; • The Ebonyi SAPZ programme will also ensure the contractor(s), together with opinion leaders, traditional leaders, sensitise migrant workers on societal norms, taboos and other cultural practices in the area; • The Contractor will be mandated to submit for the approval of the Supervising Engineer a labour influx management plan which will include a social and cultural orientation plan.
34		Public Safety		<ul style="list-style-type: none"> • The Contractor(s) will guard all excavations and trenches including borrow areas, canals and drains with caution tapes and safety nets; • The Contractor(s) will use warning signs at vantage points to indicate ongoing construction works • The Contractor(s) will enforce proper security at the programme site during construction works to limit entry of unauthorised persons to the programme site; • The Contractor will ensure that all haulage trucks comply with the approved speed limit of 50 km/hr within the communities along the haulage road • The Contractor should ensure that there are traffic wardens along haulage routes to assist pedestrians in crossing; • Movement of crews and equipment within the rights-of-way and over routes provided for access to the work shall be performed in a manner to minimize damage to land, crops or property.

		Road impacts & traffic issues	Road network, communities	<ul style="list-style-type: none"> • Announcement and notification of work by the contractor. The communities must be informed at least seven days before start of work • Warning signs shall be provided at the junction on entering the programme area • Transport of materials (such as quarry products and concrete) will as much as possible be carried out during off-peak traffic hours to minimize the impact on traffic. • Speed limits of between 20-30 km/hour will be enforced along the route for all trucks; • Trucks transporting quarry products and other friable materials to the site will be covered • All temporary traffic controls will be done in consultation with , FRSC and the traffic Police; • The contractor shall ensure that all the vehicles to be used for the programme and especially in transporting equipment and materials will be serviced regularly and all the drivers to be engaged/ assigned would be required to hold the requisite driver’s license as prescribed by the Licensing Authority. • In the event of an unfortunate incident of any truck failure, such truck will be towed within 24 hours; • The contractor will repair and maintain damaged sections of the road network due to construction activities • No vehicle shall be parked at unauthorized places to reduce the risk of accidents.
35		Occupational health & safety	Processing plant workers	<ul style="list-style-type: none"> • The Contractor(s) will be mandated to adopt a Health & Safety Policy to guide the land preparation and construction activities; • The Contractor will ensure that only qualified machine operators with requisite skills and experience be employed to operate the machines; • The Contractor will ensure regular maintenance and servicing of its bulldozers, excavators and tractors as well as other machinery to ensure they are in good condition; • Good conditioned and well-maintained equipment will reduce frequent breakdowns, noise nuisance and smoke emissions which could affect the operator’s and other workers’ health and safety; • The Contractor will regularly carry out training on standard operational procedures; • Health & safety training will also be provided for machine operators and workers’; • The Contractor will provide first aid training for its workers and provide first aid kits at the programme site during land preparation and construction activities to treat minor ailments. However, major cases will be referred to the nearest hospital or health post; • The Contractor will also provide and enforce the use of appropriate Personal Protective Equipment (PPE) such as safety boots, reflective jackets, hand gloves, earplugs and nose masks; • Sanctions will be implemented where workers do not use the PPEs provided; • Contractor will organise weekly toolbox meetings for workers and brief them on EHS issues and what to do to safeguard the environment and avoid accidents or injuries.

36		Waste generation and disposal	Soil, bodies water	<ul style="list-style-type: none"> • The Contractor will ensure efficient use of construction materials to minimize the waste to be generated; • Excavated soil material will, as much as possible, be reused in construction; • The contractor(s) waste management plan should include disposal of excavated material and cleared vegetation, which cannot be re-used. This will be subject to approval by the engineering consultant; • The Contractor(s) will provide bins on site for collection and disposal of plastic waste and polythene materials such as lubricant containers, drinking water sachets and carrier bags which will be regularly emptied at approved dump site; • Workers will be sensitized to comply with the Waste Management Plan; • The contractor must promote waste avoidance; reduction; reuse and recycling as applicable; • Disposal of waste material shall be by proper waste disposal methods including burying, where burial of such materials is approved by the Engineer, or by removal from the construction area; • The contractor(s) will allow the neighbouring communities to collect the tree and shrub stems for use as poles, fuelwood and fencing material; • As much as possible, the twigs and leaves will be spread and ploughed into soil or allowed to decompose.
37		Sanitation issues and public health	Land, bodies water	<ul style="list-style-type: none"> • The Contractor will provide temporary sanitation facilities at the programme site for use by the construction workers. • The workers will be educated against “free range” defecation; • The Contractor will provide adequate waste bins at the programme site to minimize indiscriminate disposal of plastic and polythene material, cans and food waste by workers. • These bins will be frequently emptied at approved dump sites to prevent littering with cans and bottles which could collect water and breed mosquitoes.

Table 6.3: Mitigation Measures for Significant Potential Adverse Impacts (Cassava)

S/N	Proposed Project Activities	Cassava		
		Environmental Impacts	Key Receptors	Evaluation

1	<p>Enhanced Agricultural Production and Productivity in Proximity to Agro-Industrial Clusters</p> <ul style="list-style-type: none"> o Development and operation of agricultural fields, o Construction of small dams, dykes and weirs <ul style="list-style-type: none"> ▪ Site clearing and/or levelling, ▪ Compacting, ▪ Use of heavy equipment and hazardous materials ▪ Material Extraction, Slope stability/Excavation, cutting, and filling 	Deforestation in the process of land preparation for cassava cropping	Flora, fauna	<ul style="list-style-type: none"> • Trees should be planted in the open farm access roads; • The landscape should be permitted to regrow based on application of some control mechanism to prevent wildlife intrusion into residential and administrative quarters.
2		Alterations of local natural water cycles / Depletion of groundwater for irrigation purposes	Groundwater aquifer	<ul style="list-style-type: none"> • Avoid conflicting water use through proper segmentation of water availability through the use of dedicated storages for rice farming purposes; • Pipe-borne water should be provided in the long term to all cassava farmers;

3	<ul style="list-style-type: none"> ▪ Hazardous materials storage and disposal, ▪ Waste management, ▪ Construction camp and crew set up 	Soil quality degradation	Soil, fauna, water bodies	<ul style="list-style-type: none"> • The farmers will be encouraged to adopt integrated weed and pest management practices for weed and pest control such as use of certified and disease tolerant seed varieties, use of early maturing seed varieties, proper land preparation, early planting, following recommended planting space between rows and plants, timely/early weeding, suitable water management practices and the use of agrochemicals where necessary. This will minimize the rate of agrochemical use; • The Ebonyi SAPZ programme will encourage the use of diammonium phosphate fertilizer (DAP) as a nitrogen source to slow down acidification caused by fertilizers such as ammonium sulphate; • The Farmers will adopt minimum tillage during planting seasons to reduce the susceptibility of the soil to erosion and also hard pan formation associated with continuous ploughing at the same depth; • After harvesting, crop residue comprising process residue (straw, husks, skins, trimmings, cobs and bran of cereals) and field residue (stalks and stubble/stems, leaves of crops) will be tilled into the soil to improve the soil structure and soil organic matter content; • Farmers will utilise cover crops at erosion prone areas; • The Ebonyi SAPZ programme will, preferentially, advise and train farmers on selective pesticides with low Environmental Impact Quotient (EIQ) where appropriate, rather than broad-spectrum products, to minimize impacts on non-target species.
4		Surface and ground water pollution	Water, aquatic life	<ul style="list-style-type: none"> • The Contractor(s) will promptly collect any excess excavated soils to minimize the potential for erosion into water bodies and such excess or unusable materials will be used to fill existing borrow pits; • The Contractor will ensure appropriate spill control measures are provided at the vehicle maintenance area and fuel storage areas to reduce the potential impact from spills.eg. sand buckets, cemented platforms, etc. These will include provision of bunds to contain spills, installation and servicing of fuel dispensers; • Workers will be trained on how to contain and manage spills; • Heaps of excavated soils suitable for reuse during construction will be utilized in the shortest possible time to minimise exposure. Where the material is unsuitable for backfilling, it may be used to fill borrow pits or it will be disposed at an approved dump site.

5	Air pollution due to increased mechanized farming, vehicular movement and increased burning of biomass of cleared forest post-harvest waste	Air, workers, public	<ul style="list-style-type: none"> • The Farm manager will incorporate the Air Quality Management Plan into standard operations. The plan will include the following: <ul style="list-style-type: none"> o dust from vehicular movement; o dust from burning of biomass; o exhaust emission from vehicles and machinery; o VOCs from fuel storage and dispensing areas; o noise from operation of machinery; o monitoring; o Regular maintenance of machinery/equipment in accordance with manufacturer specifications to ensure minimum levels of emission from the terminal operations.
6	Improper disposal of agricultural waste, fertilizer and chemical containers	Soil, water bodies	<ul style="list-style-type: none"> • Residents should be advised to use appropriate waste dump sites and to stop indiscriminate waste dumping; • Official waste dump sites should be established and waste management operators should be contacted on the prompt clearing of waste deposited.
7	Pest and rodent infestation of matured crop	Matured crop, farmers, public	<ul style="list-style-type: none"> • Develop a training programme for farmers especially on integrated pest management; • Field sanitation should be adequately maintained.
8	Noise and vibration;	Air, workers, neighbouring communities	<ul style="list-style-type: none"> • Abate noise by regular maintenance of machineries; • Use manual labour as much as possible; • Restriction of activities to daytime; • Workers within the vicinity of high-level noise to be provided with adequate PPE; • No idling of machinery if not in use, they should be switched off; • Control speed and noise of construction machinery; • Insulate noisy machines and activities to minimize noise impact to neighbouring communities.

9		Impacts on water quality	Community members downstream users, soil	<ul style="list-style-type: none"> • The Ebonyi SAPZ programme and farmers will ensure that any pesticides used are manufactured, formulated, packaged, labelled, handled, stored, disposed of, and applied according to the FAO's International Code of Conduct on Pesticide Management; • The Ebonyi SAPZ programme and farmers will ensure that pesticides that fall under the World Health Organization's (WHO) Recommended Classification of Pesticides by Hazard Classes 1a (extremely hazardous) and 1b (highly hazardous) are not purchased, stored or used; • The use of agrochemicals including, antibiotics herbicide and pesticides will be reduced as much as possible on farms; • Where possible, mechanical weed and pest control will be considered.
10		Fire risk	Farmers, public property, workers	<ul style="list-style-type: none"> • Burning of wastes will not be utilised as a farm management practice; • Ebonyi SAPZ programme prohibits burning wastes as a farm management practice and will ensure all programmes it supports comply with this directive; • The Ebonyi SAPZ programme will educate all farmers and workers on potential causes of fire on the farms e.g., smoking, cooking and burning; • All farmers and workers will be trained on fire prevention and control. <p>The Ebonyi SAPZ programme and farmers will ensure all equipment and machinery are regularly serviced and maintained.</p>
		Social Impacts		
11		Land Use Rights	Farmers, Neighbouring communities	<ul style="list-style-type: none"> • The Ebonyi SAPZ programme will ensure that no loss of farmland is allowed.
12		Increasing demand for lands for farming;	Farmers, Neighbouring communities	<ul style="list-style-type: none"> • The Ebonyi SAPZ programme will ensure that no loss of farmland is allowed.
13		Loss of fallow and other agricultural land	Farmers	<ul style="list-style-type: none"> • The Ebonyi SAPZ programme will ensure that no loss of farmland is allowed.

14		Elimination of smallholder farmers	Farmers	<ul style="list-style-type: none"> • The Ebonyi SAPZ programme will ensure that no loss of farmland is allowed.
15		Occupational health & safety	Workers	<ul style="list-style-type: none"> • The Farm manager should have a comprehensive health and safety policy; • Ensure there is compliance to various health and safety regulations; • Carry out regular risk assessments of the workplace; • Establish a standard code of practice for the programme workers including drivers and suppliers so as to promote safety of the public during the operation; • Install fully equipped first aid kits at strategic points at the working areas; • Ensure there is adequate sanitation facilities to be installed on sites; • Warning signs/bumps to be erected and/or placed at risky points; • There should be insurance covers for the workers under the workman's compensation Act; • Provide adequate emergency procedures for the facility staff; • Arrange regular emergency drills for staff • Install at strategic points enough firefighting equipment; • Appropriate PPEs such as gloves, nose masks, coveralls, goggles, safety boots, etc. will be provided for staff and farmers; • The use of PPEs will be enforced especially during the handling of agrochemicals such as during spraying of weedicides; • Safety procedures, particularly with the operation of machines and the handling and use of agrochemicals will be enforced by the SAPZ programme and sanctions applied when not adhered to; • Farm stores at different sections should be built to encourage farmers purchase approved chemicals and PPEs.

16		Increased spate of GBV due to the need and participation of more women	Farmers, women	<ul style="list-style-type: none"> • Commitment / policy to cooperate with law enforcement agencies investigating perpetrators of gender-based violence; • Ensure a copy of the code of conduct is presented to all workers and signed by each worker; • Ensure workers are trained on the content of the code of conduct in English and local language; • Provide cultural sensitisation training to improve awareness and sensitivity of workers to local cultures, traditions and lifestyles; • Prohibit child and forced labour; • Establish and implement the GBV-GRM. • Engage competent security personnel; • Develop a clear SAPZ programme specific internal “Reporting and Response Protocol” to guide relevant stakeholders in case of GBV/SEA incidents; • Strengthen operational processes of SAPZ programme states on GBV/SEA; • Identify development partners and cultivating pragmatic partnership on GBV/SEA prevention measures and referral services; • Provide financial support implementation of the GBV/SEA actions described herein, including training and awareness building for various stakeholders.
17		Conflicts over land and water use and plot allocation;	Farmers, Neighbouring communities	<ul style="list-style-type: none"> • Sensitize the farmer on the new efficient farming techniques so that they can be fully involved in the transition process; • Stakeholder consultation and involvement in decision making at all levels.
18		Sanitation issues and public health;	Soil, Water, Workers	<ul style="list-style-type: none"> • The Farm managers will provide sanitation facilities at the programme site for use by the farmers; • The workers will be educated against “free range” defecation; • The farm managers will provide adequate waste bins at the programme site to minimise indiscriminate disposal of plastic and polythene material, cans and food waste by workers;

				<ul style="list-style-type: none"> • These wastes bins will be frequently emptied at approved dump sites to prevent littering with cans and bottles which could collect water and breed mosquitoes.
19		Impacts on Communities	Neighbouring communities	<ul style="list-style-type: none"> • In order to ensure peaceful coexistence and prevent the incidence of conflicts, the Ebonyi SAPZ programme together with Farm clusters leaders will continue to extensively consult the programme communities throughout the programme implementation to ensure their free, prior informed consent for programme developments.
20		Sustainability of the farming venture	Farmers	<ul style="list-style-type: none"> • Well trained and experienced personnel will be employed by the Ebonyi SAPZ programme to oversee the operations and effectiveness of the programme; • Efficient use of resources such as water, agrochemicals, etc. will be adopted by the Ebonyi SAPZ programme and farmers to minimize economic losses; • The Ebonyi SAPZ programme will ensure regular maintenance of the farm implements and machineries for higher efficiency; • Training will be regularly provided by the Ebonyi SAPZ programme for farmers on improved agronomic practices; • The Ebonyi SAPZ programme will ensure that farmers are provided with improved and certified seed varieties to enhance productivity; • The Ebonyi SAPZ programme will ensure adequate machinery and inputs are available to ensure the agricultural activities is maintained and implemented successfully; • Proper marketing strategies will be put in place for farmers to be able to sell produce and reduce loss of revenue; • Drainage channels and canals will be regularly desilted and cleared of weeds to allow free flow of water; • The Ebonyi SAPZ programme and value chain clusters will prepare an emergency response plan to cater for the flood and water pollution.
	Agro-Processing activities <ul style="list-style-type: none"> o Crop processing o Dealing with waste, o Treatment technologies for wastes from processing 	Environmental Impacts		

21		Noise and vibration	Air, workers, public	<ul style="list-style-type: none"> • Provide workers with dust mask, • Milling plants will be sited away from residential areas; • Abate noise by regular maintenance of machineries; • Use manual labour as much as possible; • Restriction of activities to daytime; • Workers within the vicinity of high-level noise to be provided with adequate PPE; • No idling of machinery if not in use, they should be switched off; • Control speed and noise of construction machinery; • Insulate noisy machines and activities to minimize noise impact to neighbouring communities.
22		Impact on air quality	Air, workers, public	<ul style="list-style-type: none"> • Milling plants will be sited away from residential areas; • Provide dust masks to workers; • Abate dust by suppressants; • Control speed of working machinery.
24		Fire Risk	Farmers, public property, workers	<ul style="list-style-type: none"> • Burning wastes will not be utilised as a farm management practice; • The Ebonyi SAPZ programme prohibits burning wastes as a farm management practice and will ensure all programmes it supports comply with this directive • The Ebonyi SAPZ programme will educate all farmers and workers on potential causes of fire on the farms e.g., smoking, cooking and burning; • All farmers and workers will be trained on fire prevention and control; • The Ebonyi SAPZ programme and farmers will ensure all equipment and machinery are regularly serviced and maintained;
		Social Impacts		

25		Sustainability of the processing plant	Farmers, Workers	<ul style="list-style-type: none"> • Well trained and experienced personnel will be employed by the Ebonyi SAPZ programme to oversee the operations and effectiveness of the processing plant; • Efficient use of resources be adopted by the Ebonyi SAPZ programme and farmers to minimize economic losses; • The Ebonyi SAPZ programme will ensure regular maintenance of the machineries for higher efficiency; • Ebonyi SAPZ programme will ensure adequate machinery and inputs are available to ensure the agricultural activities is maintained and implemented successfully; • Proper marketing strategies will be put in place for farmers to be able to sell produce and reduce loss of revenue; • Drainage channels and canals will be regularly desilted and cleared of weeds to allow free flow of water; • The Ebonyi SAPZ programme and value chain clusters will prepare an emergency response plan to cater for the flood and water pollution.
26		Occupational health & safety	Processing plant workers	<ul style="list-style-type: none"> • The plant operator should have a comprehensive health and safety policy; • Ensure there is compliance to various health and safety regulations; • Carry out regular risk assessments of the workplace; • Establish a standard code of practice for the programme workers including drivers and suppliers so as to promote safety of the public during the operation; • Install fully equipped first aid kits at strategic points at the working areas; • Ensure there is adequate sanitation facilities to be installed on sites; • Warning signs/bumps to be erected and/or placed at risky points; • There should be insurance covers for the workers under the workman's compensation Act; • Provide adequate emergency procedures for the facility staff; • Arrange regular emergency drills for staff -Install at strategic points enough firefighting equipment; • Appropriate PPEs such as gloves, nose masks, coveralls, goggles, safety boots, etc. will be provided for staff and farmers; • The use of PPEs will be enforced especially during the handling of agrochemicals such as during spraying of weedicides; • Safety procedures, particularly with the operation of machines and the handling and use of agrochemicals will be enforced by the SAPZ programme and sanctions applied when not adhered to;

				<ul style="list-style-type: none"> • Farm stores at different sections should be built to encourage farmers purchase approved chemicals and PPEs.
27		Sanitation issues and public health	Land, water bodies	<ul style="list-style-type: none"> • The farm managers will provide sanitation facilities at the programme site for use by the farmers. • The workers will be educated against “free range” defecation; • The farm managers will provide adequate waste bins at the programme site to minimize indiscriminate disposal of plastic and polythene material, cans and food waste by workers. These bins will be frequently emptied at approved dump sites to prevent littering with cans and bottles which could collect water and breed mosquitoes.
28		Pest/rodent infestation and contamination of stored cassava	Stored cassava, farmers, public	<ul style="list-style-type: none"> • Develop a training programme for farmers especially on integrated pest management; • Field sanitation should be adequately maintained;

29		Post-harvest losses	Farmers	<p>The farm managers will adopt an integrated pest management system to control insects and rodent infestation. This will include:</p> <ul style="list-style-type: none"> • Good housekeeping practices such as regular cleaning inside storage rooms and proper packing of produce for ease of inspection; • Keeping the surroundings of storage rooms clean and free from weeds; • Prevention of insects and rodents from entering storage rooms by regularly inspecting all doors, walls, windows and roof for any openings and repairing them; • Use of biological control, such as cats, to keep mice and other rodents from the storage rooms; • Use of rodent traps; • Chemical control/fumigation through the use of approved agrochemicals to control pests and rodents; • all storage rooms at the programme area will have proper ventilation and will be regularly inspected for defects e.g., roof leakages; • The Farm managers will ensure the storage room and the surrounding environment is always kept clean and free from weeds; • bags of cassava tuber and processed cassava will be properly arranged on pallets and the pallets will be arranged in rows with adequate spacing in between to ensure ease of cleaning the storage room and inspection of produce for rodents and insects; • The Ebonyi SAPZ programme will ensure new produce from the farm/mill are not mixed with old produce in the storage room by storing the new produce at a different section in the storage room; • The aggregation centres managers will adopt “first in first out” practices to ensure that old produce is always sold first; • Any infested produce will be immediately removed and destroyed to prevent infestation of other produce; • Chemical treatment/fumigation, by using only EPA approved agrochemicals, will be used by The Farm manager to control pest/rodents and diseases where necessary
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<p>Processing Infrastructure development/Construction and/or upgrading of Agro-Industrial Hub infrastructure</p> <ul style="list-style-type: none"> o Transmission and distribution of electricity, o Water supply system, o Access Roads <ul style="list-style-type: none"> ▪ Site clearing and/or levelling, ▪ Compacting, ▪ Use of heavy equipment and hazardous materials ▪ Material Extraction, Slope stability/Excavation, cutting, and filling ▪ Hazardous materials storage and disposal, 	<p>Environmental Impacts</p>
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30	<ul style="list-style-type: none"> ▪ Waste management, ▪ Construction camp and crew set up 	Air quality deterioration	Project affected communities, construction workers, farmers	<ul style="list-style-type: none"> • Dust emissions from trucks, will be controlled and minimized by the use of designated routes in order to minimize impacts to residents, construction workers, port workers/users and institutions along the transport route. • Provide dust masks to workers; • Sprinkle water on the soil during excavation and land filling; • Control speed of working machinery; • The proposed road construction and road upgrade works will be done using mitigation and control techniques, such as standard dust suppression measures e.g. dampening of unpaved surfaces; • Ensure vehicular speed limits of 30mph over any unpaved landscape to minimise dust generation. Material dumping will be regulated to reduce dust emissions; • Owners / operators of construction equipment and vehicles will implement the manufacturer recommended engine maintenance programmes to minimize the emission of fumes into the environment; • The Contractor will monitor dust and remedial action will be taken whenever dust generating activities take place; • Dust-related grievances will be investigated and managed as part of the Grievance Redress Mechanism;
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31		Vibration and noise nuisance	Workers/ Local communities and road users	<ul style="list-style-type: none"> • The Contractor should employ standard noise abatement measures and engineering best practices to ensure that the impact of these issues is minimized and reduced to acceptable limits. • The Contractor should ensure that earthworks and other construction activities will be phased out or controlled to reduce noise generation during construction. • All equipment shall be operated and maintained in accordance with appropriate industry and equipment standards including specifications for noise levels and manufacturer's specifications (including regular checks and maintenance); • Machines in intermittent use shall be shut down in the intervening periods between works or throttled down to a minimum.
32		Loss of vegetation and impacts on flora and fauna	Flora and fauna, within access road and other infrastructure RoW	<ul style="list-style-type: none"> • The construction works contractor will sensitize its machine operators to carry out vegetation clearance in sections and limit vegetation clearance to portions of the land to be developed. This is to allow fauna to migrate to adjoining bushes; • Insulate noisy machines and activities during construction to minimize noise impact to neighbouring communities • Unnecessary hooting is to be avoided as much as possible • Limit construction activities to designated areas; • Movement of crews and equipment within the rights of-way and over routes provided for access to the work shall be performed in a manner to minimize damage to vegetation and fauna within the programme area. • Clearing of vegetation in sections by the contractor(s) will ensure only areas of the land to be developed at a particular time are exposed to agents of erosion. This will also ensure the cleared areas of the land are not left bare over long periods as development at the cleared areas will be carried out immediately. This will minimize erosion and sediment transport from the programme site.
		Surface and groundwater contamination/ impact on aquatic organisms	Streams, Rivers and creeks	<ul style="list-style-type: none"> • The Contractor(s) will immediately collect any excess excavated soils to minimize the potential for erosion into water bodies and such excess or unusable materials will be used to fill existing borrow pits; • The Contractor will ensure appropriate spill control measures are provided at the vehicle maintenance area and fuel storage areas to reduce the potential impact from spills.eg. sand buckets, cemented platforms, etc. These will include provision of bunds to contain spills, installation and servicing of fuel dispensers; • Workers will be trained on how to contain and manage spills;

				<ul style="list-style-type: none"> • Heaps of excavated soils suitable for reuse during construction will be utilized in the shortest possible time to minimize exposure; • Where the material is unsuitable for backfilling, it may be used to fill borrow pits or it will be disposed at an approved dump site.
		Social Impacts		
33		Obstruction of access ways to communities	Community members	<ul style="list-style-type: none"> • The Contractor(s) will provide safe alternative access routes for access ways that are obstructed/destroyed during construction works; • The Contractor(s) will erect sign posts at vantage points to guide community members through safe alternative access ways during construction works.
		Influx of workers and migrants	Workers, public, neighbouring communities	<p>The Ebonyi SAPZ programme will implement a stakeholder engagement plan that will include:</p> <ul style="list-style-type: none"> • Informing stakeholders of increases in workforce and potential for influx; • Engaging with local government/traditional authorities on issues, risks and opportunities regarding labour influx; • Engaging local communities to understand their concerns, raise awareness of risks and opportunities, and identify solutions to issues relating to labour influx; • Developing a feedback and grievance redress mechanism to collect any feedback or complaints related to labour influx associated with the programme; • The Ebonyi SAPZ programme will also ensure the contractor(s), together with opinion leaders, traditional leaders, sensitise migrant workers on societal norms, taboos and other cultural practices in the area; • The contractor will be mandated to submit for the approval of the Supervising Engineer a labour influx management plan which will include a social and cultural orientation plan.
34		Public safety		<ul style="list-style-type: none"> • The Contractor(s) will guard all excavations and trenches including borrow areas, canals and drains with caution tapes and safety nets; • The Contractor(s) will use warning signs at vantage points to indicate ongoing construction works • The Contractor(s) will enforce proper security at the programme site during construction works to limit entry of unauthorised persons to the programme site;

				<ul style="list-style-type: none"> • The Contractor will ensure that all haulage trucks comply with the approved speed limit of 50 km/hr within the communities along the haulage road • The Contractor should ensure that there are traffic wardens along haulage routes to assist pedestrians in crossing; • Movement of crews and equipment within the rights-of-way and over routes provided for access to the work shall be performed in a manner to minimize damage to land, crops or property.
		Road impacts & traffic issues	Road network, communities	<ul style="list-style-type: none"> • Announcement and notification of work by the contractor. The communities must be informed at least seven days before start of work • Warning signs shall be provided at the junction on entering the programme area • Transport of materials (such as quarry products and concrete) will as much as possible be carried out during off-peak traffic hours to minimise the impact on traffic. • Speed limits of between 20-30 km/hour will be enforced along the route for all trucks; • Trucks transporting quarry products and other friable materials to the site will be covered • All temporary traffic controls will be done in consultation with , FRSC and the traffic Police; • The contractor will ensure that all the vehicles to be used for the programme and especially in transporting equipment and materials will be serviced regularly and all the drivers to be engaged/ assigned would be required to hold the requisite driver's license as prescribed by the s Licensing Authority. • In the event of an unfortunate incident of any truck failure, such truck will be towed within 24 hours; • The contractor will repair and maintain damaged sections of the road network due to construction activities • No vehicle shall be parked at unauthorised places to reduce the risk of accidents.

35		Occupational health & safety	Processing plant workers	<ul style="list-style-type: none"> • The Contractor(s) will be mandated to adopt a Health & Safety Policy to guide the land preparation and construction activities; • The Contractor will ensure that only qualified machine operators with requisite skills and experience be employed to operate the machines; • The Contractor will ensure regular maintenance and servicing of its bulldozers, excavators and tractors as well as other machinery to ensure they are in good condition; • Good conditioned and well-maintained equipment will reduce frequent breakdowns, noise nuisance and smoke emissions which could affect the operator's and other workers' health and safety; • The Contractor will regularly carry out training on standard operational procedures; • Health & safety training will also be provided for machine operators and workers'; • The Contractor will provide first aid training for its workers and provide first aid kits at the programme site during land preparation and construction activities to treat minor ailments. However, major cases will be referred to the nearest hospital or health post; • The Contractor will also provide and enforce the use of appropriate Personal Protective Equipment (PPE) such as safety boots, reflective jackets, hand gloves, earplugs and nose masks; • Sanctions will be implemented where workers do not use the PPEs provided; • Contractor will organise weekly toolbox meetings for workers and brief them on EHS issues and what to do to safeguard the environment and avoid accidents or injuries.
36		Waste generation and disposal	Soil, water bodies	<ul style="list-style-type: none"> • The Contractor will ensure efficient use of construction materials to minimize the waste to be generated; • Excavated soil material will, as much as possible, be reused in construction; • The Contractor(s) waste management plan should include disposal of excavated material and cleared vegetation, which cannot be re-used. This will be subject to approval by the engineering consultant; • The Contractor(s) will provide bins on site for collection and disposal of plastic waste and polythene materials such as lubricant containers, drinking water sachets and carrier bags which will be regularly emptied at approved dump site; • Workers will be sensitized to comply with the Waste Management Plan;

				<ul style="list-style-type: none"> • The Contractor will promote waste avoidance; reduction; reuse and recycling as applicable; • Disposal of waste material shall be by burying, where burial of such materials is approved by the Engineer, or by removal from the construction area; • The Contractor(s) will allow the neighbouring communities to collect the tree and shrub stems for use as poles, fuelwood and fencing material; • As much as possible, the twigs and leaves will be spread and ploughed into soil or allowed to decompose.
37		Sanitation issues and public health	Land, water bodies	<ul style="list-style-type: none"> • The contractor will provide temporary sanitation facilities at the programme site for use by the construction workers. • The workers will be educated against “free range” defecation; • The contractor will provide adequate waste bins at the programme site to minimise indiscriminate disposal of plastic and polythene material, cans and food waste by workers. • These wastes bins will be frequently emptied at approved dump sites to prevent littering with cans and bottles which could collect water and breed mosquitoes.

6.4 Climate Change and Green Growth

The SAPZ Programme has been screened and classified as a Category 2 operation in line with the Bank's Climate Safeguards Operation. This means that the Programme may be vulnerable to climate risks and, thus, will require the consideration of climate trends and identification of climate risk management, adaptation and or mitigation measures to be integrated in each component.

Capacity building programmes (Training of Trainers- ToT) on climate resilient agricultural extension services is embedded in the Component 2 to generate green jobs in the Programme's area of influence; while policies and projects that encourage climate smart agricultural adoption (especially agro-forestry and multiple cropping) and promote sustainable practices and technologies will be incentivized. To mitigate against all implementation challenges, an Agriculture Value Chain Expert / Climate Change Safeguards Officer will be included in the PSIUs in all the SAPZ States. Main climate change related risks in Programme area can be summarized as flooding, dry spells and drought.

For the Agro-industrial Hubs and the Agricultural Transformation Centres, resilience and adaptation measures in the preparatory/construction phase will include:

- a. Ensuring the development of climate-resilient enabling infrastructure and management: this can be achieved by ensuring the procurement of improved fuel efficiency of farm machinery, manage climate risk by improved design of key Programme assets to increase climate resilience and reduce climate hazard.
- b. The private sector participants in the programme will make provision for managing climate change risks to their operations through contingency budgets. Where possible, they will insure high value vulnerable assets, and spread climate risk by diversification.
- c. Increase institutional capacity for responding to climate related damage. This is applicable to both the State, private sector and PIU.

All recommended climate risk management measures and green growth opportunities will be included in the Programme is ESMS, ESMPs and ESIA as applicable.

CHAPTER SEVEN

ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN (ESMMP)

This chapter enlists and discusses the framework for the mitigation measures taken to address all the adverse impacts identified in chapter six. It also discusses the fundamentals of the environmental and social management plan. Furthermore, it outlines the institutional responsibilities and accountabilities that will ensure that all the provisions are implemented under strict supervision. In addition, the cost implication of monitoring all the identified areas 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.

7.1 Description of the Proposed Environmental and Social Management and Monitoring Plan

For the proposed programme activities and their potential impacts, the site and value chain specific management and monitoring mechanisms for both the programme implementation and mitigation measures to various impacts have been proffered. This can be found in annex VI.

7.2 Other Management Plans

7.2.1 Land Use and Infrastructure Management Plan

This action plan is recommended to mitigate impacts on land use and infrastructure due to programme activities during the various phases of the proposed project. The proposed project activities that may potentially affect soils, land use, infrastructure and land capability required for future agricultural activities include:

- Loss of soil and land capability due to the construction of project infrastructure. This can be either permanent where infrastructure remains permanently or remains for the duration of the programme;
- Contamination of soil resources;
- Increased erosion; and
- Infestation with invasive alien plant species.

Management Measures

The following management measures are recommended during the construction and operational phases, to minimise impacts on soil quality and productivity. These measures should continue to be implemented during the remaining phases of the proposed project, where applicable.

- **Soil removal and disturbance.** To minimise the area of disturbance during the cultivation, processing, construction and operation phases, mitigation measures should include progressive closure to take place, where possible, to minimise the footprint.
- **Loss of organic matter/loss of biochemical cycle.** Soil productivity and the loss of the soil biochemical cycle should be considered during the construction, operation, and closure phases. Mitigation measures include the following methods:

- The stripping, segregating, and stockpiling of the soil by type. This must include the topsoil and subsoil horizons that have the potential to support agriculture and be utilised during rehabilitation programs. Topsoil must be stockpiled separately to other soil types, in stockpiles not exceeding 2 m height, with lightly compacted 45-degree slopes;
- Rehabilitation with soils from the stripping program;
- Incorporation of organic matter into the upper horizons. This could include composting, or mulching depending on nutrient requirements; and
- Nutrients deficient to plant growth may be added to the soil, with fertilizer amendment.
- **Soil stockpiles.** The following should be implemented to manage soils stored in stockpiles:
 - Where space constraints are not limiting, topsoil stockpiles should be constructed as a low long facility not higher than 2 m, or where space constraints limit this, stockpiles should be constructed as terraced stockpiles with terraces limited to 5m high with slopes no steeper than 200 m;
 - Where necessary physical erosion control measures for soil stockpiles such as proper location on flatter areas with low erosion potential, interceptor ditches and berms, toe paddocks, mulches, could be used to control erosion. This would supplement the soil binding properties of the vegetation which is expected to naturally colonise the stockpiles; and
 - Where practical, the different soil types should be stockpiled separately.
- Soil erosion/sediment delivery. Soil erosion/sedimentation during the construction and operation phases can be mitigated using the following methods:
 - Where needed, promptly re-vegetate exposed areas and topsoil stockpiles to control erosion;
 - Construct roads and landscape features so that natural drainage patterns are not impeded;
 - Construct on-site roads as far as possible along existing tracks;
 - Establish a monitoring plan for identifying potential erosion problems early and implement mitigation measures where necessary; and
 - Establish a sustainable self-sufficient vegetative community on the post-programme landscape.
- Soil contamination. Soil contamination may be an issue during the construction and operational phases. Soil contamination can be mitigated using the following methods:
 - Develop a comprehensive Spill and Leak management plan;
 - Designate fuel and chemical storage and refuelling areas; and
 - Design project facilities with secondary containment systems that contain spills and minimise impacts.
- Progressive rehabilitation. Progressive rehabilitation should be conducted during the operational phase.

7.2.3 Flora and Fauna Management Plan

The primary purpose of the Flora and Fauna Management Plan is to protect the biodiversity of the area from any unintended damage due to the Ebonyi State SAPZ programme development and operation, and to protect the project personnel from dangers associated with the native flora and fauna. This plan will include the following provisions as well as others that may be identified as it is further developed:

- Animals shall not be handled, removed, killed or unnecessarily disturbed by the Ebonyi State SAPZ support project or its employees, or by the Ebonyi State SAPZ's contractors or their subcontractors' employees;
- The Ebonyi State SAPZ will not tolerate poaching of fauna or flora by its personnel or by any of its contractors or subcontractors;
- The Ebonyi State SAPZ will ensure through a High Conservation Value study that all High Conservation Value Forest sites are properly marked and left untouched;
- The Ebonyi State SAPZ will help to maintain the integrity and quality of biodiversity in the project area;
- The Ebonyi State SAPZ will assist in protecting the swampy section from liquid effluent generated in the rice processing centre;
- Land clearing operations are expected to drive wildlife away from the land preparation operations for the various Ebonyi State SAPZ intervention / support activities, however, if any specie classified as VU by the Ministry of Environment moves to the project areas is trapped or hurt during land clearing operations, the Wildlife Division under the Ministry will be informed to determine whether translocation or other actions are required to save the individual. The Ebonyi State SAPZ will allocate funds for such contingency;
- The Ebonyi State SAPZ intervention is to occur over a period of five years. The Ebonyi State SAPZ should plan its development projects in advance to minimize the impact on the fauna, help identify and control impacts on flood zones to result in a lower amount of biomass to manage;
- The Ebonyi State SAPZ shall monitor the general condition of the aquatic habitat downstream to ensure that its water withdrawals are not creating significant stresses to that habitat and if so, the Ebonyi State SAPZ shall develop plans to install wells to replace surface water usage to mitigate the significant impacts.
- The Ebonyi State SAPZ shall ensure that the site is kept clean, tidy and free of garbage that would attract animals;
- In order to reduce the risk from invasive species, the monitoring program for the interventions should track what types of invasive species occur, where they occur, how they were most likely introduced to the area, how they were eradicated, and the success of the various eradication measures. If any of the staff identifies a continuing problem with invasive species, it should determine the root cause of that problem and investigate additional measures to address that root cause;
- In order to decrease the demand for local bush meat, the Ebonyi State SAPZ should take the following measures:
 - o decrease hunting pressure by ensuring that adequate supplies of meat other than local bush meat as well as other protein sources are available in stores and markets within the study area;
 - o educates its employees on the adverse impacts of hunting and consuming bush meat;
 - o to the lowest degree possible, prohibit and enforce prohibitions on hunting inside the Ebonyi State SAPZ area;
 - o sponsor education programs in local villages about the adverse impacts of hunting and consuming bush meat; and
 - o sponsor programs to transit hunters to other, sustainable livelihood activities.
- The Ebonyi State SAPZ will work with conservation groups and other stakeholders around the Project area to help prevent poaching. Initiatives may include hiring guards, posting signs among others.

7.2.4 Waste Management Plan

The primary purpose of the Waste Management Plan is to ensure that wastes are minimized and that wastes that are generated are properly managed and disposed to avoid damage to the environment. This process can be expressed as follows:

- minimize waste production as much as possible;
- if waste is produced, reuse or recycle that waste as much as possible;
- if reuse or recycling is not possible, the waste should be treated, neutralized, or transformed into inert materials; and if this is not possible, the waste must be disposed in a way not harmful to the environment or to human beings.

The following summarize the important elements of a Waste Management Plan:

- The plan must establish the responsibility for waste management and appoint an overall Waste Management Supervisor who must be fully trained in the implementation of the Waste Management Plan;
- The Ebonyi State SAPZ must develop a list of all wastes generated at the different facilities with estimated quantities of each on a monthly basis or other time interval, particularly Hazardous Wastes;
- The Ebonyi State SAPZ must provide well labelled storage bins for the different categories of waste in specially designed plastic or metal bins so that each type of waste can be treated or disposed-off as necessary;
- Hazardous Wastes must be properly disposed based on their specific properties as noted in Material Safety Data Sheets (MSDS) and may not be disposed with non-hazardous wastes;
- Hazardous Waste at the Ebonyi State SAPZ intervention farm area is expected to be primarily composed of the following:
 - o Empty agrochemical substances containers (e.g. fertilizers, pesticides, fungicides);
 - o Empty petrochemical substances containers (e.g. oil, grease, lubricants); used lubricants; and used towels soaked with oil and grease or lubricants;
- Hazardous Wastes cannot be mixed unless specifically noted in the plan;
- The Ebonyi State SAPZ must establish a list of accredited waste disposal contractors and obtain a Certificate of Accreditation from each to ensure that they are operating legally;
- The Ebonyi State SAPZ must have accredited waste disposal contractors for the following items and activities:
 - o used engine oil recycling contractor/facility;
 - o lead and lead battery recycling contractor (also other heavy metal pollutants);
 - o tire and rubber recycling contractor;
 - o plastic recycling contractor, particularly for plastic containers which must be rinsed prior to disposal (note – do not burn PVC in open air because dioxins and furans can be generated);
 - o used batteries (not car and equipment batteries) and e-waste (electronic waste) recycling/exporting contractor;
 - o Hazardous Waste incineration contractor (for incineration at high temperatures in specially constructed incinerators); and
 - o Domestic waste collection contractor.
- The Ebonyi State SAPZ must track all hazardous waste disposal activities using an appropriate Waste Manifest Form and all completed forms shall be kept for record purposes;
- The Ebonyi State SAPZ should periodically (e.g. every six months) reconcile its estimated disposal quantities with the waste manifests and other records of actual wastes generated, and investigate any significant discrepancies;
- The Waste Management Supervisor must ensure that periodic inspections are conducted of waste management practices to ensure compliance with this plan.

7.2.5 Erosion and Sedimentation Management Plan

The Erosion and Sedimentation Management Plan will provide the guidance to control soil erosion and the transport of sediment to surface waters. Soil erosion is a major soil degradation process

affecting the soil quality not only by directly reducing nutrients and organic matter levels, but also by affecting soil properties such as infiltration rates.

Erosion could occur during forest clearing and rice plantation establishment when the soil is left uncovered. Related activities that could cause this erosion include the establishment of the base camps during the harvesting, construction of access roads and development of drainage works. The top layer of soil is the most vulnerable and unfortunately tends to be the most fertile soil. Soil suspended as solids in the water column can physically enter the waterways and obstruct them. Soil erosion can also transport agrochemicals such as fertilizers and pesticides, which adhere to the suspended solids.

All exposed soil areas in the project area will be managed through a diversified set of measures and strategies that minimize the risk of erosion and run-off, control the flow of storm water over exposed soil areas, retain sediments within the cleared areas as much as possible, and control erosion and run-off downstream of the cleared areas. These measures are grouped and presented below.

The Ebonyi State SAPZ shall monitor the effectiveness of erosion and run-off control through a systematic verification of compliance with control measures implemented through monitoring of impacts to surface water quality downstream (turbidity) and run-off accumulation at streams and natural drainage channels downstream of construction fronts.

Erosion and runoff will be minimized through the implementation of the following types of measures:

- Vegetated buffer zones will be protected along streams to help control sedimentation;
- Leguminous cover crops will be used to help minimize soil erosion, and assist soil conservation and moisture retention by intercepting rainfall (absorbing the energy of the raindrops, thus reducing runoff), decreasing surface velocity, restraining soil movement, improving soil porosity, and, increasing biological activity in the soil;
- Site clearing operations will progress in a gradual and phased manner to ensure there are no large increases in sediment discharge;
- While vegetation clearing and earthmoving activities are in progress and permanent; erosion control devices cannot be implemented, temporary erosion control devices will be used;
- As a rule, the only rainwater that will be allowed to flow over cut and fill slopes is that which falls directly on them. All exposed soil working surfaces will be tilted towards the base of cut slopes and, where this is not possible, measures such as berms will be installed at the upper limits of fill slopes to minimize uncontrolled storm water flow over them;
- Slopes of all cut and fill areas will be rigorously controlled and will at no time be allowed to be greater than the slope established in the final design;
- Temporary protection of exposed soil surfaces with measures such as plastic film, bio-membranes or other means, will be implemented whenever necessary;
- Permanent erosion control may be achieved through measures such as terracing along with a re-vegetation program. The terraces would consist of low, broad-based earth levees constructed approximately parallel to the contours designed to intercept overload flow before it achieves great erosive force and to conduct it to a suitable discharge point.
- Erosion protection such as riprap, or sacked concrete may be used around culvert entrances;
- Inlet structures used to collect storm run-off will be constructed of any suitable construction material. The structures will ensure efficient removal of design-storm runoff in order to avoid interruption of construction during or following storms and to prevent erosion resulting from overtopping of the inlet;
- Piles of soil or other materials will be allowed for short periods of time and will be located only in flat areas and away from any storm water courses. Only topsoil piles will be allowed to remain for extended periods and will be protected from rainfall; storm water will be controlled through the implementation of the following types of measures;

- o All flow of storm water over exposed soil surfaces will be along pre-established paths that will not interfere with vehicle and other activities and will contain breakers and other devices to control flow velocity. Hydraulic stairs, drop structures or other energy dissipation structures will be used when necessary to convey storm water to lower grounds;
- o Careful considerations will be given to the drainage of all farm access roads, facility areas, borrow pits, and surplus soil deposit areas;
- o All storm drainage will be discharged via surface drainage systems. Maximum use of natural drainage features will be used. Runoff from cleared areas will be collected in open channels or ditches for removal from the immediate area. The use of buried pipe will be minimized and buried pipes will be day-lighted to open channel drains as soon as practical.

7.2.6 Employment, Training, and Awareness Management Plan

The Employment, Training, and Awareness Management Plan will be required both during the implementation phase and operations. For both phases, the following will be incorporated, as appropriate:

- During the new employee orientation process, all workers will receive health and safety training on standard work processes and other health and safety requirements applicable to their work activities;
- All workers at work fronts will receive weekly safety orientations that last at least 15 minutes. If significant accidents occur or other health and safety issues arise, these orientations may be supplemented;
- The training status for all workers will be recorded;
- Health and safety training will be detailed in the Integrated Health and Safety Plan (IHSP) that will specify the contents, target groups, frequency and forms of evaluation of each type of training to be applied. It will include at least the following modules:
 - o Induction health and safety training;
 - o Community relations training;
 - o First aid;
 - o Venomous animals;
 - o Use of PPE; and
 - o Safe Work Procedures.

7.2.7 Water Management Plan

The Water Management Plan will address water conservation, protection of water resources, responsibly using surface water and groundwater for farming and farming activities plantation and mill purposes, and practicing rainfall harvesting, where these are appropriate. The important aspects of this plan will be:

- Training of all workers to ensure that they understand the significance of protecting all water sources;
- Implementation of measures contained in the Erosion and Sedimentation Management Plan to control sedimentation of surface water resources and minimize the loss of nutrients and therefore the need for chemical fertilizers;
- Implementation of the measures contained in the Chemical Management Plan to ensure that all chemicals used on the site are used properly and in the minimum necessary quantities to control adverse impacts to surface and groundwater;
- Implementation of the measures contained in the Waste Management Plan to ensure that all wastes generated on the site are properly stored and disposed to control adverse impacts to surface and groundwater by liquid effluents or by leachate from solid wastes;
- Monitoring significant effluent streams on a periodic basis to ensure that they meet applicable discharge requirements;
- Developing and implementing a site-specific water quality monitoring plan for both surface

- water and groundwater to ensure that management measures are achieving the desired results;
- Monitoring water quantity downstream of nurseries to ensure that withdrawals for nursery watering needs do not significantly affect downstream aquatic environment or human users; and
 - Development of parameters for the installation of water wells to ensure that the wells meet all the applicable national standards and that they do not have significant adverse impacts on other groundwater users.

7.2.8 Chemical Management Plan

The Chemical Management Plan will provide details for the acquisition, storage, application, use, and disposal of all pesticides, herbicides, fertilizers, and other chemicals used in the nurseries, plantations, mills and other project infrastructure.

Improper usage and application of fertilizers can pollute the soil and the waterways in the area. The effect of fertilizer runoff is known as eutrophication or increased growth of vegetation that can affect aquatic life.

This program will use chemical, cultural, biological, and physical practices to control the infestations. High levels of other chemicals (e.g. pesticides, insecticides, and fungicides) in the waterways can affect the aquatic life and even the supply of freshwater for human use.

This Chemical Management Plan will be developed to ensure that chemical use is minimized, and when chemicals are used, that they are used safely and responsibly. For pest control, the Ebonyi State SAPZ will utilize a specially created Integrated Pest Management Program. Decisions on schedule, application process and quantities of chemicals applied, if they are necessary, will be based on detailed analysis of soil characteristics, existing and likely pests, bio-control options, and safe and available chemical control options. It will include requirements for farmer training and safe application practices for farmer/workers, the environment, and surrounding communities. The use of agrochemicals is resource extensive. Thus, the application of fertilizer should be based strictly on the analysis requirements. The use of organic fertilizer will minimize the impacts of the chemicals in the soil and the waterways. Fuel dispensers must be used by well-trained personnel to prevent accidental spillage.

Chemical usage for weed control will be minimized using the following types of practices for immature plantings:

- rice circles should be kept weed-free through manual weeding;
- hormonal herbicides (e.g. 2,4-D amine and triclopyr) will be avoided;
- excessive spray drift and scorching on lower fronds will be avoided through careful control of areas that are sprayed;
- spraying will be limited to the minimum amount required to treat specifically identified weed problems.

The Chemical Management Plan will include the following important aspects:

- agrochemicals should be properly stored and handled to avoid spills;
- Farmers/workers will be informed of the dangers of agrochemicals and trained on the proper methods to handle, use, and dispose of the chemicals and their used containers incorporating all appropriate elements of the IFC guide for —Pesticide Handling and Application;
- the application of pesticides and fertilizers will be in strict accordance with the manufacturers' instructions and generally established safety procedures;
- every chemical product will have its own Material Safety Data Sheet (MSDS);
- Ebonyi State SAPZ will not make use of Persistent Organic Pollutants (POP) banned under the Stockholm Convention, which came into force on the 17th of May 2004 and which Nigeria adhered with.

This International Convention banned:

- o Aldrin;
- o Chlordane;

- o Dieldrin;
- o Dioxin (PCDDs);
- o DDT;
- o Endrin;
- o Furans;
- o Heptachlor;
- o Hexachlorobenzene;
- o Mirex;
- o Polychlorinated biphenyls; and,
- o Toxaphen.
- The Ebonyi State SAPZ will implement a proper Monitoring and Surveillance System (MSS) for pests. The MSS will provide information on pests presence and activity to determine the right time to control a particular pest. This systematic pest control strategy will result in an effective control with minimal chemical usage and minimal damage to other living organisms and the environment.

7.2.9 Air Quality Management Plan

The Air Quality Management Plan will include the following important aspects:

- noise levels in mills and other Project areas shall meet Nigerian requirements;
- all boilers used in the Project will be of modern construction to minimize emissions of NOx and other pollutants;
- all project vehicles used for transportation will be properly maintained and fitted with standard pollution control equipment to minimize emissions;
 - o The Ebonyi State SAPZ will study the potential for capturing methane generated from rice production and use that methane for energy production at its mills to decrease emissions to the atmosphere;
 - o The Ebonyi State SAPZ will avoid the use of ozone depleting substances for uses such as coolants or cleaning operations.

7.2.10 Vegetation Clearing and Biomass Management Plan

The Vegetation Clearing and Biomass Management Plan will ensure that all vegetation clearing and biomass management for all aspects of the Ebonyi State SAPZ activities will be conducted in accordance with detailed procedures that will meet the requirements of Nigeria as well as best practices outlined by Roundtable Sustainable Agriculture (RSA).

Site clearing for farm access road development, nursery establishment, where applicable plantation development, mill development, and infrastructure development can damage the habitats of terrestrial flora and fauna species. If clearing is not done properly, it could result in the removal of ecologically important habitats and species. The conversion of forests, even secondary, to rice plantations can reduce the biodiversity, with species reductions occurring for insects, birds, reptiles, and soil microorganisms. The Ebonyi State SAPZ, abiding by environmental sustainability, will not develop High Conservative Value Forest areas.

This plan will include procedures for the following:

- delineating areas to be cleared;
- delineating areas to be protected;
- specifying methods for clearing in various types of areas or terrain, including methods to allow fauna to relocate out of the area to be cleared;
- specifying methods for best utilization of merchantable timber;
- specifying procedures for ensuring that non-timber forest products are reasonably utilized by local villagers before or immediately after areas are cleared; and
- specifying procedures for utilizing and/or disposing of the biomass generated by the clearing activities

This plan will be used in conjunction with the Employment, Training, and Awareness Management

Plan and the Erosion and Sedimentation Management Plan to ensure that workers/farmers, the environment, and surrounding communities are protected.

7.2.11 Emergency Response and Incident Management Plan

The Emergency Response and Incident Management Plan will include procedures for addressing all reasonably foreseeable and possible emergencies such as:

- fires;
- floods;
- spills or releases of hazardous chemicals or wastes to the ground or water;
- medical emergencies; and,
- other weather-related emergencies

The Emergency Response and Incident Management Plan will define the methods of intervention and required resources to be implemented by the Ebonyi State SAPZ in the event of an accident to protect staff and property and to prevent harmful effects on the local population and the environment. As part of the plan, the Ebonyi State SAPZ will facilitate the alert of rescue services and inform competent relevant authorities. Spills are the release of substances (solids or liquids) in a magnitude that could cause substantial negative effects to the system receiving it. The system in question could be, for example, soil, river, lake, sea or the atmosphere. The spill response aspects of the plan will be outlined for all employees and relevant employees will be trained in specific spill response procedures for the substances for which they are responsible.

The impacts of spills can have very adverse effects on the environment and humans. Spills can occur during many of the typical operations such as refuelling of equipment, painting, changing oil during transfer of the liquids or solid from container to another, rinsing drums containing liquid or solid that is harmful; they may also occur as a result of a burst hose or pipe, the malfunctioning of an overflow valve of a tank or road accident of a fuel tanker. The Emergency Response and Incident Management Plan will include the following features to address spills or releases of hazardous materials:

- identify the personnel responsible in the event of a spill as well as a hierarchy for notifications both within the Commercial Agriculture as well as Government and emergency response personnel;
- provide the structure for a spill response organization;
- characterize the different types of materials and potential quantities of spills that could occur as a result of the Ebonyi State SAPZ intervention;
- outline spill response procedures as well as equipment, protective equipment, supplies, and materials to support the response;
- provide specific training guidelines and procedures for personnel to ensure a safe and effective response to potential spill events; and
- provide training guidelines for recovery and disposal of all materials contaminated in the event of a spill.

The Emergency Response and Incident Management Plan will also define the procedures, training, supplies, and materials for designated personnel to respond to fires, medical emergencies, and other significant emergencies or incidents during both construction and operations of various Ebonyi State SAPZ intervention activities.

7.3.10 Cultural Heritage Management Plan

The Cultural Heritage Management Plan will ensure that known cultural sites are identified and adequately protected, and that a procedure is in place for identifying any unknown or unmarked sites that may be encountered during development (Chance Find Procedure). In order to mitigate impacts to known sites, the Ebonyi State SAPZ will demarcate, along with each affected village and community, the cultural and sacred sites used by that village and community for traditional practices, so that those sites can be excluded from any vegetation clearing or other construction activities.

During the course of construction, if any artifact or human remains are discovered, work in the

immediate vicinity shall be halted immediately and the Ebonyi State SAPZ will implement a Chance Find Procedure that will include the following:

- Ebonyi State SAPZ' HSE coordinator shall take reasonable precautions to prevent any person from removing or damaging any such item;
- all work will be moved at least 30 m away from the artifact, or outside the boundaries of the site containing the artefact;
- the local village Chiefs and Government Officials will be notified of the 'find' to determine whether it is significant from a cultural perspective;
- if the artefact appears to be pre-historic, the national museum will be notified; and, appropriate actions will be taken after consultations with the relevant authorities.

7.2.12 Traffic and Vehicle Management Plan

The Traffic and Vehicle Management Plan will include the following provisions:

- The Ebonyi State SAPZ will place speed limits and appropriate road signage along all Project roads;
- The Ebonyi State SAPZ will enforce speed limits for safety, air quality, and noise purposes both on the Project site and its immediate environment;
- all Ebonyi State SAPZ drivers would be trained by a road safety specialist; and
- all vehicles should be properly maintained and undergo periodic safety inspections.

7.2.13 Social Investment Plan

The Social Investment Plan outlines the types of measures that the Ebonyi State SAPZ will consider as it develops the project intervention to assist the communities in and around the project area to benefit from the presence of the project. As a basis, the Ebonyi State SAPZ will sign a Memorandums of Understanding (MOU) with villages and community to ensure that there is no loss of village farms or plantations (e.g. coffee, oil palm, cocoa, kolanut, and banana) and will provide for farmland for future generations to avoid impacts related to food insecurity. The Ebonyi State SAPZ will demarcate such farmland for each village and community in coordination with a team to be composed of the villagers, the Ebonyi State SAPZ personal, Subdivision Farm Council, and the Regional Delegation under the appropriate Ministry.

Some of the programmes being considered by the Ebonyi State SAPZ as part of its Social Investment Plan include:

- assisting in the creation of ranches or farms to provide workers/farmers and villagers with meat (e.g. cows, goats, sheep, poultry) at affordable price and to decrease the hunting pressure on wild animals;
- using a portion of the agric-waste (e.g. rice husk) as fuel for cooking, domestic and industrial source of energy where applicable (e.g. compacting into briquettes) to decrease the need for fuel wood from the forests;
- providing technical assistance to out-growers as well as a market for agricultural products grown on village farms and plantations;
- improving the provision of health care services to both its workers, farmers and the broader community in the Project area;
- improving the provision of potable water to both its workers/farmers and the broader community in the Project area;
- improving the provision of educational services to both its workers/farmers and the broader community in the Project area;
- providing access to electricity to project affected communities at low cost;
- providing scholarships for deserving local students; and
- providing priority for employment to local residents where applicable.

7.2.14 Health, Safety, and Security Management Plan

The Health, Safety, and Security Management Plan for the Project will comply with all Lagos State requirements as well as international best practices. It will address measures for hygiene, health,

and safety at the work place and include an ongoing training program for all employee's project beneficiaries. The Ebonyi State SAPZ will provide the necessary safety equipment for its employees. The plan will address issues such as:

- the proper provision and use of personnel protective equipment (PPE) such as safety boots, respirators, eye protection, hearing protection, gloves, and hardhats;
- analysis of risks associated with job activities in order to develop standard requirements for PPE on a job-specific and station-specific basis;
- provision of training on the proper use of PPE and penalties for the improper use of PPE;
- training on the proper and safe use of all equipment in workshops, garages, the plantation, nurseries, and mills;
- physical barriers so that unauthorized personnel are not admitted to areas where dangerous equipment is in use;
- training related to job-specific risks and activities, including:
 - o electrical installations (e.g. electric shock on direct contact with conductors and indirect contact with masses powered up, burns, fire and explosion);
 - o mechanical equipment (e.g. tool blasting or matter risk, crushing of fingers, wounds, equipment shock);
 - o lifting devices (e.g. crushing risk, injury caused by appurtenances, falling, collision);
 - o machinery and vehicles (e.g. risk of accident on contact with other materials, collision with or knocking down of persons, obstacle shock, fall by the operator, collision with a vehicle or machine);
 - o hand tools, electric or other welding equipment (e.g. risk of injury, electrocution, poisoning, dazzle);
 - o workshops and garages (e.g. risk of mechanical injury, shock and collision with machines);
 - o sterilizers and boilers (e.g. risk of burns due to heat and steam from furnace, explosion risk); and
 - o power plant, processing lines and workshops (e.g. noise-related risks, electrocution risk) provision of properly trained and equipped first aid personnel including a well-stocked pharmacy, a treatment room with beds, and an ambulance for any worksite injuries

7.2.15 Community Health & Safety Plan

The purpose of the Community Health and Safety Plan is to address the potential impacts of the project on the human population living in and around the farm settlement. These mitigation measures include:

- construction activities can draw significant numbers of single men and others attracted by the opportunity to provide goods and services to construction workers and project beneficiaries with disposable income. Some of these activities such as alcohol, drugs, and sex trade can lead to increased crime and diseases, including HIV/AIDS, thus the Ebonyi State SAPZ will encourage contractors to recruit most of their construction workers from the immediate area especially for infrastructure development, thereby minimizing the number of single men migrating for work;
- The Ebonyi State SAPZ will also ensure that it and its contractors provide adequate training and enforcement codes of conduct to minimize worker participation in risky activities such as sex trade, drugs, and alcohol;
- The Ebonyi State SAPZ will conduct sensitization of local communities regarding the potential impacts from construction workers and inform those communities about the terms and conditions of Ebonyi State SAPZ's worker Code of Conduct;
- The Ebonyi State SAPZ will conduct community training and awareness programs to ensure that the local population understands the risks of participating in risky economic activities for short-term economic gain; and
- The Ebonyi State SAPZ will work closely with the health districts of the Ministry of Health

in the State and promote sensitization campaigns to help the local population avoid risky activities; and Ebonyi State SAPZ will work closely with the health districts to monitor the incidence of diseases and other health measures that has indicated a need for further intervention to protect community health and safety.

7.2.16 Stakeholders Engagement Plan

The Ebonyi State SAPZ has been implementing its Stakeholders Engagement Plan since the inception of the project invention. It includes the following major considerations:

- identification of project stakeholders;
- summary of past consultation efforts;
- stakeholder's engagement and implementation of some of the SAPZ components especially youth and women empowerment;
- stakeholder engagement during various studies including the GRM, ESIA etc;
- stakeholder engagement during operations;
- resources for stakeholder engagement; and
- monitoring and reporting on stakeholder engagement

In coordination with its Stakeholders Engagement Plan, the Ebonyi State SAPZ will developed and is implementing a Grievance Procedure that include the following components:

- anyone may contact the Project, in person, by email, or by telephone to submit a grievance;
- contacts about grievances may be by the affected person or through an agreed local liaison committee;
- all complaints will be documented by the Ebonyi State SAPZ and tracked to resolution, and information on the status will be available to the person making the complaint;
- The Ebonyi State SAPZ will investigate the complaint, using technical assistance if necessary;
- determine the response including, if applicable, proposed actions;
- The Ebonyi State SAPZ will inform the person making the complaint, either verbally or in writing, of Ebonyi State SAPZ's response and proposed actions (if any);
- the grievance mechanism will inform complainants of their options if the complaint cannot be resolved;
- The Ebonyi State SAPZ will strive to investigate and resolve complaints promptly;
- there will be no cost to the person presenting the complaint;
- all complaints will be treated with appropriate confidentiality;
- complaints will be investigated and resolved without retribution to the complainant or other persons; and
- project personnel, especially those who have contacts with the public, will be briefed/trained about the grievance procedure, including who to contact within the Ebonyi State SAPZ or the Government of Lagos about a complaint.

7.2.17 Resettlement Action Plan

The Project will not require any involuntary resettlement therefore there is no need for a Resettlement Action Plan framework. Any resettlement activity will be on a voluntary basis, however, if the Project and local villagers do agree to a mutually agreeable resettlement program, the Ebonyi State SAPZ will ensure that any such program is consistent with the principles and guidelines of the Nigerian Law.

7.3 Institutional Arrangements, Responsibilities and Accountabilities

The roles and responsibilities of the executor of the programme and adequate institutional arrangements are vital to the efficient execution of the environmental and social safeguard measures outlined in this ESMMP. Thus, details of the institutional arrangements and the roles and responsibilities of the diverse institutions in the implementation of the ESMMP are discussed and summarised in Table 7.1.

Table 7.1: Roles and Responsibility of Institutions in the implementation and monitoring of the ESMMP

S/N	Category	Roles & Responsibilities
1	Federal Ministry of Environment	<ul style="list-style-type: none"> Lead role - provision of advice on screening, scoping, review of draft ESMP report (in liaison with the Ebonyi State Ministry of Environment), receiving comments from stakeholders, public hearing of the project proposals and social liability investigations, monitoring and evaluation process and criteria.
2	Ebonyi State Ministry of Environment	<ul style="list-style-type: none"> Environmental monitoring and compliance overseer at the State level; Site assessment and monitoring of ESMP implementation. Monitors ESMMP implementation particularly waste management and pollution control aspects
4	Federal Ministry of Agriculture and Food Security	<ul style="list-style-type: none"> Provision of overall leadership and direction to other MDAs by engaging all the critical stakeholders to support, cooperate with and participate in established policy direction for the SAPZ.
5	Ebonyi State Ministry of Agriculture and Natural Resources	<ul style="list-style-type: none"> Provision of all necessary information and support
6	Safeguard Unit	<p>Environmental Safeguards:</p> <ul style="list-style-type: none"> Collate environmental baseline data on relevant environmental characteristics of the selected project sites. Analyse potential community/individual sub-projects and their environmental impacts. Ensure that project activities are implemented in accordance with best practices and guidelines set out in the ESMMP. Identify and liaise with all stakeholders involved in environment related issues in the project; and be responsible for the overall monitoring of mitigation measures and the impacts of the project during implementation. <p>Social Safeguards:</p> <ul style="list-style-type: none"> Develop, coordinate and ensures the implementation of the social aspects of the ESMMP. Identify and liaise with all stakeholders involved in social related issues in the project. Conduct impact evaluation and beneficiary's assessment; and Establish partnerships & liaise with organizations, CBOs and CSOs.
7	Other State MDAs	<ul style="list-style-type: none"> Ensure monitoring of mitigation measures and the impacts of the project during implementation as it relates to gender and health issues respectively. Establish partnerships & liaise with organizations relevant NGOs as well as CBOs and CSOs.

8	E&S Consultant	<ul style="list-style-type: none"> • Development of ESMP • Training of relevant AAU Staff, regulators, MDAs and contractor on ESMP implementation and monitoring. • Implementation of ESMP
9	Contractors	<ul style="list-style-type: none"> • Compliance with BOQ specification in procurement of material and construction; • Implement ESMP during project implementation; • Ensure all contractors and workers sign the Code of Conduct (CoC) and are routinely trained on the contents of the CoC; • Prepare C-ESMP for approval of FMEnv; • Implement C-ESMP during project implementation; • Ensure that all construction personnel and subcontractors are trained on the content of the C-ESMP and are made aware of the required measures for environmental and social compliance and performance; • Prepare OHS manual and abide by labour laws as set out in the agreement; • Provide adequate basic amenities and PPEs to workers and ensure that the PPEs are worn by workers during works; • Prepare and maintain records and all required reporting data as stipulated by the ESMP, for submission to the Supervising Consultant.
10	LGAs	<ul style="list-style-type: none"> • Provision of oversight function across project within its jurisdiction for ESMP compliance; • Monitoring of activities related to public health, sanitation, waste management amongst others.
11	Host Communities	<ul style="list-style-type: none"> • Promote environmental awareness; • Review environmental and social performance report made available by project developer; • Provide comments, advice and/or complaints on issues of nonconformity; • Attend public meetings organized by the project developer to disseminate information and receive feedback.
12	NGOs/CSOs	<ul style="list-style-type: none"> • Assisting in their respective ways to ensure effective response actions, conducting scientific research alongside government groups to evolve and devise sustainable environmental strategies and techniques.
13	AfDB	<ul style="list-style-type: none"> • Provision of support to the Ministry of Environment in the area of safeguards due diligence. • Recommend additional measures for strengthening management framework and implementation performance; • Implementation support missions and ensuring that the SAPZ and its subprojects comply with the E & S conditions of the loan agreement with the AfDB
14	General Public	<ul style="list-style-type: none"> • Identify issues that could derail the project and support project impacts and mitigation measures.

7.4 Grievance Redress Mechanism

The existing grievance redress mechanism in the project environment which empowers the Community Head and leadership to arbitrate over grievances will be enhanced using the AfDB approach. The AfDB's approach to resolving grievances on project interventions is described below:

7.4.1 AfDB Grievance Redress Mechanism Approach

The AfDB defines project GRM as a systematic process for receiving, evaluating and facilitating resolution of affected people's project-related concerns, complaints and grievances about the borrower's/client's social and environmental performance on a project. AfDB requires its clients to be aware of and respond to stakeholders' concerns that are related to the project in a timely manner. For this purpose, the programme will establish an effective grievance redress mechanism, process, or procedure to receive and facilitate resolution of stakeholders' concerns and grievances, in particular, about the client's E&S performance. In OS 1, the Bank requires the borrower/client to establish a "credible, independent and empowered local grievance and redress mechanism to receive, facilitate and follow up on the resolution of the affected people's grievances and concerns regarding the E&S performance of the project. The local grievance redress mechanism needs to be sufficiently independent, empowered and accessible to the stakeholders at all times during project cycle and all responses to grievances shall be recorded and included in project supervision formats and reports." Some Bank's intervention may inevitably have the potential to impact the local population's well-being. The aim of a project GRM is, therefore, to enable people fearing or suffering adverse impacts to be able to be heard and assisted. People potentially or actually affected by a Bank-funded project need a trusted way to voice and resolve project related concerns and the project needs an effective way to address affected people's concerns. The GRM provides a structured and managed way of allowing the concerns of affected people to be heard and addressed, including by the borrower's/client's project management staff and in certain circumstances, by Bank staff.

The main advantages of establishing and maintaining an appropriate GRM linked to the Bank-funded project are:

1. Helping maintain good development conditions in the field, conducive to harmonious, sustainable development;
2. Minimising the risk of violent or otherwise destructive behaviours, and the associated economic and social costs;
3. Helping to protect the most vulnerable local groups and individuals;
4. Alleviating the risk of dispute or conflict escalation, such as cases being brought to the Bank's Independent Review Mechanism.

The process by which the GRM is designed should be integrated into the overall approach to the project preparation as prescribed in the Bank's ISS. The Bank ISS through its (IESIA) Guidelines Notes provides guidance on development and Implementation of GRM. It should also be included in the concrete actions required in the ESMP for Category 1 projects and, on a case-by-case basis, for Category 2 projects that exhibit specific potential social tensions, in particular risks of mismanagement of

compensation/resettlement schemes or the presence of particularly vulnerable groups in the project's area of influence.

7.4.2 GRM at project level

The GRM in the Programme will be established under the guidance provided in the Bank's ISS through its IESIA Guidelines Notes. The first step is to determine the primary goal of the GRM which would generally be aimed to resolve specific grievances in a manner that meets both project management and community needs, but with important local variations. The scope of the grievances that may legitimately be brought forward by the communities and/or individuals affected shall be defined in advance. That scope will generally cover most, if not all, of the issues raised in a typical E&S Assessment: natural resources, pollution, cultural property, land acquisition, the income of resettled/displaced populations, the welfare of vulnerable groups, etc.

The second step is to design the GRM by:

1. Preparing a preliminary design;
2. Selecting ways and means to receive, register, assess and respond to grievances;
3. Select grievance resolution approaches;
4. Design a means to track and monitor grievances;
5. Develop the grievance redress mechanism infrastructure;
6. Review and refine the design.

At the project level, the design of GRM may be done with the assistance of the specialized Independent Consulting Team as part of the ESMP implementation. The GRM shall be designed based on the following principles:

1. Involvement of individuals of mixed levels and functions from the entity (e.g., operations, environmental affairs, community relations, legal affairs, contractors). Staffing the design team from just one function such as community relations or human resources is unwise;
2. The inclusion of a balanced group of representatives from the community, representing the range of constituencies and demographics that will be using the grievance redress mechanism, while keeping the team small enough to be responsive;
3. GRM relying upon clear terms of reference and a work plan that outlines team goals, roles, and responsibilities, level of decision-making authority, reporting lines, tasks, time frame, and products;
4. Making use of multiple channels (e.g., face to face, phone conversation, mail, text or e-mail, message on a dedicated website), sensitive to cultural customs and traditional methods that may influence or impede the expression of grievances;
5. The existence of a central point of contact that will receive complaints and log them into a central register;
6. Existence and operation of designated complaint resolution staff;

7. Processes for acknowledging the receipt of a grievance and informing the complainant about the time frame in which a response can be expected.

7.4.3 Appointing members of Grievance Redress Committees (GRC)

The Programme will involve the formulation of a Grievance Redress Committee (GRC) at the project level, i.e., GRM staff for handling grievances. Generally, all project staff, the management staff of agencies involved in the project, and government administrators will take on grievance handling as a responsibility. The GRC members shall be qualified, experienced, and competent personnel who can win respect and confidence of the affected communities. It is also important to maintain a gender balance in constituting the GRC members. The criteria for selecting members of the GRCs shall include the following:

1. Knowledge of the project, its objectives, and outcomes;
2. Technical knowledge and expertise to understand project design and requirements;
3. Understanding of the social, economic, and cultural environments and the dynamics of the communities;
4. Capacity to absorb the issues dealt with and to contribute actively to decision-making processes;
5. Social recognition and standing; and
6. equitable representation of males and females.

Specifically, for the SAPZ implementation, the GRC at the project level shall constitute among other members:

- i. Director, Agric Department (Ebonyi State Ministry of Agric & Nat Res.);
- ii. Representatives from the 8 LGA (1 each);
- iii. Village Heads;
- iv. A Representative of Farmers Group;
- v. A Representative of Community Women;
- vi. Youth Leader;
- vii. a member from a recognized Non-Government Organization;
- viii. SAPZ Liaison Officer from Ebonyi State Ministry of Agric & Nat Res. (Secretary).

The GRC shall have the right to request the project technical staff and officers from relevant State or non-State institutions to attend the meetings and provide information. A complainant has the right to appear in person, to be accompanied by a community member, and/or to request to be represented by a community elder. GRCs shall be established at the project level to assure accessibility to Project Affected Persons.

7.4.4 Procedures, complaints channels and time frame for GRM

As there is no ideal model or one-size-fits-all approach to grievance resolution, the best solutions to conflicts are generally achieved through localized mechanisms that take into consideration the specific issues, cultural context, local customs, and project conditions and scale. The process by which a complaint will be accepted or rejected needs be carefully

designed to maximize interactivity and cultural sensitivity. The acceptance/rejection of a complaint will go through a discussion stage where the plaintiff and the GRM staff interact on the grounds and motives of the complaint, after which the plaintiff will clearly and transparently be told whether or not the complaint is eligible and will be processed. The acceptance/rejection of the complaint shall be based on objective criteria that are posted by the GRC, including a written copy displayed in the public access area of the GRM in an appropriate language.

The processing of the complaint, if accepted should go through various phases:

1. Filing of the complaint and labelling with an identification code communicated immediately to the plaintiff;
2. Assessment of the complaint (including severity of the risk/impact);
3. Formulation of the response;
4. Selection of the grievance resolution approach is a key. There are four general approaches to choose from:
 - i. The project's management proposes a solution;
 - ii. The community and the project's management decide together;
 - iii. The project's management and the community defer to a third party to decide;
 - iv. The project's management and the community utilize traditional or customary practices to reach a solution.

AfDB's ISS recommends the application of a "Decide together" approach that is usually the most accessible, natural and unthreatening ways for communities and a project's management to resolve differences. With the potential to resolve perhaps the majority of all grievances, "decide together" should be the centrepiece of any grievance mechanism's resolution options. In its simplest form, a grievance redress mechanism can be broken down into the following primary components:

1. Receive and register a complaint;
2. Screen and validate the complaint (based on the nature and type of a complaint);
3. Formulate a response;
4. Select a resolution approach, based on consultation with affected person/group;
5. Implement the approach;
6. Settle the issues;
7. Track and evaluate results;
8. Learn from the experience and communicate back to all parties involved.

The time for the Grievance Redress Committees to meet shall be agreed upon and documented, depending on the nature and severity of the complaint. A number of mechanisms will be available to aggrieved parties to seek redress. These shall include institutions specific (internal) to a project and set up from its inception or others that might have emerged over time in response to the needs identified while the project evolved. Other institutions which are already established within a country's judicial, administrative, and/or

political systems and those existing outside a project shall also be used. These may include: government bureaucracy; judicial institutions; and political institutions such as Local Government Authorities, etc. In addition, the Bank itself sometimes may provide a forum for grievance redress. GRMs shall include avenues for resolving conflicts between affected persons or other stakeholders and can provide information sought by the public on the project. The channels of presenting complaints could include the presentation of complaints via third parties (e.g., village elites/traditional leaders, community-based organizations, lawyers, non-government organizations [NGOs], etc.); face-to-face meetings; facsimile, telephone, and email communications; written complaints; etc.

The projects to be implemented under this intervention will have diverse E&S contexts. It is therefore expected that as part of the implementation of these projects, the projects shall develop GRM which will foster simpler means of addressing complaints. If the complainant is not satisfied, the complainants will have to appeal to the Ebonyi State SAPZ Project Implementation Unit.

7.4.5 The AfDB's Independent Review Mechanism (IRM)

The AfDB has also established its own accountability mechanism, the Independent Review Mechanism (IRM). The IRM seeks to assess whether a Bank approved project complies with the relevant AfDB's ISS. The IRM makes itself accessible to any group (a minimum of 2 persons living in the project's area of influence) actually or potentially negatively affected by a Bank-funded project. The IRM reports to the Bank's Board of Directors and is thus independent of Bank management.

The IRM was established by the Bank to achieve more transparency. It is also a costly mechanism to trigger. The establishment of local GRMs can help to alleviate the need for plaintiffs to resort to the IRM, while problem-solving can be more rapidly and cost-effectively done locally. The cultural context in which GRMs operate also helps to defuse complaints and to find appropriate and commensurate solutions

7.5 Training Programmes

Training is essential for ensuring that the ESMMP is implemented efficiently and effectively. It is therefore imperative that the Ebonyi Ministry of Environment, Ministry of Agriculture and Natural Resources and other institutions and persons that have roles to play in the implementation of the ESMMP are equipped with appropriate education, training or experience.

It was revealed that most institutions with roles in the ESMMP are not very conversant with AfDB ISS as well as with some components of the ESMMP implementation with regards to gender-based issues, labour influx, climate change and grievance redress mechanisms. Consequently, the training programme presented in Table 7.2 have been proposed to enhance the capacities of those that will be involved in ESMMP implementation.

Table 7.2: Institutional Capacity Strengthening Plan

Capacity Building Activity	Proposed Topics	Objectives	Target Audience	Duration	Cost (Naira)
Module 1: AfDB's ISS and Nigeria Extant Laws on Environmental Protection	<ul style="list-style-type: none"> • Introduction to E&S policies and laws in Nigeria • AfDB's ISS & OS • Operational Safeguards triggered by project activities. • The roles and responsibilities of regulators and the AfDB during project implementation 	To enhance awareness of AfDB's OS and applicable national regulatory requirements for project activities	<ul style="list-style-type: none"> • Ebonyi State Min of Agric and Natural Res • Ebonyi State Min of Env, • Ebonyi State Sanitation and Env Protection Agency, • Ebonyi State Min of Works, • Contractors, • FMEnv, • Representatives of the LGAs 	1-day	1,000,000
Module 2: Training on Environmental and Social Management Plan (ESMP) Implementation	<ul style="list-style-type: none"> • Overview of ESMMP • Potential Impacts of Project • Pollution & Control Measures • Environmental Management • Labour influx, GBV, Code of Conduct, vulnerable people inclusion • Environmental Performance Monitoring • Environmental Reporting 	To enhance competence in environmental sustainability and regulatory practice	<ul style="list-style-type: none"> • Ebonyi State Min of Agric and Natural Res, • Ebonyi State Min of Env, • Ebonyi State Sanitation and Env Protection Agency, • Ebonyi State Min of Works, • Contractors, • FMEnv, • Representatives of the LGAs 	1-day	
Module 3: Climate Smart Agriculture	<ul style="list-style-type: none"> • Introduction to climate change • Climate-smart strategies for crop production • Climate-smart livestock production systems • Creation of an enabling environment for climate-smart crop and livestock production 	To mainstream climate change adaptation strategies to enhance project sustainability.	Ebonyi State Min of Agric and Natural Res, Ebonyi State Min of Env, Ebonyi State Sanitation and Env Protection Agency, Ebonyi State Min of Works, Contractors, FMEnv, Representatives of the LGAs	1-day	1,000,000

Module 4: Agricultural Waste Management	Agricultural waste management Agricultural waste recycling strategies Composting Biogas Production Vermi composting	To develop & implement eco-friendly and modern methods of livestock waste recycling to prevent environmental degradation and enhance profitability	Ebonyi State Min of Agric and Natural Res, Ebonyi State Min of Env, Ebonyi State Sanitation and Env Protection Agency, Ebonyi State Min of Works, Contractors, FMEnv, Representatives of the LGAs	1-day	1,000,000
Module 5: Training on Construction HSE	Introduction to Construction HSE Overview of Health and Safety Hazards in Construction Incidents: Causation, Investigation & Reporting Excavation Safety First Aid, Defensive Driving etc. Project/Site Specific OHS Construction Site Inspection Personal Protective Equipment	To ensure completion of project with zero fatalities, zero Lost Time Injuries (LTI) or occupational illness by promoting safe & healthy working conditions for workers and monitoring officers	Ebonyi State Min of Agric and Natural Res, Ebonyi State Min of Env, Ebonyi State Sanitation and Env Protection Agency, Ebonyi State Min of Works, Representatives of the LGAs Contractors, FMEnv,	1-day	1,000,000
Total				5 days	5,000,000

7.6 MONITORING AND REPORTING

7.6.1 Monitoring Activities

The monitoring plan (Internal and External Monitoring) for the ESMP is presented in Table 7.3. Monitoring results shall be documented with preventive/corrective actions to be implemented.

Table 7.3: Internal and External Monitoring

Monitoring Action	Responsibility	When	Deliverables
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Internal Monitoring	Regular site visit to ensure that the mitigation measures and actions specified in the monitoring plan and as bound by the contract is satisfactorily implemented.	Environmental Safeguard Specialist from Ebonyi State Implementing Unit. National Safeguards Unit	During Preconstruction, Construction and Operation Phases	Monitoring Reports and documentation
	Site visit for monitoring and inspection to ensure contractor adhere strictly to the engineering designs and specifications for the project	Supervision Consultants	During Construction Phase	Observations and Monitoring Reports to be compiled and presented to the Ebonyi State Implementing Unit.
External Monitoring	Regular site visit to ensure project is implemented in an environmentally & socially sustainable manner using the monitoring indicators specified in the monitoring plan and other national and international environmental & social requirements	FMEnv, LGAs, Representatives of affected communities, and other relevant MDAs.	During Preconstruction, Construction and Operation Phases	Inspect monitoring reports from Safeguard units and provide feedback on observations. Enforce corrective actions where necessary.

7.6.2 Reporting Procedures

The Ebonyi State Implementing Unit shall implement a system of continuous reporting between all parties involved in the ESIA implementation to ensure receipt of timely feedback and to take rapid corrective actions if there are issues of non-conformance (Annex VIII).

7.7 Record Keeping and Control

The Contractor is under obligation to keep records providing evidence of ongoing mitigation activities. Such records may include site monitoring plan, HSE Policy, Site Specific HSE Plan, Waste Management Plan, Traffic Control Plan, Emergency response and preparedness procedures, site instructions, training records, complaints records, incident report, Inspection, maintenance and equipment calibration records. These documents should be made available to the Safeguard Unit upon request.

The Safeguard Unit is also required to keep records to provide evidence of monitoring activities and effectiveness of the monitoring plan. The Site Monitoring Plan identifies problems/corrective actions therefore monitoring reports are to be kept by the Safeguard Unit and made available to relevant regulators upon request. In addition, all significant communications with the FMEnv, *Nigerian* Society of Mining Engineers (NSME) and other relevant authorities should be documented and kept. These documents are required to track performance in order to achieve and demonstrate compliance with the monitoring plan and applicable regulatory requirements

7.8 Contractual Measures

Most of the mitigation measures are the obligations of the Contractor, particularly during the pre-construction and construction phases of the project. Consequently, the Contractor will have to prepare their proposals taking into account the measures in Table 7.4 as well as the detailed general environmental management conditions that will surface during civil works attached as Annex I.

Table 7.4: Contractual Measures

Action	Remarks
The measures as described in this ESIA shall be included in the tender documents with appropriate flexibility to adjust these measures to site circumstances, and that the potential contractor will have to prepare their proposals taking into account these measures.	The non-inclusion of these measures in the proposal will lead to a disqualification of the proponent; The contract with the successful bidder should contain these environmental and social management measures as firm conditions to be complied with.
Specifically, the measures should be translated into a suite of environmental specification that are written in the same language style and format as the rest of the contract document	This approach will ensure that the environmental and social controls integrate seamlessly into the tender document and are presented in a familiar form to the Contractor
Cost of mitigation measures be added to the cost of the contractual document	The contractor must take into account and put the cost for the environmental and social requirements specified in the ESIA.

7.9 ESIA Disclosures

After a review and clearance by the FMEnv/AfDB, the ESIA will be disclosed at the FMEnv, SME and the host LGA offices as well as at the AfDB website. The purpose of this disclosures will be to inform stakeholders about the programme activities, impacts, anticipated and proposed environmental management actions as well as to obtain the certificate of conformity from the Federal Ministry of Environment. Minimum disclosure requirements for disclosure is shown in the Table 7.5 below.

Table 7.5: Disclosure Procedure to comply with Nigerian regulations

Action	Remarks
Disclosure on 2 national newspapers	The project proponent will disclose the ESIA as required by the Nigeria EIA public notice and review procedures. This entails advert in 2 newspapers: one national and one local (State) newspaper
Disclosure at the Ebonyi Ministry of Environment	The project proponent will display the ESIA as required by the Nigeria EIA public notice and review procedures
Disclosure at the Ebonyi Ministry of Agriculture and Natural Resources	The project proponent will display the ESIA as required by the Nigeria EIA public notice and review procedures
Disclosure at the respective LGA offices	The purpose will be to inform stakeholders about the project activities; environmental and social impacts anticipated and proposed environmental and social mitigation measures.

7.10 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 will be time-based for quality implementation and appropriate monitoring. Table 7.6 presents the schedule for the mitigation measures with respective time lapse.

Table 7.6: Tentative ESIA Implementation Schedule

S/N	Activity	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
1	Clearance and Formal Disclosure of ESIA	█	█	█									
2	Inclusion of Environmental & Social Requirements in Bid Docs	█	█	█									
3	Allocating Budget for ESIA	█	█	█									
4	Appointing Support Staff for ESIA	█	█	█									
5	Review & Approval of Contractor's ESIA, Waste & HSE Plan	█	█	█									
6	Finalization of Designs, studies and other preliminary	█	█	█									
7	Environmental and Social Training		█	█	█								
8	Mobilization to site		█	█	█								
9	Site Clearing and preparation		█	█	█								
10	Implementation of Mitigation			█	█	█	█	█	█	█	█	█	
11	Monitoring & Reporting on ESIA Implementation			█	█	█	█	█	█	█	█	█	█
12	Environmental and Social Auditing										█	█	█

7.11 ESIA Costing and Cost Analysis

The cost analysis illustrated here is structured to ensure that each of the identified mitigation measures is successfully and expertly implemented. It is designed exclusively identified for each of the activities and value chains in the Ebonyi SAPZ programme. Hence, it covers the productivity, Agro-Processing and Small infrastructure activities

mitigation measures. In addition, the cost analysis is designed to reflect a global spread across the Stated measures. Table 7.7 illustrates the synoptic details of the ESIA costing for the Ebonyi SAPZ programme.

Table 7.7: Cost Analysis of the Proposed Project ESIA Implementation

S/N	ESIA Activities (Monitoring)	Cost Estimate (₦)
1	Impact Mitigation Monitoring	13,308,375
	<i>Institutional Capacity Reinforcement Programme</i>	5,000,000
	Total for Mitigation Monitoring	18,308,375
	10% Contingency	1,830,837.5
	Grand Total	20,139,212.5

CHAPTER EIGHT

PUBLIC CONSULTATION

8.1 Stakeholders Consultations

Stakeholders' participation during planning, design and implementation is widely recognized as an integral part of environmental and social impact assessment for programmes. It is a two-way flow of information and dialogue between programme proponents and stakeholders, which is specifically aimed at developing ideas that can help shape programme design, resolve conflicts at an early stage, assist in implementing solutions and monitor ongoing activities. Stakeholders' consultation is, thus, a process and continues throughout programme implementation period to provide information to identified stakeholders.

8.1.1 *Objectives of Stakeholder Consultations*

The main objective of the consultations with stakeholders was to discuss the proposed programme environmental and social implications and to identify alternatives for consideration. Specifically, the consultations sought to achieve the following objectives:

- to provide information about the proposed programme;
- to provide opportunities for stakeholders to discuss their opinions and concerns;
- to effectively communicate key programme information such as construction timelines and work schedules to stakeholders, particularly programme affected communities and persons;
- to provide and discuss with stakeholders the alternatives considered to reduce anticipated impacts;
- to identify and verify significance of environmental, social and health impacts;
- to establish a mechanism for receiving and addressing grievances in a timely manner; and
- to inform the process of developing appropriate mitigation and management options.

8.1.2 *Stakeholders Consulted*

1. Project Proponent/Relevant MDAs;
2. Ebonyi State Ministry of Agriculture and Natural Resources;
3. Ebonyi State Ministry of Environment;
4. Ebonyi State Agriculture Development Project;
5. Ebonyi State Ministry of Works & Transport;
6. International Fund for Development;
7. Ebonyi Fertilizer Company

Potential Project Beneficiaries:

Primary

Nkaliki Hatchery
Ikwo rice mill

Iboko rice mill
Edda rice mill
Ishiagwu Ndiebor
Onuigboji-Ikwo
Amangwu
Ugwulanwu
Amata Ugwulangwu
Amika 135
Amaleze
Ezillo

Secondary

All communities across the 13 LGAs in the state

Tertiary

Ebonyi state and other southeast states

8.1.3.1 Outcome of Stakeholder Consultations

A summary of the outcome of the inception meeting with the Commissioner of Agriculture and Natural Resources and staff of other relevant ministries and parastatals is presented in Table 8.1. The minutes of the technical session with the stakeholders from the Ministry of Agriculture and Natural resources and other relevant ministries and parastatals is also summarized in Table 8.2. The minutes of the Focus Group Discussions held with the women folk across the State is, in addition, presented in Table 8.3. The list of stakeholders across the value chains consulted and their contributions/concerns is presented in Table 8.4. The key issues raised during the consultation and responses of the consultant are outlined in Table 8.5. Photos taken during and after consultations with the various stakeholders/institutions are outlined in Plate 8.1, while the attendance list can be found in annex V.

Table 8.1: Minutes of the meeting with the Commissioner and Permanent Secretary

Date	16/11/2023
Venue	Hon Commissioner of Agriculture and Natural Resources' office
In attendance	<p>Ebonyi State Commissioner of Agriculture and Natural Resources Heads of Department in Ministry of Agriculture and Natural resources Heads of Department in Ministry of Environment Heads of Department in Ministry of Work Project Coordinator, IFAD Director, Ebonyi Fertilizer Company Director, Ebonyi State ADP HRH Eze Emmanuel Nwojiji Ebonyi Farmers Consultancy team - Des Ariest Company Nigeria Limited</p>
Language of Communication	English
Time	11:25 – 12:18pm
Welcome and Introductory Speech	<p>The Ebonyi State Commissioner for Agriculture and Natural resources, Mrs. Princess Nkechinyere Iyioku Ezeani welcomed everyone present to the meeting.</p> <p>She mentioned that Ebonyi State Ministry of Agriculture and Natural Resources is embarking on a program called Special Agro-Processing Zone (SAPZ) program.</p> <p>She as well mentioned that the governor of Ebonyi State, His Excellency, Executive Governor of Ebonyi State, Buldr. Francis Ogbonna Nwifuru has been supportive since the inception of the program and that they are appreciative of all his supports.</p> <p>She mentioned that Des Ariest Nigeria Ltd. staff came for site visitation, interaction with the farmers and stakeholders and data collection from the different sites.</p> <p>She therefore pleaded that both the farmers and the stakeholders should give the team members maximum cooperation as they dispense their job so that Ebonyi State will qualify for the project.</p> <p>The commissioner appreciated His Excellency, Buldr. Francis Ogbonna Nwifuru again and stated that she is confident that their dreams concerning the SAPZ project will be actualized because God is always with them.</p> <p>She further mentioned that the commencement of the project will be from January or February 2024.</p> <p>She mentioned also that Ebonyi people are going to benefit a lot from the project as almost 95% of Ebonyians are farmers</p>

Opening Remarks	<p>The team leader, Des Ariest Ltd, Hon. Engr. Solomon Bulus (FNSE) thanked the Commissioner for Agriculture and Natural resources Ebonyi State, Mrs. Princess Nkechinyere Iyioku Ezeani for her wonderful welcome speech and warm reception.</p> <p>He added that SAPZ program is a special agro processing zone program which is funded by a multi-lateral organization.</p> <p>He added also that it is an empowerment program that it is meant for industrialization. He further said that phase 1 of the program is already in operation in Nigeria.</p> <p>He added that the team (Des Ariest Company Nigeria Ltd.) is here to carry out feasibility study and Environmental and Social Impact Assessment (ESIA) study to make sure that Ebonyi State qualifies for the second phase of the program.</p> <p>He therefore urged everyone to be on board so that Ebonyi State will not only sell rice to Nigerians but as well export rice to other countries thereby attracting foreign exchange. He stressed that it is the reason why everyone has to cooperate with the team so that the agenda of His Excellency, the Governor of Ebonyi State will be actualized.</p> <p>Hon. Engr. Solomon Bulus (FNSE) revealed that Mr. President is indeed committed to ensure that Nigerians benefit from the project. He said also that Ebonyi State stands out to partake in the project but the reason why Ebonyi did not take part in the first phase will be corrected this time as Des Ariest Company was invited to put things in the right shape and part.</p> <p>He said also that he knew Ebonyi state from childhood as one of the major rice producers in the country. He further mentioned that before Kebbi and Kano State started producing rice in large quantities that Ebonyi State has been producing rice. Therefore, if there is any place that needs motivation and support to queue in into the project, Ebonyi is first he stated.</p> <p>He stressed that the team will work with the people of Ebonyi State very closely and that they have already commenced work with the stakeholders to make sure that Ebonyi State qualifies for the project.</p> <p>He therefore calls for maximum cooperation from the people of Ebonyi State</p>
ESIA Consultant Team Lead's Statement	<p>The ESIA consultant (TL) explained in details the need for the ESIA.</p> <p>He noted that soil, water and air samples would be collected all around the farms to assess the current State of the environment.</p> <p>These, according to him, would also serve as the baseline data to assess the impact of the intervention project on the environment in the future.</p> <p>He also emphasized the need for public consultation which was designed to elicit from the farmers their perception of the proposed programme.</p> <p>He finally thanked the Commissioner and all present for their expected cooperation.</p>

<p>The Reactions of other MDAs</p>	<p>HRH Eze Emmanuel Nwojiji welcomed everyone present most especially the visitors and he further expressed his worries over what happened to so many projects that were introduced and welcomed in Ebonyi State but collapsed at just the preliminary stage. He said that he strongly believes that this very project will not collapse as the other ones did as he can read from the faces of team leader and his colleagues that they are willing to deliver. He also promised his maximum cooperation and that of his entire community.</p> <p>Team leader, Ebonyi Farmers welcomed the team. He also pledged their maximum cooperation and said that the project seems to be well calculated at this point in time because the farmers need to develop for tomorrow. He also said that it is well known that Ebonyi State's economic mainstay is farming just as the Hon. Commissioner pointed out. He as well appreciated the Hon. Commissioner for Agriculture and Natural Resources for her awesome support to farmers in the state since she assumed duty as the Commissioner for Agriculture and Natural Resources.</p> <p>State Project Coordinator IFAD welcomed the Des Ariest team and at the same time commended the Hon. Commissioner for Agriculture and Natural Resources and His Excellency, the Governor of Ebonyi State for the good work they are doing in agricultural sector in the state. He narrated what transpired during the first phase and even how people wondered that Ebonyi State could not qualify for the first phase of SAPZ project. Furthermore, he asserted that it is by the way that this very project (phase 2) came at the right time with the right people and he is assuring the team that he will join the Commissioner for Agriculture and Natural Resources and His Excellency in providing whatever that is required of Ebonyi State to make sure that the state qualifies for the second phase of the project. He further said that the project is a very big project of about five hundred million US Dollars jointly financed by World Bank and the International Fund for Agricultural Development and that they cannot afford to miss it this time. He therefore pledged his maximum cooperation with the team since IFAD is directly involved and he happens to be IFAD state coordinator.</p> <p>Director Ministry of Agriculture, Mr. Idam Moses pledged his unalloyed support and that of his colleagues to see that the state qualifies for the project.</p> <p>Delegate from Ministry of Environment, Mr. Omeh S. promised his unalloyed cooperation and that of his co-workers. He also mentioned that he is confident that the state will qualify this time as the team that came seems capable and professional.</p> <p>Director Ministry of Works, Engr. Eze Villard O. pledged his unalloyed support and that of his co-workers. He further stated that they are eager to provide assistance to the team when it comes to areas of good access road for execution of the project.</p> <p>Another representative from Agricultural Development Program (ADP) pledged their cooperation and support for the success of the project. He promised also that information needed from the unit will be provided.</p> <p>Representative from Ebonyi State Fertilizer Company promised maximum cooperation on behalf of the entire company. He assured that they are ready to partner with the team.</p>
<p>Closing Remarks</p>	<p>The Commissioner for Agriculture and Natural resources Ebonyi State appreciated everyone present and pleaded that she will be excused from technical session for her to attend to other official calls that required urgent attention. The inception meeting ended at 12:18 pm and thereafter, the technical session began.</p>

Table 8.2: Minutes of the technical session

Date	16/11/2023
Venue	Hon Commissioner of Agriculture and Natural Resources' office
In attendance	<p>Heads of Department in Ministry of Agriculture and Natural resources Heads of Department in Ministry of Environment Heads of Department in Ministry of Work Project Coordinator, IFAD Director, Ebonyi Fertilizer Company Director, Ebonyi State ADP HRH Eze Emmanuel Nwojiji Ebonyi Farmers Consultancy team - Des Ariest Company Nigeria Limited</p>
Language of Communication	English
Time	1:00 – 3:00 pm
Opening Remarks	<p>The President, ECOLOGISTICS opened the floor by reiterating the objectives of the session which are to identify and justify the priority value chains in the State identify and justify the potential sites</p>
ESIA Consultant Team Lead's Statement	<p>The team leader Des Ariest Ltd., Hon. Engr. Solomon Bulus (FNSE) welcome everyone present and stated that he is happy to have so many people around for the technical interaction as they will be helpful in providing some useful information that will make Ebonyi to qualify for the SAPZ project. He further said that in the course of the technical session that the major focus will comparative advantages Ebonyi state has with regards to Agriculture. He then invited Dr. Shakirudeen, to pilot the technical session and urged everyone to contribute positively bearing in mind that the motive for the meeting is to make sure that Ebonyi State qualifies for the SAPZ phase 2 project.</p>

Reactions and Opinions

The participants enunciated the Agricultural potentials of the State by highlighting the value chains and their comparative advantages. These, according to him, include:

Rice farming and processing:

Rice is cultivated in all 13 LGAs of the state. It can however be found in commercial quantities in

- **Ikwo L.G.A.**
- **Izzi L.G.A.**
- **Edda L.G.A. formerly known as Afikpo South L.G.A.**

The SPC IFAD Ebonyi State mentioned that because rice is produced in commercial quantities in the above mentioned locations, the government through IFAD intervention cited rice processing plants in those areas. He added that another reason behind citing processing plants in those areas was also because those areas are across the 3 senatorial zones in the state and such will improve efficiency in rice processing in the geographical locations.

Cassava cultivation and processing

Cassava is also well cultivated across the state. Three (3) LGAs where it is cultivated in commercial quantities include:

- **Ohaukwu L.G.A.**
- **Ishielu L.G.A.**
- **Ohaozara L.G.A.**

The above 3 L.G.A.s were picked across the 3 senatorial zones in the state. The stakeholders noted that unlike rice, cassava has not received major support in the area of processing from the government. They also added that Uburu and Ugwulangwu in Ohaozara L.G.A. both in the south senatorial zone produces cassava in commercial quantity. However, they stated that Ohaukwu L.G.A. has the largest market for cassava in the state where over 15 trucks of processed cassava (garri) are sold every four days. Hence, Mgbo in Ohaukwu L.G.A. was chosen as one of the locations where cassava processing plant can be located. The second location was in Umuhali in Ishielu L.G.A. while Ugwulangwu in Ohaozara L.G.A. was chosen as the third site.

Livestock farming and processing

The stakeholders made mention of need to revitalize the poultry farm (hatchery) at Nkaliki and development of Ezzamgbo veterinary farms. They further stated that an integrated farm (Cattle and piggery) at Ezzamgbo for processing and production of milk can be revitalized. SPC IFAD said also that the project was given approval by First Bank Nigeria Plc but the project could not continue that time due to the fact that the past government were almost rounding off and the people did not want to incur more debt for the incoming government.

Yam cultivation and processing

The stakeholders stated that Izzi is known for production of yam in Ebonyi State and on that note, Agbaja community in Izzi L.G.A. very close to Benue State was chosen for siting yam processing plant and road infrastructural development.

Potatoes cultivation and processing

The stakeholders present listed Ikwo L.G.A. (Nnoyo and Inyimagu) and Ishielu L.G.A. (Amazu and Nkalagu) as the highest L.G.A. in terms of potatoes production. However, Nnoyo is known to produce more potatoes than Inyimagu as they sell trucks of potatoes every market day (four days intervals). Thus, Amazu was noted to be producing more potatoes than Nkalagu community

	<p>Maize cultivation and processing The stakeholders present agreed that they cultivate maize but not in commercial scale.</p> <p>The priority of outlined value chain was supported by all present with reservation based on their sustainability. The major area of dissent as expressed are: The sustainability of the cultivation of plantain and banana as they are seriously affected by floods. The State is highly vulnerable to flood based on its geographical location. Experiences over the years have also indicated when these flood incidences occurred, They lead to massive destruction of plantain and banana farms. So, no massive investment in plantain and banana is encouraged in the State The sustainability of aquaculture value chain was also called into question as these are also highly affected by flooding which is ubiquitous to Ebonyi State. Harvesting can however be done prior the flood season to avert losses. There is also the need for capacity building in the management of aquaculture farms and the installation of flood early warning system. Rice cultivation is currently affected by flooding. The State has however devised the adaptation technique of early planting so as to harvest before the flood comes. The rice value chain will also benefit from the early warning. Poultry farming despite its potential is rarely done across the State. This is attributed to the access to chicks and feeds by the farmers. Cassava cultivation thrive despite the flood hazards as they are cultivated early and harvested before the floods. The participants at the technical session unanimously thus agreed that the following are the most suitable value chain the State has comparative advantage and should invest in: Rice cultivation and processing Cassava cultivation and processing Livestock farming and processing</p>
Consultant's response and suggestions	<p>The ESIA TL thanked the stakeholders present for their contributions with a word of hope that the consultancy team will do their best to ensure that the State participate in the programme He noted that all contributions will be documented and communicated to the SAPZ and necessary actions will be taken based on their contributions He also noted that public consultation will be a continuous step throughout the life cycle of the programme and they may still be invited for consultations in the future</p>
Closing Remarks	<p>The participants gave assurance of their cooperation and support to the programme. The meeting was brought to a close after the photographic session.</p>

Table 8.4: Stakeholders Consulted

Stakeholder/Institution/Location	Contact Person	Role	Contact No	Date	Concerns raised/information received
Project Implementers					
Ebonyi State Ministry of Agriculture and Natural Resources	Mr. Moses	Director	08068683896	Ongoing	

Ebonyi State Ministry of Environment	Mr. Omeh Simon	Director	08035763998	Ongoing	<ul style="list-style-type: none"> • Provided relevant information and documents on programme; • Provided contact information, facilitated technical session. • Facilitated stakeholder consultations and field investigations.
Ebonyi State Ministry of Works & Transport	Eng Eze Villard	Director	08037025071	Ongoing	
Ebonyi State Agriculture Development Project	Mr Gabriel Oyibe	PM	08035734227	Ongoing	
Ebonyi state Agric Services	Mr. Chukwuka Ede	HOD	08037591058	Ongoing	
Ebonyi State Fertilizer company	Mr Ikechukwu	Desk officer	07038892727	Ongoing	
International Fund for Development (IFAD) VCDP	Mr. Sunday Ituma	State Project Coordinator	08037792295	Ongoing	

Key Issues from Consultation

The key issues raised during the stakeholder consultation and the responses on how the issue will be addressed are presented in Table 8.5.

Table 8.5: Key Issues from the Consultation

Value Chains	Key Issues/Concerns	Response
Livestock	Hope the proposed programme will be consistent, continuous and won't be lopsided	The proposed programme won't be lopsided and will go round all farmers that register to participate
	How does the programme intend to help solve the consistent problem of egg glut	The programme is looking into the issues linking farmers with off takers. The process of converting raw egg into egg powder is also ongoing.
	With the potential increase in productivity how does the programme intend to control the price of Livestock products?	With the introduction of off takers, price will be stabilised
	With the coming of more birds, there will be more droppings worsening the current waste-disposal problem bedeviling Livestock farmers. How will the programme assist with the management of Livestock waste?	The programme is currently working on the process of evacuating and converting Livestock waste across the State. The options considered include; conversion to biogas; conversion to pellets and use as organic manure.
	Can the programme assist with bio-security on major farms?	This will be looked into
Rice	When is the exact date of programme implementation?	The implementation schedule for the programme will be communicated to the stakeholders including the programme community in due course
	Will off-takers be provided by the programme?	The programme will provide off takers
	How does the programme intend to assist with pest control especially birds which destroys their crops?	This will be looked into
	Will they be provided with better varieties of rice seedling in addition to the short and medium types that is being cultivated now?	The programme will provide high quality rice seedlings to improve the productivity of the farmers
	Will the programme support dry season farming?	The farmers will be supported to cultivate rice all year round
	How does the programme intend to assist with the control and management of waste?	The programme is currently looking how best to covert waste to wealth such as feed for ruminants, Livestock or fish
Cassava	What is the nature of the proposed programme?	The nature of programme for different farmers will be based on needs-assessment. The specific programme for the different farmers is therefore still being finalised

	When is the exact date of programme implementation?	The implementation schedule for the programme will be communicated to stakeholders' including the programme community in due course
	Does the programme entail counterpart funding?	The proposed programme entails counterpart funding from the State Government
	Will they be provided with high quality juveniles	The programme will definitely provide high quality seedlings to improve productivity of the farmers
	With the potential increase in productivity how do they prevent glut in the market?	The programme intends to link the farmers to off takers. It is also looking into encouraging processing and value addition



Consultation with the Commissioner of Agriculture and Natural Resources



Technical Session held with members of the Ministry of Environment, Ministry of Agric and Nat Res and ADP officials



Consultation with the members of Nkaliki Hatchery



Consultation with the members of Rice Farm Community



Consultation with the members of Cassava farm Community



IDI with the field manager Iboko rice mill



IDI with the LG chairman



Visit to the Ebony Agro-industry Ltd, Ikwo



IDI with the Financial Control Manager,
Ebony Agro-Industrial Company Ltd, Ikwo



IDI with Hon. Ekumankama Chinma
(Ohaozara LGA Chairman)



Consultation with the people of Amaleze,
Ishielu LGA



IDI with the field manager Amangwu rice
mill, Edda LGA

Plate 8.1: Photos taken during and after Consultation

ANNEXURE

ANNEX I GENERAL ENVIRONMENTAL MANAGEMENT CONDITIONS FOR CONSTRUCTION CONTRACTS/CIVIL WORKS

1. In addition to these general conditions, the Contractor shall comply with any specific Environmental and Social Management Plan (ESMP) for the works he is responsible for. The Contractor shall inform himself about such an ESMP, and prepare his work strategy and plan to fully take into account relevant provisions of that ESMP. If the Contractor fails to implement the approved ESMP after written instruction by the Supervising Engineer (SE) to fulfil his obligation within the requested time, the Owner reserves the right to arrange through the SE for execution of the missing action by a third party on account of the Contractor.

2. Notwithstanding the Contractor's obligation under the above clause, the Contractor shall implement all measures necessary to avoid undesirable adverse environmental and social impacts wherever possible, restore work sites to acceptable standards, and abide by any environmental performance requirements specified in an ESMP. In general, these measures shall include but not be limited to:
 - a) Minimize the effect of dust on the surrounding environment resulting from earth mixing sites, asphalt mixing sites, dispersing coal ashes, vibrating equipment, temporary access roads, etc. to ensure safety, health and the protection of workers and communities living in the vicinity of dust producing activities.
 - b) Ensure that noise levels emanating from machinery, vehicles and noisy construction activities (e.g., excavation, blasting) are kept at a minimum for the safety, health and protection of workers within the vicinity of high noise levels and nearby communities.
 - c) Ensure that existing water flow regimes in rivers, streams and other natural or irrigation channels is maintained and/or re-established where they are disrupted due to works being carried out.
 - d) Prevent bitumen, oils, lubricants and waste water used or produced during the execution of works from entering into rivers, streams, irrigation channels and other natural water bodies/reservoirs, and also ensure that stagnant water in uncovered borrow pits is treated in the best way to avoid creating possible breeding grounds for mosquitoes.
 - e) Prevent and minimize the impacts of quarrying, earth borrowing, piling and building of temporary construction camps and access roads on the biophysical environment including protected areas and arable lands; local communities and their settlements. In as much as possible restore/rehabilitate all sites to acceptable standards.
 - f) Upon discovery of ancient heritage, relics or anything that might or believed to be of archaeological or historical importance during the execution of works, immediately report such findings to the SE so that the appropriate authorities may be expeditiously contacted for fulfilment of the measures aimed at protecting such historical or archaeological resources.

- g) Discourage construction workers from engaging in the exploitation of natural resources such as hunting, fishing, and collection of forest products or any other activity that might have a negative impact on the social and economic welfare of the local communities.
 - h) Implement soil erosion control measures in order to avoid surface run off and prevents siltation,
 - i) Ensure that garbage, sanitation and drinking water facilities are provided in construction worker scamps.
 - j) Ensure that, in as much as possible, local materials are used to avoid importation of foreign material and long-distance transportation.
 - k) Ensure public safety, and meet traffic safety requirements for the operation of work to avoid accidents.
3. The Contractor shall indicate the period within which he/she shall maintain status on site after completion of civil works to ensure that significant adverse impacts arising from such works have been appropriately addressed.
 4. The Contractor shall adhere to the proposed activity implementation schedule and the monitoring plan / strategy to ensure effective feedback of monitoring information to project management so that impact management can be implemented properly, and if necessary, adapt to changing and unforeseen conditions.
 5. Besides the regular inspection of the sites by the Supervising Engineer for adherence to the contract conditions and specifications, the Owner may appoint an Inspector to oversee the compliance with these environmental conditions and any proposed mitigation measures. State environmental authorities may carry out similar inspection duties. In all cases, as directed by the SE, the Contractor shall comply with directives from such inspectors to implement measures required to ensure the adequacy rehabilitation measures carried out on the bio-physical environment and compensation for socio-economic disruption resulting from implementation of any works.
 6. All vessels (drums, containers, bags, etc.) containing oil/fuel/surfacing materials and other hazardous chemicals shall be bonded in order to contain spillage. All waste containers, litter and any other waste generated during the construction shall be collected and disposed-off at designated disposal sites in line with applicable government waste management regulations.
 7. All drainage and effluent from storage areas, workshops and camp sites shall be captured and treated before being discharged into the drainage system in line with applicable government water pollution control regulations.
 8. Used oil from maintenance shall be collected and disposed-off appropriately at designated sites or be reused or sold for re-use locally.
 9. Entry of runoff to the site shall be restricted by constructing diversion channels or holding structures such as banks, drains, dams, etc. to reduce the potential of soil erosion and water pollution.

10. Construction waste shall not be left in stockpiles along the road, but removed and reused or disposed of on a daily basis.
11. If disposal sites for clean spoil are necessary, they shall be located in areas, approved by the SE, of low land use value and where they will not result in material being easily washed into drainage channels. Whenever possible, spoil materials should be placed in low-lying areas and should be compacted and planted with species indigenous to the locality.
12. The Contractor shall obtain appropriate licenses/permits from relevant authorities to operate quarries or borrow areas.
13. The location of quarries and borrow areas shall be subject to approval by relevant local and national authorities, including traditional authorities if the land on which the quarry or borrow areas fall in traditional land.
14. New extraction sites:
 - a) Shall not be located in the vicinity of settlement areas, cultural sites, wetlands or any other valued ecosystem component, or on high or steep ground or in areas of high scenic value, and shall not be located less than 1km from such areas.
 - b) Shall not be located adjacent to stream channels wherever possible to avoid siltation of river channels.
 - c) Where they are located near water sources, borrow pits and perimeter drains shall surround quarry sites.
 - d) Shall not be located in archaeological areas. Excavations in the vicinity of such areas shall proceed with great care and shall be done in the presence of government authorities having a mandate for their protection.
 - e) Shall not be located in forest reserves. However, where there are no other alternatives, permission shall be obtained from the appropriate authorities and an environmental impact study shall be conducted.
 - f) Shall be easily rehabilitated. Areas with minimal vegetation cover such as flat and bare ground, or areas covered with grass only or covered with shrubs less than 1.5m in height, are preferred.
 - g) Shall have clearly demarcated and marked boundaries to minimize vegetation clearing.
15. Vegetation clearing shall be restricted to the area required for safe operation of construction work. Vegetation clearing shall not be done more than two months in advance of operations.
16. Stockpile areas shall be located in areas where trees can act as buffers to prevent dust pollution. Perimeter drains shall be built around stockpile areas. Sediment and other pollutant traps shall be located at drainage exits from workings.
17. The Contractor shall deposit any excess material in accordance with the principles of these general conditions, and any applicable ESMP, in areas approved by local authorities and/or the SE.

18. Areas for depositing hazardous materials such as contaminated liquid and solid materials shall be approved by the SE and appropriate local and/or national authorities before the commencement of work. Use of existing, approved sites shall be preferred over the establishment of new sites.
19. To the extent practicable, the Contractor shall rehabilitate the site progressively so that the rate of rehabilitation is similar to the rate of construction.
20. Always remove and retain topsoil for subsequent rehabilitation. Soils shall not be stripped when they are wet as this can lead to soil compaction and loss of structure.
21. Topsoil shall not be stored in large heaps. Low mounds of no more than 1 to 2m high are recommended.
22. Re-vegetate stockpiles to protect the soil from erosion, discourage weeds and maintain an active population of beneficial soil microbes.
23. Locate stockpiles where they will not be disturbed by future construction activities.
24. To the extent practicable, reinstate natural drainage patterns where they have been altered or impaired.
25. Remove toxic materials and dispose of them in designated sites. Backfill excavated areas with soils or overburden that is free of foreign material that could pollute groundwater and soil.
26. Identify potentially toxic overburden and screen with suitable material to prevent mobilization of toxins.
27. Ensure reshaped land is formed so as to be inherently stable, adequately drained and suitable for the desired long-term land use, and allow natural regeneration of vegetation.
28. Minimize the long-term visual impact by creating landforms that are compatible with the adjacent landscape.
29. Minimize erosion by wind and water both during and after the process of reinstatement.
30. Compacted surfaces shall be deep ripped to relieve compaction unless subsurface conditions dictate otherwise.
31. Re-vegetate with plant species that will control erosion, provide vegetative diversity and, through succession, contribute to a resilient ecosystem. The choice of plant species for rehabilitation shall be done in consultation with local research institutions, forest department and the local people. Water Resources Management
32. The Contractor shall at all costs avoid conflicting with water demands of local communities.
33. Abstraction of both surface and underground water shall only be done with the consultation of the local community and after obtaining a permit from the relevant Water Authority.
34. Abstraction of water from wetlands shall be avoided. Where necessary, authority has to be obtained from relevant authorities.

35. Temporary damming of streams and rivers shall be done in such a way avoids disrupting water supplies to communities downstream, and maintains the ecological balance of the river system.
36. No construction water containing spoils or site effluent, especially cement and oil, shall be allowed to flow into natural water drainage courses.
37. Wash water from washing out of equipment shall not be discharged into water courses or road drains.
38. Site spoils and temporary stockpiles shall be located away from the drainage system, and surface run off shall be directed away from stockpiles to prevent erosion.
39. Location of access roads/detours shall be done in consultation with the local community especially in important or sensitive environments. Access roads shall not traverse wetland areas.
40. Upon the completion of civil works, all access roads shall be ripped and rehabilitated.
41. Access roads shall be sprinkled with water at least five times a day in settled areas, and three times in unsettled areas, to suppress dust emissions.
42. Unusable materials and construction elements such as electro-mechanical equipment, pipes, accessories and demolished structures will be disposed of in a manner approved by the SE. The Contractor has to agree with the SE which elements are to be surrendered to the Client's premises, which will be recycled or reused, and which will be disposed of at approved landfill sites.
43. As far as possible, abandoned pipelines shall remain in place. Where for any reason no alternative alignment for the new pipeline is possible, the old pipes shall be safely removed and stored at a safe place to be agreed upon with the SE and the local authorities concerned.
44. AC-pipes as well as broken parts thereof have to be treated as hazardous material and disposed of as specified above.
45. Unsuitable and demolished elements shall be dismantled to a size fitting on ordinary trucks for transport.
46. In advance of the construction work, the Contractor shall mount an awareness and hygiene campaign. Workers and local residents shall be sensitized on health risks particularly of AIDS.
47. Adequate Road signs to warn pedestrians and motorists of construction activities, diversions, etc. shall be provided at appropriate points.
48. Construction vehicles shall not exceed maximum speed limit of 40km per hour.
49. Should the Contractor, deliberately or accidentally, damage private property, he shall repair the property to the owner's satisfaction and at his own cost. For each repair, the Contractor shall obtain from the owner a certificate that the damage has been made good satisfactorily in order to indemnify the Client from subsequent claims.

50. In cases where compensation for inconveniences, damage of crops etc. are claimed by the owner, the Client has to be informed by the Contractor through the SE. This compensation is in general settled under the responsibility of the Client before signing the Contract. In unforeseeable cases, the respective administrative entities of the Client will take care of compensation.

51. Within 6 weeks of signing the Contract, the Contractor shall prepare an EHS-MP to ensure the adequate management of the health, safety, environmental and social aspects of the works, including implementation of the requirements of these general conditions and any specific requirements of an EMP for the works.

The Contractor's EHS-MP will serve two main purposes:

- For the Contractor, for internal purposes, to ensure that all measures are in place for adequate HSE management, and as an operational manual for his staff.
- For the Client, supported where necessary by a SE, to ensure that the Contractor is fully prepared for the adequate management of the HSE aspects of the project, and as a basis for monitoring of the Contractor's HSE performance.

55. The Contractor's EHS-MP shall provide at least:

- A description of procedures and methods for complying with these general environmental management conditions, and any specific conditions specified in an EMP;
- A description of specific mitigation measures that will be implemented in order to minimize adverse impacts;
- A description of all planned monitoring activities (e.g. sediment discharges from borrow areas) and the reporting thereof; and • The internal organizational, management and reporting mechanisms put in place for such.

56. The Contractor's EHS-MP will be reviewed and approved by the Client before start of the works. This review should demonstrate if the Contractor's EHS-MP covers all of the identified impacts, and has defined appropriate measures to counteract any potential impacts.

57. The Contractor shall prepare bi-weekly progress reports to the SE on compliance with these general conditions, the project EMP if any, and his own EHS-MP. An example format for a Contractor HSE report is given below. It is expected that the Contractor's reports will include information on:

- HSE management actions/measures taken, including approvals sought from local or national authorities;
- Problems encountered in relation to HSE aspects (incidents, including delays, cost consequences, etc. as a result thereof);
- Lack of compliance with contract requirements on the part of the Contractor;
- Changes of assumptions, conditions, measures, designs and actual works in relation to HSE aspects; and

- Observations, concerns raised and/or decisions taken with regard to HSE management during site meetings.
58. It is advisable that reporting of significant HSE incidents be done “as soon as practicable”. Such incident reporting shall therefore be done individually. Also, it is advisable that the Contractor keeps his own records on health, safety and welfare of persons, and damage to property. It is advisable to include such records, as well as copies of incident reports, as appendices to the bi-weekly reports. Example formats for an incident notification and detailed report are given below. Details of HSE performance will be reported to the Client through the SE’s reports to the Client
59. The Contractor shall provide sufficient training to his own personnel to ensure that they are all aware of the relevant aspects of these general conditions, any project EMP, and his own EHSMP, and are able to fulfil their expected roles and functions. Specific training should be provided to those employees that have particular responsibilities associated with the implementation of the EHS-MP.

General topics should be:

- Occupational Health and Safety Basics
 - Occupational Health and Safety in water supply pipeline installation
 - Safety Practices in Borehole installation and Aquifer Abstraction
 - Electrical Safety Basics
 - Hazard Identification and Control
 - Hazard Communication Programme
 - Accident Investigation
 - Asbestos Management
 - Safe work Procedures
 - Fall Protection
 - Noise Management Programme
 - Workers Respiratory Programme
 - Work place Violence Management
 - Fire Safety
 - Emergency Management; and
 - Social and cultural awareness
60. It is expected that compliance with these conditions is already part of standard good workmanship and State of the art as generally required under this Contract. The item “Compliance with Environmental Management Conditions” in the Bill of Quantities covers

these costs. No other payments will be made to the Contractor for compliance with any request to avoid and/or mitigate an avoidable HSE impact.

Example Format: HSE Report

Contract:

Period of reporting:

HSE management actions/measures:

Summarize HSE management actions/measures taken during period of reporting, including planning and management activities (e.g. risk and impact assessments), HSE training, specific design and work measures taken, etc.

HSE incidents:

Report on any problems encountered in relation to HSE aspects, including its consequences (delays, costs) and corrective measures taken. Include relevant incident reports.

HSE compliance:

Report on compliance with Contract HSE conditions, including any cases of non-compliance.

Changes:

Report on any changes of assumptions, conditions, measures, designs and actual works in relation to HSE aspects.

Concerns and observations:

Report on any observations, concerns raised and/or decisions taken with regard to HSE management during site meetings and visits.

Signature (Name, Title Date):

Contractor's Representative

Example Format: HSE Incident Notification

Provide within 24 hrs to the Supervising Engineer

Originators Reference No:

Date of Incident: Time:

Location of incident:

Name of Person(s) involved: Employing Company:

Type of Incident:

Description of Incident:

Where, when, what, how, who, operation in progress at the time (only factual)

Immediate Action:

Immediate remedial action and actions taken to prevent reoccurrence or escalation

Signature (Name, Title, Date):

Contractor's Representative

ANNEX II OCCUPATIONAL HEALTH AND SAFETY (OHS) PLAN

INTRODUCTION

Every project poses its HSE risks. This plan was necessitated to meet up with OHS standards and to achieve the objectives set for the proposed project. The project team shall undertake to ensure high performance standards and conformity with contract requirements by managing the works in a systematic and thorough manner.

PROJECT DESCRIPTION

2.1 Purpose

The purpose of this document is to describe the Project Occupational Health and Safety (OHS) plan for the proposed road rehabilitation and construction and the specific management controls, risk control systems and workplace precautions required to ensure compliance with Occupational Health and Safety Laws and Standards.

2.2 HSE Objectives

The Objectives for this plan are to:

- Adopt a positive Health & Safety Culture.
- Adopt the principles of prevention to avoid risk.
- Complete the project without incident (Zero fatalities, Zero Lost Time Injury (LTI) or occupational illness).

2.3 Scope of Work

The Project Occupational Health and Safety (OHS) plan covers the scope of works defined in the contract. This includes Preconstruction, Construction, Operation & Maintenance and Decommissioning phases.

2.4 Policy Statement

In addition to the existing HSE policy, other policies shall be developed which includes:

- Substance Abuse Policy – Prohibiting the consumption or possession of narcotics, drugs, alcohol and other banned substances
- Emergency Response Policy – Stating commitment to ensure adequate resources and arrangement are in place in the case an emergency.
- Community Affairs Policy – Stating commitment to foster healthy relationships with communities through observance of the highest standard of conduct.
- Road Safety Policy–Stating commitment to complying with Road Traffic regulations and continuously improving its road safety performance by implementing a Road Safety Management Plan (RSMP)

KEY RESPONSIBILITIES

Involvement of all in implementing, maintaining and continually improving OHS processes is the key to successful completion and achievement of quality objectives set by the management. All project personnel shall therefore be required to be familiar with the

content of this OHS plan and shall participate in implementing, maintaining and improving the management system. It is the responsibility of the project manager and all key personnel to ensure that the requirements for quality are fulfilled for works under their responsibility. All new staff and staff who are given new responsibilities are to be inducted into the requirements set out in this plan in general and into their function and responsibilities in particular.

3.1 Project Manager Responsibilities

- Set good example in HSE issues.
- Ensure the availability of resources essential to establish, implement, maintain and improve the OHS Management System.
- Define, document and communicate roles, allocate responsibilities and accountabilities, delegating authorities, to facilitate effective OHS management.
- Ensure that all of the activities undertaken in the Project conform to Nigerian legislation, client requirements or international standards when applicable.
- Review objectives achievements throughout the year.

3.2 Project Supervisors Responsibilities

- Enforcing all phases of the established HSE plan.
- Set good example in HSE issues.
- Preparing Job Hazard Analysis when required.
- Ensuring the safety of all workers associated with the site.
- Conducting HSE inspections.
- Ensuring workers are competent for their allocated tasks.
- Attending and participating in HSE meetings.
- Participating in accident investigations.

3.3 HSE Manager/Supervisor Responsibilities

- Prepare relevant OHS documentation and procedures.
- Monitor the efficient implementation of OHS requirements.
- Participate and organize the OHS risk assessments.
- Advise management of compliance and of conditions requiring attention.
- Conduct regular HSE inspections.
- Make thorough analysis of statistical data and inspections; delineates problem areas; and makes recommendation for solutions.
- Take part in the review of all OHS incidents and assist in investigating incident.
- Monitor the efficient implementation of the Project's OHS requirements.
- Organize the Project's OHS risk assessment exercises.
- Check on the use of all types of personal protective equipment specifies the use of appropriate PPE for the various work activities. Evaluates their effectiveness and suggests improvements where indicated.

3.4 HSE Advisor Responsibilities

- Check on the use of all types of personal protective equipment specifies the use of appropriate PPE for the various work activities. Evaluates their effectiveness and suggests improvements.
- Conduct independent inspections to observe conformance with established OHS Plan and determines the effectiveness of individual elements of the plan (pre-task briefing, weekly toolbox talk, etc)
- Establish contact with Subcontractors with the objective of maintaining good relations and coordination of accident prevention activities and compliance with the established OHS plan.
- Correct unsafe acts and unsafe conditions.
- Deliver HSE induction/orientation course to all employees, including subcontractors.
- Deliver HSE awareness course and toolbox talk.
- Advise employees on OHS matters.

3.5 All employees' responsibilities

- Take all reasonable and practical steps to care for their own health and safety and avoid affecting the health and safety of co-workers and the general public.
- Follow all instructions and use the equipment properly
- Not interfere with any safety arrangements.
- Report any circumstances which may not comply with the project's OHS management system.

4.0 Competency

All personnel required to operate or work with any equipment or machine must be competent, be tested for each equipment that he/she shall be operating. All personnel who as part of their profession require licensing or certification must obtain the necessary certification before he/she shall be allowed to work on the site.

Fitness

All personnel working on site shall be required to be certified medically fit to do so by an approved medical facility or Medical Doctor (pre-employment medical examination).

6.0 HSE Training

6.1 Induction/Orientation

Every new or rehired employee and Subcontractors employees must undergo mandatory OHS orientation / induction. The purpose of the Induction is to educate workers and make them aware of the major potential hazards he or she shall come into contact with while working on the site; also, it is one more opportunity to stress the importance of HSE being the first priority in the operations. The content of the HSE orientation / induction shall cover the following subjects:

- Site safety rules.
- Personnel protective equipment requirements (PPE).
- Environmental sensitivity and protection.
- Preparation and planning of the job (Daily Pre-task talk).
- Emergency plan and muster points.

6.2 Project Specific HSE Training

In addition to the HSE orientation /induction, there shall be specific site HSE trainings which shall cover the following topics:

- Manual handling.
- Electrical Safety
- Emergency Prevention, Preparedness and Response
- Work at height training
- First Aid training (for site First Aiders)
- Lifting and Rigging
- Safe Driving techniques (for drivers)

7.0 Hazard identification & HSE risk assessment

7.1 Project HSE Risk Assessment

The project HSE risk assessment shall be developed and recorded. The Project's HSE risk assessment shall be conducted by a team consisting of HSE Manager/ Supervisor and technical managers/supervisors. It must be approved by the Project manager.

7.2 Fire Risk Assessment

A fire risk assessment shall be developed and recorded. A fire safety plan shall be in place in the site.

7.3 Job Hazard Analysis

Job hazard analysis is required when the hazards and risks associated with a specific task is to be identified so as to implement control measures. The HSE department together with the technical managers/supervisors shall develop a job hazard analysis when applicable.

8.0 EMERGENCY PREPAREDNESS AND RESPONSE

Emergency procedures and evacuation plan shall be developed by the HSE Department and displayed on the notice board. These procedures shall be communicated to all staff. Also, each section/department shall have at least a trained first aider at all times.

9.0 HSE IMPLEMENTATION AND PERFORMANCE MONITORING

9.1 HSE Meetings

HSE management meetings shall be held once a month. The meeting is to help identify safety problems, develop solutions, review incident reports, provide training and evaluate the effectiveness of our safety programme. Some of the meetings shall be:

- Project/Site Management HSE Meeting for management and supervision (Monthly);
Tool box talk meetings for all workforce (Weekly);
Pre-task briefing for all workforces (Daily);
Special situation meeting (As required).

9.2 HSE Reporting

All incidents and illnesses must be reported to the Site Supervisor after which investigation shall commence and recorded so that appropriate corrective actions shall be implemented to prevent any re-occurrence and report findings shall be forwarded to management for review. Reporting requirements shall include notification of incident, investigation report, and monthly report. Notification of Incident form shall be developed which shall be filled and submitted to HSE department for investigation.

9.3 HSE Inspection and Audits

For continual improvement of HSE management system, HSE inspection and audit shall be conducted. An inspection checklist shall be developed. This is to ensure that the HSE management system is being adhered to. The inspection shall be conducted by the HSE department together with site management.

9.4 Corrective and Preventive Actions and Non-Conformities

During the course of inspections, concerns raised shall be addressed and closed out. It is expected that within a period of two weeks, a close out inspection shall take place to verify that the corrective actions have been closed.

10.0 Project HSE Rules

The project HSE rules shall be developed and supervision shall develop specific rules and procedures when necessary. The following site rules shall be implemented at all times. The Site Manager shall draw these rules to the attention of their own workmen or staff. All sub-contractors must ensure that these rules are drawn to the attention of their workmen and staff. The Principal Contractor may implement additional site rules during the contract programme. Any such additional rules shall be notified to all personnel engaged on the project prior to their implementation. The HSE rules shall include but not limited to:

1. Personal Protective Equipment must be worn at all times;
2. All instructions issued by the Site Manager regarding the storage, handling or cleaning of materials, plant and equipment must be followed;
3. All vehicles must be parked in the designated areas;
4. Any workman suffering from a medical condition that might affect his work and/or that could require specific medical treatment must inform the supervisor before commencing work;
5. All site tools shall either be battery operated or at 110 volts operated;
6. No one shall be permitted on site if it is believed that they are under the influence of alcohol or drugs;
7. Vehicles must not reverse without a banksman in attendance;
8. All visitors to site must undergo a site-specific induction and operative Identity badges must be worn at all times;
9. All excavations must be secured;
10. Smoking and eating shall only be permitted in the designated area. This area shall be identified during induction;
11. All food and drink vendors on site shall be registered;

12. The variant of food and drink to be sold in the sites must be approved by the HSE officer;
13. No hot works operations are permitted without a hot work permit in place;
14. There shall be no radios or other music playing devices on site;
15. Good housekeeping practices to be adopted;
16. Compliance with all Ethical Power Permit to Work systems;
17. The site keyed access procedure must be strictly adhered to;
18. All Contractors must comply with Site Health & Safety Guidelines / Site Safety Method Statement;
19. No untrained worker shall be permitted to operate heavy machineries.

11.0 SAFE WORK PRACTICES

Implementing safe work practices is one of the keys to achieving our HSE objectives and some of these safe work practices include:

11.1 Personal Protective Equipment (PPE)

The basic PPE required for the project shall be Safety Glasses, Safety Boots, Hand Gloves, Hard Hat and Coverall. Any other PPE shall be used as applicable. Management is responsible for the provision of PPE and usage shall be enforced at all time. PPE shall be provided in circumstances where exposure to hazards cannot be avoided by other means or to supplement existing control measures identified by a risk assessment. An assessment shall be made to ensure that the PPE is suitable for purpose and is appropriate to the risk involved. Information, instruction & training shall be given to all employees on safe use, maintenance and storage of PPE. Employees shall, in accordance with instructions given, make full use of all PPE provided and maintain it in a serviceable condition and report its loss or defect immediately to the maintenance department where it shall be replaced. PPE shall be replaced when it is no longer serviceable and returned on a new for old basis. Employees shall sign to State that they have received PPE when issued.

12.0 WELFARE FACILITIES

The provision of welfare facilities on the site shall be communicated to all operatives at site induction. A cleaning regime shall be implemented and maintained for the duration of the construction phase to ensure the site welfare facilities remain in a clean and tidy condition.

- If mains drinking water becomes unavailable during the construction phase bottled water shall be brought to site for all operatives for the necessary period.
- All food and drink vendors on site shall be registered.
- The HSE officer will ensure that only approved vendors are allowed to sell food.
- The variant of food and drink to be sold on the sites must be approved by the HSE office
- Access to the site should be restricted to avoid sale of contraband on site
- Smoking and eating shall only be permitted in the designated area. This area shall be identified during induction.

13.0 SIGNAGE

Adequate provision for warning and directional signs shall be made.

14.0 PROJECT HSE PROCEDURES

OHS procedures shall be developed. Project activities shall generally be controlled in accordance with OHS Procedures. These procedures shall include:

- Lifting and Rigging Procedure
- HSE Reporting Procedure
- Working at Height Procedure.
- Emergency Procedure.

ANNEX III: PROTECTION OF CULTURAL PROPERTY

1. Cultural property includes monuments, structures, works of art, or sites of significance points of view, and are defined as sites and structures having archaeological, historical, architectural, or religious significance, and natural sites with cultural values. This includes cemeteries, graveyards and graves.
2. The initial phase of the proposed emergency reconstruction operations pose limited risks of damaging cultural property since projects will largely consist of small investments in community infrastructure, reconstruction of existing structures, and minor public works. Nevertheless, the following procedures for identification, protection from theft, and treatment of discovered artefacts should be followed and included in standard bidding documents.

Chance Find Procedures

3. Chance find procedures will be used as follows:
 - (a) Stop the construction activities in the area of the chance find;
 - (b) Delineate the discovered site or area;
 - (c) Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be present until the responsible local authorities and the Ministry in charge of Department of Archaeology and Museums take over;
 - (d) Notify the supervisory Engineer who in turn will notify the responsible local authorities and the Ministry of Culture immediately (within 24 hours or less);
 - (e) Responsible local authorities and the Ministry in charge of Department of Archaeology and Museums would be in charge of protecting and preserving the site before deciding on subsequent appropriate procedures. This would require a preliminary evaluation of the findings to be performed by the archaeologists of the Department of Archaeology and Museums (within 72 hours). The significance and importance of the findings should be assessed according to the various criteria relevant to cultural heritage; those include the aesthetic, historic, scientific or research, social and economic values;
 - (f) Decisions on how to handle the finding shall be taken by the responsible authorities and the Ministry in charge of Department of Archaeology and Museums. This could include changes in the layout (such as when finding an irremovable remain of cultural or archaeological importance) conservation, preservation, restoration and salvage;
 - (g) Implementation for the authority decision concerning the management of the finding shall be communicated in writing by the Ministry in charge of Department of Archaeology and Museums; and
 - (h) Construction work could resume only after permission is given from the responsible local authorities and the Ministry in charge of Department of Archaeology and Museums concerning safeguard of the heritage

4. These procedures must be referred to as standard provisions in construction contracts, when applicable, and as proposed. During project supervision, the Site Engineer shall monitor the above regulations relating to the treatment of any chance find encountered are observed.
5. Relevant findings will be recorded in World Bank Project Supervision Reports (PSRs), and Implementation Completion Reports (ICRs) will assess the overall effectiveness of the project's cultural property mitigation, management, and activities, as appropriate.

ANNEX IV: ATTENDANCE LIST

EBONYI STATE GOVERNMENT

PARTICIPATION OF EBONYI STATE IN THE PHASE-2 OF THE SPECIAL AGRO-INDUSTRIAL PROCESSING ZONES (SAPZ) PROGRAM

FEASIBILITY AND ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STUDIES

STAKEHOLDERS ATTENDANCE SHEET

S/N	Name	Stakeholders Type/MDA	Position / Status	Telephone	Signature
1	Ariozee C. Agui	Rice farmer	Youth leader	09022269250	[Signature]
2	Augustine Nwankwo	"	Youth	08122552884	[Signature]
3	Nwomi Kalu	"	"	08166538102	[Signature]
4	Nwakpa Eze	"	"	09068292053	[Signature]
5	Ikegwu Chingagoro	"	"	08168568736	[Signature]
6	Thomas Nwankwo	"	"	08025966209	[Signature]
7	Uche Nwakpa	"	"	0802583170	[Signature]
8	Christian Okoro	"	"	N/A	[Signature]
9	Emmanuel Kelechi	"	"	N/A	[Signature]
10	Sunday Chikwu	"	"	N/A	[Signature]
11	Okoro U2Dr	"	"	0701221828	[Signature]
12	Okoro Nwamg	"	"	08120933977	[Signature]
13	Chidike Nwoko	"	"	08024019132	[Signature]
14	Christian Okoro	"	"	N/A	[Signature]
15	Okoro Agwu	"	"	N/A	[Signature]
16	Mawr Innocent	"	"	N/A	[Signature]
17	Mawr Okite	"	"	N/A	[Signature]
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EBONYI STATE GOVERNMENT

PARTICIPATION OF EBONYI STATE IN THE PHASE-2 OF THE SPECIAL AGRO-INDUSTRIAL PROCESSING ZONES (SAPZ) PROGRAM

FEASIBILITY AND ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STUDIES

STAKEHOLDERS ATTENDANCE SHEET

S/N	Name	Stakeholders Type/MDA	Position / Status	Telephone	Signature
1	M. C. B. S. S. S. S.	Effectual	Sec/ret	0703884560	[Signature]
2	Insp. James Moses	Police officer	Security	09032229275	[Signature]
3	Insp. Isoma Nwankwo	Police officer	Security	08034123559	[Signature]
4	Idam Moses	Director	Director	08068682896	[Signature]
5	Olbonnaya Okoro	Youth leader	Youth leader	07026582896	[Signature]
6	Arum Kenneth	Youth farmer	Elcumir	0803874252	[Signature]
7	Ovuna Cornelius	Youth farmer	Sec.	08085660318	[Signature]
8	M. B. M. S. S. S.	HOD Agric	HOD Agric	08035830724	[Signature]
9	W. D. S. S. S.	IA TO Whamm	Site Manager	0816124415	[Signature]
10	Okoro MRM	IBOKO MRM	Site Manager	08039330328	[Signature]
11	Insp. EZIUKA BENJAMIN	IBOKO Rice mul	Offi Cer.	07038792679	[Signature]
12					
13					
14					
15					

11/1/2023

EBONYI STATE GOVERNMENT

**PARTICIPATION OF EBONYI STATE IN THE PHASE-2 OF THE SPECIAL AGRO-INDUSTRIAL PROCESSING ZONES (SAPZ) PROGRAM
FEASIBILITY AND ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STUDIES
STAKEHOLDERS ATTENDANCE SHEET**

09/10/2023

S/N	Name	Stakeholders Type/MDA	Position / Status	Telephone	Signature
1	ARUM KENECHUKWU M.	CASSAVA FARMER	Chairman	08038942528	[Signature]
2	HRH NWOJIJI EMMA	STAKE HOLDER	HEAD RULER	08089650804	[Signature]
3	OVUNNA CORNELIUS	RICE FARMER	Secretary	08085666038	[Signature]
4	IGIDE, NICHOLAS O.	RICE Farmer	AVG Team	0703607611	[Signature]
5	Ugbuloke Patrick	RICE Farmer	AVG SEC.	07088984464	[Signature]
6	OSIBULE PHILIP M.	CASSAVA Farmer	Apex P.R.O	0902584955	[Signature]
7	Nguni Vincent Chukwura	EBONYI Fertilizer	Asst. Officer	07038892777	[Signature]
8	Gabriel Oyiye Odo	pm Ebonyi ADP	Prog. Mgr.	08035734227	[Signature]
9	Faye Eze Villard O	Ministry of Work	Direct/Head	08037025071	[Signature]
10	Umesh Samsi	Ministry of Environment	Director	08035763995	[Signature]
11	Sunday M Itumg	IFAD/ICDP	SPC	08037792295	[Signature]
12	Enwo Nwachukwu	PRO MANAGER	PRO	07032993889	[Signature]
13	NWANI CHUKWUNMEDE	YOUTH LEADER	YOUTH LEADER	08060852001	[Signature]
14	MKPIDMA CHARLES O.	FOOD & NUTRITION	HOD	08023896926	[Signature]
15	Ede, Chukwuka N.	Agric Services	HOD	08037591058	[Signature]
16	Idan Moses	Min of Agric	Director	08068653896	[Signature]
17	Badru Abdulalan	Des Ariest	Member	08028376677	[Signature]
18	Abiodun Ajijola	Des Ariest Limited	member	09236451292	[Signature]
19	CHARLES O. JONAM	DES ARIEST LTD	member	08037963559	[Signature]
20	Obunye S.	DES ARIEST LTD	Project Lead	08037232665	[Signature]
21	Hon. Solomon Maren	DES ARIEST LTD	Team Leader	08094431228	[Signature]
22	Bat Eze (G) MGB	DES ARIEST LTD	Member	07744440927	[Signature]
23	Chibuzor Jude	DES ARIEST LTD	member	08133517074	[Signature]
24	Chiwetelu U.	DES ARIEST LTD	member	08053526266	[Signature]
25	Hon. Ogburny Okorie	Youth Leader/RICE	Youth Leader	07036589546	[Signature]
26	Alu Onuabuchi Feleick	Youth P.R.O.	Youth P.R.O.	07036793574	[Signature]
27	EDEZE GNATHA N.	CASSAVA ENTREPRENEUR	YOUTH FARMER	07036295451	[Signature]
28	Francis Nwabeogu	RICE Farmer	Director	09035816664	[Signature]
29	Philip Ogboloko	Rice Cassava/Poultry	Director	08035059015	[Signature]
30	Dr. UGURU B. N.	Ebonyi State Fertilizer	SPC	08064409270	[Signature]
31	Uru Jacinta Aguibilo	Zenith Bank	Banker	0704090555	[Signature]
32	Ngoni D. Agb	Zenith Bank	Banker	08033700819	[Signature]
33	EDU ELIZABETH U.	RICE FARMER	Chairman	07036865059	[Signature]

EBONYI STATE GOVERNMENT

PARTICIPATION OF EBONYI STATE IN THE PHASE-2 OF THE SPECIAL AGRO-INDUSTRIAL PROCESSING ZONES (SAPZ) PROGRAM

FEASIBILITY AND ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STUDIES

STAKEHOLDERS ATTENDANCE SHEET

S/N	Name	Stakeholders Type/MDA	Position / Status	Telephone	Signature
1	Ekumankama Chima	Chairman		0903357747	
2	Okon Esem Oko	Sec. Gen	Sec. Gen	08031583488	
3	Hon. Robert Chukwura	Councillor	Councillor	0913666993	
4	Dele Ekwunonu Otu	Youth leader	Youth leader	08033819	
5	Dabonnyas Ikechukwu	Farmer	Farmer	08032419872	
6	Prince Ekumankama	Stakeholder	Stakeholder	0813490715	
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EBONYI STATE GOVERNMENT

PARTICIPATION OF EBONYI STATE IN THE PHASE-2 OF THE SPECIAL AGRO-INDUSTRIAL PROCESSING ZONES (SAPZ) PROGRAM

FEASIBILITY AND ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STUDIES

STAKEHOLDERS ATTENDANCE SHEET

S/N	Name	Stakeholders Type/MDA	Position / Status	Telephone	Signature
1	Mbasem Ifeanyi	Rubber/Rice Mgr	GM	08034168245	
2	HON EZE ANNA OKORO	STAKE HOLDER	FARMER	08108549664	
3	OBASI UDUMAH ANONY	RICE	FARMER	080391328	
4	LUKWA GODWIN IGOE	SITE MANAGER	MNCOR	09033926073	
5	LUKWA ABACHI O-	FARMER		0816262666	
6					
7					
8					
9					
10					
11					



**ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA)
EBONYI STATE SAPZ INTERVENTION PROGRAM**

Meeting Attendance

Sn	Name	Ministry / Community	Position	Phone	Sign
1	Chief Oge Godwin	Amaka	V. President Town Union	08060473039	
2	Dr. Victor N. Nwanwa	Amike Ezanpa	Sec. Town Union	08036018088	
3	Eze Abamefula	Ababa	Community head	0701149008	

ANNEX V LIST OF PERSONS MET

S/N	NAME	COMMUNITY/ORGANISATION	POSITION	PHONE NO.
1	Mr Sunday Micheal Ituma	IFAD Ebonyi State	State Project Coordinator	08037792295
2	Eng Eze Villard	Ministry of Works and transport	Director	08037025071
3	Mr Boniface	Nkaliki Hatchery	CSO	08037740126
4	Mr Ngbubi Samuel	Nkaliki Hatchery	Vet Officer	
5	Mr Njemese Nkem	Ebony Agro-Industry Ltd	Financial Control Manager	08037747654
6	Mr Olughu Azu	Iboko rice mill	Field manager	08039330328
7	Hon (Prince) Ekumankama Chinma		Chairman/Town union president	07033571747
8	Hon Ikechukwu		Town union president	08033513497
9	Mr Daniel Ogubuzuru		Member	08132295750
10	Mr Ifeanyi Mbam		General Manager	08034568245

ANNEX VI ESSMP

S/N	Project Activities	Rice, Cassava and Livestock			Monitoring Indicator	Monitoring Frequency	Responsibility		Monitoring Cost
		Environmental Impacts	Receptors	Mitigation Measures			Mitigation	Monitoring	NGN
1	<p>Enhance Agricultural Production and Productivity in Proximity to Agro-Industrial Clusters</p> <p>Development and operation of agricultural fields, Site clearing and/or levelling, Compacting & Blasting, Use of heavy equipment and</p>	Deforestation in the process of land preparation for the programme’s agricultural activities	Flora, fauna	<p>Trees should be planted in the open farm access roads;</p> <p>The landscape should be permitted to regrow based on application of some control mechanism to prevent wildlife intrusion into residential and administrative quarters.</p>	<p>Area cleared outside the corridor.</p> <p>Extent of area cleared for installation</p> <p>Number of trees planted and area extent of lawns developed</p>	Monthly	Contractor	ESO, Facilitator	347,175

2	<p>hazardous materials Material Extraction/quarrying, Slope stability/Excavation, cutting, and filling Hazardous materials storage and disposal, Waste management, Construction camp and crew set up</p>	<p>Alterations of local natural water cycles / Depletion of groundwater for irrigation purposes</p>	<p>Groundwater aquifer</p>	<p>Avoid conflicting water use through proper segmentation of water availability through the use of dedicated storages for crop and animal farming purposes; Pipe-borne water should be provided in the long term to all farmers;</p>	<p>No of targeted farmer/CIGs; No of farmers using rainwater harvesting Number of farmers using the environmentally friendly wastewater disposal approach</p>	<p>Monthly</p>	<p>Contractor</p>	<p>ESO, Facilitator</p>	<p>347,175</p>
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3		Soil quality degradation	Soil, fauna, water bodies	Farmers will be encouraged to adopt integrated weed and pest management practices for weed and pest control such as use of certified and disease tolerant seed, fingerlings and chicks varieties, use of early maturing seed varieties, proper land preparation, early planting, following recommended planting space between rows and plants, timely/early weeding,	Soil quality parameters (especially hydrocarbon contaminants) Compliance with fuel storage procedures	Monthly	Contractor	ESO, Facilitator	308,600
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				<p>suitable water management practices and the use of agrochemicals where necessary. This will minimize the rate of agrochemical use;</p> <p>Ebonyi SAPZ SPIU will encourage the use of diammonium phosphate fertilizer (DAP) as a nitrogen source to slow down acidification caused by N fertilizers such as ammonium sulphate;</p>					
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				<p>Farmers will adopt minimum tillage during planting seasons to reduce the susceptibility of the soil to erosion and also hard pan formation associated with continuous ploughing at the same depth;</p> <p>After harvesting, crop residue comprising process residue (straw, husks, skins, trimmings, cobs and bran of cereals) and field residue (stalks and</p>					
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				<p>stubble/stems, leaves of crops) will be tilled into the soil to improve the soil structure and soil organic matter content.</p> <p>Farmers will utilise cover crops at erosion prone areas;</p> <p>Ebonyi SAPZ SPIU will, preferentially, advise and train farmers on selective pesticides with low Environmental Impact Quotient (EIQ) where appropriate, rather than</p>					
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				broad-spectrum products, to minimize impacts on non-target species;					
4		Surface and ground water pollution	Water, aquatic life	The contractor(s) will immediately collect any excess excavated soils to minimize the potential for erosion into water bodies and such excess or unusable materials will be used to fill existing borrow pits; The contractor will ensure appropriate spill	Physicochemical parameters Bacteriological parameters Pesticide residue parameters Groundwater pH, conductivity, TDS, chloride, iron, nitrate, coliforms, phosphate, pesticides, fluorides, heavy metals (leads, arsenic, cadmium,	Daily	Contractor	ESO, Facilitator	308,600

				<p>control measures are provided at the vehicle maintenance area and fuel storage areas to reduce the potential impact from spills.eg. sand buckets, cemented platforms, etc. These will include provision of bunds to contain spills, installation and servicing of fuel dispensers.</p> <p>Workers will be trained on how to contain and manage spills.</p>	mercury, etc.), pesticide loads				
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				<p>Heaps of excavated soils suitable for reuse during construction will be utilized in the shortest possible time to minimise exposure.</p> <p>Where the material is unsuitable for backfilling, it may be used to fill borrow pits or it will be disposed at an approved dump site</p>					
5		Air pollution due to increased mechanized farming, vehicular movement and increased burning of biomass of cleared	Air, workers, public	The The Farm manager will incorporate the Air Quality Management Plan into standard	TSP, PM10, NOx, SOx, CO	Quarterly	Contractor	ESO, Facilitator	308,600

		forest post-harvest waste		<p>operations. The plan will include the following:</p> <ul style="list-style-type: none"> dust from vehicular movement dust from burning of biomass exhaust emission from vehicles and machinery VOCs from fuel storage and dispensing areas noise from operation of machinery monitoring Regular maintenance of machinery/eq 					
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				quipment in accordance with manufacturer specifications to ensure minimum levels of emission from the terminal operations.					
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6		Improper disposal of agricultural waste, fertilizer and chemical containers	Soil, water bodies	Residents should be advised to use appropriate waste dump sites and to stop indiscriminate waste dumping. Official waste dump sites should be established and waste management operators should be contacted on the prompt clearing of waste deposited.			Contractor	ESO, Facilitator	270,025
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7		Pest and rodent infestation of matured crop	Matured crop, farmers, public	Develop a training programme for farmers especially on integrated pest management Field sanitation should be adequately maintained	Clean environment in and around storage sheds Cleaning roaster Records on infested/contaminated produce Evidence of records for stored produce monitoring	Daily	Contractor	ESO, Facilitator	308,600
8		Noise and vibration;	Air, workers, neighbouring communities	Abate noise by regular maintenance of machineries Use manual labour as much as possible. Restriction of activities to daytime Workers within the vicinity of high-level noise to be	Noise level	Monthly/ Whenever there is noise complaint	Contractor	ESO, Facilitator	462,900

				<p>provided with adequate PPE. – No idling of machinery if not in use, they should be switched off.</p> <p>Control speed and noise of construction machinery;</p> <p>Insulate noisy machines and activities to minimize noise impact to neighbouring communities -</p>					
9		Impacts on water quality	Community members downstream users, soil	Ebonyi SAPZ SPIU and farmers will ensure that any pesticides used are	Physicochemical parameters Bacteriological parameters Pesticide residue parameters	Bi-annually (Major and minor season)	Contractor	ESO, Facilitator	347,175

				<p>manufactured, formulated, packaged, labelled, handled, stored, disposed of, and applied according to the FAO's International Code of Conduct on Pesticide Management;</p> <p>Ebonyi SAPZ SPIU and farmers will ensure that pesticides that fall under the World Health Organization's (WHO) Recommended Classification</p>	<p>Groundwater pH, conductivity, TDS, chloride, iron, nitrate, coliforms, phosphate, pesticides, fluorides, heavy metals (leads, arsenic, cadmium, mercury, etc.), pesticide loads</p>				
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				<p>of Pesticides by Hazard Classes 1a (extremely hazardous) and 1b (highly hazardous) are not purchased, stored or used;</p> <p>The use of agrochemicals including, antibiotics herbicide and pesticides will be reduced as much as possible on farms.</p> <p>Where possible, mechanical weed and pest control will be considered;</p>					
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10		Fire risk	Farmers, public property, workers	<p>Burning will not be utilised as a farm management practice.</p> <p>Ebonyi SAPZ SPIU prohibits burning as a farm management practice and will ensure all projects it supports comply with this directive</p> <p>Ebonyi SAPZ SPIU will educate all farmers and workers on potential causes of fire on the farms e.g. smoking,</p>	<p>Installation of smoke detectors, fire alarms and fire extinguishers in offices, storage room and other premises.</p> <p>Availability of fire extinguishers at vantage points on farms</p> <p>Fire belts created around project site.</p> <p>Availability of Emergency Assembly Points and emergency contact numbers at vantage points.</p> <p>Records on servicing of firefighting equipment.</p>	Daily	Contractor	ESO, Facilitator	462,900
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				<p>cooking and burning;</p> <p>All farmers and workers will be trained on fire prevention and control.</p> <p>Ebonyi SAPZ SPIU and farmers will ensure all equipment and machinery are regularly serviced and maintained;</p>					
		Social Impacts							
11		Land Use Rights	Farmers, Neighbouring communities	Ebonyi SAPZ SPIU will ensure that no loss of farmland is allowed	Implementation of measures outlined in the RAP which will outline the mitigation measures and compensation where eligible.	All issues should be settled before project	Contractor	ESO, Facilitator	347,175

						implementa tion			
12		Increasing demand for lands for farming;	Farmers, Neighbouring communities	Ebonyi SAPZ SPIU will ensure that no loss of farmland is allowed	Implementation of measures outlined in the RAP which will outline the mitigation measures and compensation where eligible.	All issues should be settled before project implementation	Contractor	ESO, Facilitator	462,900
13		Loss of fallow and other agricultural land	Farmers	Ebonyi SAPZ SPIU will ensure that no loss of farmland is allowed	Implementation of measures outlined in the RAP which will outline the mitigation measures and compensation where eligible.	All issues should be settled before project implementation	Contractor	ESO, Facilitator	308,600
14		Elimination of smallholder farmers	Farmers	Ebonyi SAPZ SPIU will ensure that no loss of farmland is allowed	Implementation of measures outlined in the RAP which will outline the mitigation measures and compensation where eligible.	All issues should be settled before project implementation	Contractor	ESO, Facilitator	308,600

15		Occupational health & safety	Workers	<p>The Farm manager should have a comprehensive health and safety policy</p> <p>Ensure there is compliance to various health and safety regulations</p> <p>Carry out regular risk assessments of the workplace</p> <p>Establish a standard code of practice for the project workers including drivers and suppliers so as to promote safety of the public during the operation</p>	<p>Farmers' awareness of health and safety policy</p> <p>Availability and proper use of PPEs</p> <p>Availability and proper use of warning signs -</p> <p>Availability of first aid kit</p> <p>Adherence to health and safety procedures</p> <p>Records on frequency, type and source of illness/accident/injury -</p> <p>Records on non-compliances</p> <p>Records on training and awareness creation on health and safety</p>	Daily	Contractor	ESO, Facilitator	347,175
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			<p>Install fully equipped first aid kits at strategic points at the working areas</p> <p>Ensure there is adequate sanitation facilities to be installed on sites</p> <p>Warning signs/bumps to be erected and/or placed at risky points</p> <p>There should be insurance covers for the workers under the workman's compensation Act</p> <p>Provide adequate emergency</p>					
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				<p>procedures for the facility staff; Arrange regular emergency drills for staff Install at strategic points enough firefighting equipment Appropriate PPEs such as gloves, nose masks, coveralls, goggles, safety boots, etc. will be provided for staff and farmers. The use of PPEs will be enforced especially during the handling of agrochemicals such as during</p>					
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				<p>spraying of weedicides; Safety procedures, particularly with the operation of machines and the handling and use of agrochemicals will be enforced by the SAPZ and sanctions applied when not adhered to; Farm stores at different sections should be built to encourage farmers purchase approved chemicals and PPEs.</p>					
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16		Increased spate of GBV due to the need and participation of more women	Farmers, women	<p>Commitment / policy to cooperate with law enforcement agencies investigating perpetrators of gender-based violence;</p> <p>Ensure a copy of the code of conduct is presented to all workers and signed by each worker.</p> <p>Ensure workers are trained on the content of the code of conduct in English and local language</p> <p>Provide cultural sensitisation</p>	<p>No of workers sensitized.</p> <p>Code of conduct developed for workers</p> <p>Code of conduct signed by Contractor and workers</p> <p>Level of awareness of workers to local cultures</p> <p>Awareness of grievance procedures.</p> <p>No of local workers</p> <p>Presence of security personnel</p>	Routine Inspection	Contractor	ESO, Facilitator	462,900
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				<p>training to improve awareness and sensitivity of workers to local cultures, traditions and lifestyles.</p> <p>Prohibit child and forced labour.</p> <p>Establish and implement the GBV-GRM.</p> <p>Engage competent security personnel</p> <p>Develop a clear SAPZ specific internal “Reporting and Response Protocol” to guide relevant</p>					
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				<p>stakeholders in case of GBV/SEA incidents,</p> <p>Strengthening operational processes of SAPZStates project area on GBV/SEA,</p> <p>Identifying development partners and cultivating pragmatic partnership on GBV/SEA prevention measures and referral services,</p> <p>Providing financial support implementation</p>					
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				of the GBV/SEA actions described herein, including training and awareness building for various stakeholders,					
17		Conflicts over land and water use and plot allocation;	Farmers, Neighbouring communities	Sensitize the farmer on the new efficient farming techniques so that they can be fully involved in the transition process Stakeholder consultation and involvement in decision making at all levels	Type and nature of complaints and concerns; Complaint records (Record of grievance and number resolved/unresolved) Management and Stakeholder Meetings	Weekly	Contractor	ESO, Facilitator	347,175

18		Sanitation issues and public health;	Soil, Water, Workers	<p>The The Farm managers will provide toilet facilities at the project site for use by the farmers.</p> <p>The workers will be educated against “free range” defecation;</p> <p>The The Farm managers will provide adequate waste bins at the project site to minimise indiscriminate disposal of plastic and polythene material, cans</p>	<p>Health records (respiratory tract infections, malaria water – borne diseases and other sanitation related diseases)</p> <p>Records on public complaints related sanitation and public health issues</p>	Daily	Contractor	ESO, Facilitator	385,750
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				<p>and food waste by workers. These bins will be frequently emptied at approved dump sites to prevent littering with cans and bottles which could collect water and breed mosquitoes;</p>					
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19		Impacts on Communities	Neighbouring communities	In order to ensure peaceful coexistence and prevent the incidence of conflicts, Ebonyi SAPZ SPIU together with Farm cluster leaders will continue to extensively consult the project communities throughout the project implementation to ensure their free, prior informed consent for project developments	Incident/accident records Health records of community members Complaints from community members	Daily	Contractor	ESO, Facilitator	308,600
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20		Sustainability of the farming venture	Farmers	<p>Well trained and experienced personnel will be employed by the Ebonyi SAPZ SPIU to oversee the operations and effectiveness of the project;</p> <p>Efficient use of resources such as water, agrochemicals, etc. will be adopted by the Ebonyi SAPZ SPIU and farmers to minimize economic losses;</p> <p>Ebonyi SAPZ SPIU will ensure regular</p>	<p>Maintenance records</p> <p>Training records</p> <p>Resource use (fuel, electricity, water, agrochemicals, etc.) records</p> <p>Availability of all necessary permits</p> <p>Emergency response plan prepared</p> <p>Records on fire incidents/accidents and investigation reports</p>	Daily	Contractor	ESO, Facilitator	308,600
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				<p>maintenance of The Farm implements and machineries for higher efficiency Training will be regularly provided by the Ebonyi SAPZ SPIU for farmers on improved agronomic practices; Ebonyi SAPZ SPIU will ensure that farmers are provided with improved and certified seed, fingerlings and chicks varieties to enhance productivity;</p>					
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				<p>Ebonyi SAPZ SPIU will ensure adequate machinery and inputs are available to ensure the agricultural activities is maintained and implemented successfully;</p> <p>Proper marketing strategies will be put in place for farmers to be able to sell produce and reduce loss of revenue.</p> <p>Drainage channels and canals will be regularly desilted and cleared of</p>					
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				<p>weeds to allow free flow of water;</p> <p>Ebonyi SAPZ SPIU and value chain clusters will prepare an emergency response plan to cater for the flood and water pollution</p>					
	<p>Agro-Processing activities Livestock processing Dealing with waste, Treatment technologies for wastes from processing</p>	Environmental Impacts							

21		Noise and vibration	Air, workers, public	<p>Abate noise by regular maintenance of machineries</p> <p>Use manual labour as much as possible.</p> <p>Restriction of activities to daytime</p> <p>Workers within the vicinity of high-level noise to be provided with adequate PPE. –</p> <p>No idling of machinery if not in use, they should be switched off.</p> <p>Control speed and noise of construction machinery;</p>	Noise level	Monthly/ Whenever there is noise complaint	Contractor	ESO, Facilitator	308,600
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				Insulate noisy machines and activities to minimize noise impact to neighbouring communities -					
22		Impact on air quality	Air, workers, public	Provide dust masks to workers Control speed of working machinery	TSP, PM10, NOx, SOx, CO	Quarterly	Contractor	ESO, Facilitator	347,175
23		Noise and vibration	Air, workers, public	Abate noise by regular maintenance of machineries Use manual labour as much as possible. Restriction of activities to daytime	Noise level	Monthly/ Whenever there is noise complaint	Contractor	ESO, Facilitator	308,600

				<p>Workers within the vicinity of high-level noise to be provided with adequate PPE. –</p> <p>No idling of machinery if not in use, they should be switched off.</p> <p>Control speed and noise of construction machinery;</p> <p>Insulate noisy machines and activities to minimize noise impact to neighbouring communities</p>					
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24		Fire Risk	Farmers, public property, workers	<p>Burning will not be utilised as a farm management practice.</p> <p>Ebonyi SAPZ SPIU prohibits burning as a farm management practice and will ensure all projects it supports comply with this directive</p> <p>Ebonyi SAPZ SPIU will educate all farmers and workers on potential causes of fire on the farms e.g. smoking,</p>	<p>Installation of smoke detectors, fire alarms and fire extinguishers in offices, storage room and other premises.</p> <p>Availability of fire extinguishers at vantage points on farms</p> <p>Fire belts created around project site.</p> <p>Availability of Emergency Assembly Points and emergency contact numbers at vantage points.</p> <p>Records on servicing of firefighting equipment.</p>	Daily	Contractor	ESO, Facilitator	270,025
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				<p>cooking and burning;</p> <p>All farmers and workers will be trained on fire prevention and control.</p> <p>Ebonyi SAPZ SPIU and farmers will ensure all equipment and machinery are regularly serviced and maintained;</p>					
		Social Impacts							

25		Sustainability of the processing plant	Farmers, Workers	Well trained and experienced personnel will be employed by the Ebonyi SAPZ SPIU to oversee the operations and effectiveness of the processing plant; Efficient use of resources be adopted by the Ebonyi SAPZ SPIU and farmers to minimize economic losses; Ebonyi SAPZ SPIU will ensure regular maintenance of the machineries	Maintenance records Training records Resource use (fuel, electricity, water, agrochemicals, etc.) records Availability of all necessary permits Emergency response plan prepared Records on fire incidents/accidents and investigation reports	Daily	Contractor	ESO, Facilitator	347,175
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				<p>for higher efficiency Ebonyi SAPZ SPIU will ensure adequate machinery and inputs are available to ensure the agricultural activities is maintained and implemented successfully; Proper marketing strategies will be put in place for farmers to be able to sell produce and reduce loss of revenue. Drainage channels and canals will be regularly</p>				
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				desilted and cleared of weeds to allow free flow of water; Ebonyi SAPZ SPIU and value chain clusters will prepare an emergency response plan to cater for the flood and water pollution					
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26		Occupational health & safety	Processing plant workers	<p>The plant operator should have a comprehensive health and safety policy</p> <p>Ensure there is compliance to various health and safety regulations</p> <p>Carry out regular risk assessments of the workplace</p> <p>Establish a standard code of practice for the project workers including drivers and suppliers so as to promote safety of the public during the operation</p>	<p>Workers' awareness of health and safety policy</p> <p>Availability and proper use of PPEs</p> <p>Availability and proper use of warning signs -</p> <p>Availability of first aid kit</p> <p>Adherence to health and safety procedures</p> <p>Records on frequency, type and source of illness/accident/injury -</p> <p>Records on non-compliances</p> <p>Records on training and awareness creation on health and safety</p>	Daily	Contractor	ESO, Facilitator	462,900
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			<p>Install fully equipped first aid kits at strategic points at the working areas</p> <p>Ensure there is adequate sanitation facilities to be installed on sites</p> <p>Warning signs/bumps to be erected and/or placed at risky points</p> <p>There should be insurance covers for the workers under the workman's compensation Act</p> <p>Provide adequate emergency</p>					
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				<p>procedures for the facility staff;</p> <p>Arrange regular emergency drills for staff -</p> <p>Install at strategic points enough firefighting equipment</p> <p>Appropriate PPEs such as gloves, nose masks, coveralls, goggles, safety boots, etc. will be provided for staff and farmers.</p> <p>The use of PPEs will be enforced especially during the handling of agrochemicals</p>				
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				<p>such as during spraying of weedicides;</p> <p>Safety procedures, particularly with the operation of machines and the handling and use of agrochemicals will be enforced by the SAPZ and sanctions applied when not adhered to;</p> <p>Farm stores at different sections should be built to encourage farmers purchase approved chemicals and PPEs.</p>					
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27		Sanitation issues and public health	Land, water bodies	<p>The Farm managers will provide toilet facilities at the project site for use by the farmers.</p> <p>The workers will be educated against “free range” defecation;</p> <p>The Farm managers will provide adequate waste bins at the project site to minimise indiscriminate disposal of plastic and polythene material, cans and food waste by workers.</p>	<p>Health records (respiratory tract infections, malaria water – borne diseases and other sanitation related diseases)</p> <p>Records on public complaints related sanitation and public health issues</p>	Daily	Contractor	ESO, Facilitator	462,900
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				These bins will be frequently emptied at approved dump sites to prevent littering with cans and bottles which could collect water and breed mosquitoes;					
28		Pest/rodent infestation and contamination of stored produce	Stored produce, farmers, public	Develop a training programme for farmers especially on integrated pest management Field sanitation should be adequately maintained	Clean environment in and around storage sheds Cleaning roaster Records on infested/contaminated produce Evidence of records for stored produce monitoring	Daily	Contractor	ESO, Facilitator	462,900

29		Post-harvest losses	Farmers	<p>The Farm managers will adopt an integrated pest management system to control insects and rodent infestation. This will include:</p> <ul style="list-style-type: none"> good housekeeping practices such as regular cleaning inside storage rooms and proper packing of produce for ease of inspection; keeping the surroundings of storage rooms clean and free from weeds; preventing insects and rodents 	<ul style="list-style-type: none"> Maintenance of storage sheds Observation of damp conditions in storage room Ventilation in storage rooms Arrangement of produce in storage rooms Fumigation records - Records of infested/contaminated/spoilt produce 	Daily	Contractor	ESO, Facilitator	385,750
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				<p>from entering storage rooms by regularly inspecting all doors, walls, windows and roof for any openings and repairing them;</p> <p>use of biological control, such as cats, to keep mice and other rodents from the storage rooms ;</p> <p>use of rodent traps;</p> <p>Chemical control/fumigation through the use of approved agrochemicals to control pests and rodents;</p> <p>All storage rooms at the scheme will</p>					
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				<p>have proper ventilation and will be regularly inspected for defects e.g. roof leakages;</p> <p>The Farm managers will ensure the storage room and the surrounding environment is always kept clean and free from weeds;</p> <p>Bags of produce will be properly arranged on pallets and the pallets will be arranged in rows with adequate spacing in</p>					
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				<p>between to ensure ease of cleaning the storage room and inspection of produce for rodents and insects;</p> <p>Ebonyi SAPZ SPIU will ensure new produce from the farm/mill are not mixed with old produce in the storage room by storing the new produce at a different section in the storage room;</p> <p>The aggregation centres managers will adopt “first in</p>					
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				<p>first out” practices to ensure that old produce is always sold first;</p> <p>Any infested produce will be immediately removed and destroyed to prevent infestation of other produce;</p> <p>Chemical treatment/fumigation, by using only EPA approved agrochemicals, will be used by The Farm managers to control pest/rodents and</p>					
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				diseases where necessary					
		Environmental Impacts							
30	Processing Infrastructure development/Construction and/or upgrading of Agro-Industrial Hub infrastructure Transmission and distribution of electricity, Water supply system, Access Roads Site clearing and/or levelling, Compacting & Blasting,	Air quality deterioration	Project affected communities, construction workers, farmers	Dust emissions from trucks, will be controlled and minimized by the use of designated routes in order to minimize impacts to residents, construction workers, port workers/users and institutions along the transport route.	TSP, PM10, NOx, SOx, CO	Daily	Contractor	ESO, Facilitator	424,325

	<p>Use of heavy equipment and hazardous materials</p> <p>Material Extraction/quarrying, Slope stability/Excavation, cutting, and filling</p> <p>Hazardous materials storage and disposal,</p> <p>Waste management,</p> <p>Construction camp and crew set up</p>			<p>Provide dust masks to workers</p> <p>Sprinkle water on the soil during excavation and land filling;</p> <p>Control speed of working machinery</p> <p>The proposed road construction and road upgrade works will be done using mitigation and control techniques, such as standard dust suppression measures e.g. dampening of unpaved surfaces</p> <p>Ensure vehicular speed limits of 30mph over any</p>					
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				<p>unpaved landscape to minimise dust generation.</p> <p>Material dumping will be regulated to reduce dust emissions.</p> <p>Owners / operators of construction equipment and vehicles will implement the manufacturer recommended engine maintenance programmes to minimize the emission of fumes into the environment.</p> <p>Contractor will monitor dust and</p>					
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				remedial action will be taken whenever dust generating activities take place. Dust-related grievances will be investigated and managed as part of the Grievance Mechanism.					
31		Vibration and noise nuisance	Workers/ Local communities and road users	The contractor should employ standard noise abatement measures and engineering best practices to ensure that the impact of these issues is minimized and	Noise level	Monthly/ Whenever there is noise complaint	Contractor	ESO, Facilitator	347,175

				<p>reduced to acceptable limits. The contractor should ensure that earthworks and other construction activities will be phased out or controlled to reduce noise generation during construction.</p> <p>All equipment shall be operated and maintained in accordance with appropriate industry and equipment standards including specifications for noise levels and manufacturer's</p>					
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				<p>specifications (including regular checks and maintenance). Machines in intermittent use shall be shut down in the intervening periods between works or throttled down to a minimum.</p>					
32		Loss of vegetation and impacts on flora and fauna	Flora and fauna, within access road and other infrastructure RoW	The construction works contractor will sensitize its machine operators to carry out vegetation clearance in sections and limit vegetation	<p>Area cleared outside the corridor.</p> <p>Extent of area cleared for installation</p> <p>Number of trees planted and area extent of lawns developed</p>	Weekly	Contractor	ESO, Facilitator	385,750

				<p>clearance to portions of the land to be developed. This is to allow fauna to migrate to adjoining bushes;</p> <p>Insulate noisy machines and activities during construction to minimize noise impact to neighbouring communities</p> <p>Unnecessary hooting is to be avoided as much as possible</p> <p>Limit construction activities to designated areas;</p> <p>Movement of crews and equipment within the rights</p>					
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				<p>of-way and over routes provided for access to the work shall be performed in a manner to minimize damage to vegetation and fauna within the project area.</p> <p>The clearing of vegetation in sections by the contractor(s) will ensure only areas of the land to be developed at a particular time are exposed to agents of erosion. This will also ensure the cleared areas of the land are not</p>					
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				left bare over long periods as development at the cleared areas will be carried out immediately. This will minimize erosion and sediment transport from the project site;					
		Surface and groundwater contamination/ impact on aquatic organisms	Streams, Rivers and Lagoon	The contractor(s) will immediately collect any excess excavated soils to minimize the potential for erosion into water bodies and such excess or unusable materials will be	Physicochemical parameters Bacteriological parameters Pesticide residue parameters Groundwater pH, conductivity, TDS, chloride, iron, nitrate,	Bi-annually (Major and minor season)	Contractor	ESO, Facilitator	385,750

				<p>used to fill existing borrow pits;</p> <p>The contractor will ensure appropriate spill control measures are provided at the vehicle maintenance area and fuel storage areas to reduce the potential impact from spills.eg. sand buckets, cemented platforms, etc. These will include provision of bunds to contain spills, installation and</p>	<p>coliforms, phosphate, pesticides, fluorides, heavy metals (leads, arsenic, cadmium, mercury, etc.), pesticide loads</p>				
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				<p>servicing of fuel dispensers.</p> <p>Workers will be trained on how to contain and manage spills.</p> <p>Heaps of excavated soils suitable for reuse during construction will be utilized in the shortest possible time to minimise exposure.</p> <p>Where the material is unsuitable for backfilling, it may be used to fill borrow pits or it will be disposed at an approved dump site</p>					
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		Social Impacts							
33		Obstruction of access ways to communities	Community members	<p>The contractor(s) will provide safe alternative access routes for access ways that are obstructed/destroyed during construction works;</p> <p>The contractor(s) will erect sign posts at vantage points to guide community members through safe alternative access ways during construction works</p>	<p>Availability of safe access roads/walkways to communities.</p> <p>Records on public complaints related to obstruction of access ways (road blocks, delays, etc.)</p>	Daily	Contractor	ESO, Facilitator	308,600

		Influx of workers and migrants	Workers, public, neighbouring communities	<p>Ebonyi SAPZ SPIU will implement a stakeholder engagement plan that will include: informing stakeholders of increases in workforce and potential for influx.</p> <p>Engaging with local government/traditional authorities on issues, risks and opportunities regarding labour influx</p> <p>Engaging local communities to understand their concerns, raise</p>	<p>Records on community sensitization programmes</p> <p>Health records on pregnancy, COVID 19, HIV/AIDS and other STDs</p> <p>Records on public complaints relating to non-conformity to societal norms by workers and migrants</p>	Weekly	Contractor	ESO, Facilitator	270,025
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				<p>awareness of risks and opportunities, and identify solutions to issues relating to labour influx</p> <p>Developing a feedback and grievance mechanism to collect any feedback or complaints related to labour influx associated with the project</p> <p>Ebonyi SAPZ SPIU will also ensure the contractor(s), together with opinion leaders, traditional leaders, sensitise migrant workers</p>					
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				<p>on societal norms, taboos and other cultural practices in the area;</p> <p>The Contractor shall be required to submit for the approval of the Supervising Engineer a labour influx management plan which will include a social and cultural orientation plan.</p>					
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34		Public safety		<p>The contractor(s) will guard all excavations and trenches including borrow areas, canals and drains with caution tapes and safety nets;</p> <p>The contractor(s) will use warning signs at vantage points to indicate ongoing construction works</p> <p>The contractor(s) will enforce proper security at the project site during construction works to limit</p>	<p>No. of complaints about pollution due to operations</p> <p>Number of workers with PPEs</p> <p>Number of FRSC and police present in the area.</p> <p>Number of safety talk and awareness conducted</p>	Monthly	Contractor	ESO, Facilitator	347,175
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				<p>entry of unauthorised persons to the project site;</p> <p>The contractor will ensure that all haulage trucks comply with the approved speed limit of 50 km/hr within the communities along the haulage road</p> <p>The contractor should ensure that there are traffic wardens along haulage routes to assist pedestrians in crossing;</p> <p>Movement of crews and equipment within the</p>					
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				rights-of-way and over routes provided for access to the work shall be performed in a manner to minimize damage to land, crops or property.					
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		Road impacts & traffic issues	Road network, communities	<p>Announcement and notification of work by the contractor. The communities must be informed at least seven days before start of work</p> <p>Warning signs shall be provided at the junction on entering the project area</p> <p>Transport of materials (such as quarry products and concrete) will as much as possible be carried out during off-peak traffic</p>	<p>Availability of safe access roads/walkways to communities.</p> <p>Records on public complaints related to obstruction of access ways (road blocks, delays, etc.)</p>	Daily	Contractor	ESO, Facilitator	424,325
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				<p>hours to minimise the impact on traffic.</p> <p>Speed limits of between 20-30 km/hour will be enforced along the route for all trucks;</p> <p>Trucks transporting quarry products and other friable materials to the site will be covered</p> <p>All temporary traffic controls will be done in consultation with FRSC and the traffic Police;</p>					
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			<p>The contractor shall ensure that all the vehicles to be used for the project and especially in transporting equipment and materials will be serviced regularly and all the drivers to be engaged/ assigned would be required to hold the requisite driver's license as prescribed by the s Licensing Authority.</p> <p>In an unfortunate incident of any</p>					
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				<p>truck failure, such trucks will be towed within 24 hours;</p> <p>The contractor will repair and maintain damaged sections of the road network due to construction activities</p> <p>No vehicle shall be parked at unauthorised places to reduce the risk of accidents.</p>					
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35		Occupational health & safety	Workers	<p>The contractor(s) will be required to adopt a Health & Safety Policy to guide the land preparation and construction activities; •t</p> <p>The contractor will ensure that only qualified machine operators with requisite skills and experience be employed to operate the machines;</p> <p>The contractor will ensure regular maintenance and servicing of its bulldozers, excavators and</p>	<p>Awareness of health and safety policy</p> <p>Availability and proper use of PPEs</p> <p>Availability and proper use of warning signs -</p> <p>Availability of first aid kit</p> <p>Adherence to health and safety procedures</p> <p>Records on frequency, type and source of illness/accident/injury -</p> <p>Records on non-compliances</p> <p>Records on training and awareness creation on health and safety</p>	Daily	Contractor	ESO, Facilitator	424,325
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				<p>tractors as well as other machinery to ensure they are in good condition.</p> <p>Good conditioned and well-maintained equipment will reduce frequent breakdowns, noise nuisance and smoke emissions which could affect the operator's and other workers' health and safety;</p> <p>Contractor will regularly carry out training on standard</p>					
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				<p>operational procedures. Health & safety training will also be provided for machine operators and workers’ Contractor will provide first aid training for its workers and provide first aid kits at the project site during land preparation and construction activities to treat minor ailments. However, major cases will be referred to the nearest hospital or health post;</p>					
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				<p>Contractor will also provide and enforce the use of appropriate Personal Protective Equipment (PPE) such as safety boots, reflective jackets, hand gloves, earplugs and nose masks.</p> <p>Sanctions will be implemented where workers do not use the PPEs provided;</p> <p>Contractor will organise weekly toolbox meetings for workers and brief them on EHS issues and</p>					
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				what to do to safeguard the environment and avoid accidents or injuries.					
36		Waste generation and disposal	Soil, water bodies	The Contractor will ensure efficient use of construction materials to minimize the waste to be generated Excavated soil material will, as much as possible, be reused in construction; The contractor(s) waste management plan should	Metallic wastes Garbage Waste oil Hazardous waste Construction Spoil Storage facilities for hazardous wastes Hazardous waste collection firm engaged Waste management plans Waste Storage bins	weekly	Contractor	ESO, Facilitator	347,175

				<p>include disposal of excavated material and cleared vegetation, which cannot be re-used. This will be subject to approval by the engineering consultant;</p> <p>The contractor(s) will provide bins on site for collection and disposal of plastic waste and polythene materials such as lubricant containers, drinking water sachets and carrier bags</p>					
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				<p>which will be regularly emptied at approved dump site.</p> <p>Workers will be sensitized to comply with the Waste Management Plan</p> <p>The contractor must promote waste avoidance; reduction; reuse and recycling as applicable</p> <p>Disposal of waste material shall be by burying, where burial of such materials is approved by the Engineer, or by removal</p>					
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				<p>from the construction area;</p> <p>The contractor(s) will allow the neighbouring communities to collect the tree and shrub stems for use as poles, fuelwood and fencing material.</p> <p>As much as possible, the twigs and leaves will be spread and ploughed into soil or allowed to decompose;</p>					
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37		Sanitation issues and public health	Land, water bodies	<p>The contractor will provide temporary toilet facilities at the project site for use by the construction workers.</p> <p>The workers will be educated against “free range” defecation;</p> <p>The contractor will provide adequate waste bins at the project site to minimise indiscriminate disposal of plastic and polythene material, cans</p>	<p>Health records (respiratory tract infections, malaria water – borne diseases and other sanitation related diseases)</p> <p>Records on public complaints related sanitation and public health issues</p>	Daily	Contractor	ESO, Facilitator	385,750
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				<p>and food waste by workers. These bins will be frequently emptied at approved dump sites to prevent littering with cans and bottles which could collect water and breed mosquitoes;</p>					
									13,308,375

Proposed Sites for the location of the AIH and ATCs

S/N	Proposed Site	Value Chain	Building Block
1	Nkaliki	Livestock	AIH
2	Ishiagwu Ndiebor	Rice	ATC
3	Onuigboji-Ikwo	Rice	ATC
4	Amangwu	Rice	ATC
5	Ugwulanwu	Cassava	ATC
6	Amata Ugwulangwu	Cassava	ATC
7	Amika 135	Cassava	ATC
8	Amaleze	Cassava	ATC
9	Ezillo	Cassava	ATC

Agro-Industrial Hubs (AIHs);

Agricultural Transformation Centre (ATC)

ANNEX VII: Questionnaire

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA)

QUESTIONNAIRE

EBONYI STATE SAPZ INTERVENTION PROGRAM

Dear Respondent,

Thank you for taking the time to complete the following survey. The purpose of this survey is to gain valuable insight on proposed intervention Ebonyi State Special Agro-Industrial Processing Zones (SAPZ) program. This provides you the opportunity to contribute to the environmental and social components of the project implementation.

NOTE:

Please read each question carefully. Your answers are completely confidential and will be included only in summaries where individual answers cannot be identified. Unless otherwise instructed, please tick appropriate answer category that best describes your opinion. It will take approximately 20 minutes to complete this questionnaire.

SECTION A: Household data

1. Gender of Respondent: (a) Male (b) Female
2. Age: (a) Below 18 yrs (b) 18-45 yrs (c) 46-65 yrs (d) Above 66 yrs
3. Marital Status: (a) Single (b) Married (d) Divorced/Separated (e) Widowed
4. Occupation: (a) Farmer (b) Daily Labourer (c) Trading & Shop Keeping (d) Artisans (e) Employed (salary) (f) Retired (g) Civil Servant (h) Unemployed (i) Others specify.....
5. Residential Status: (a) Permanent Resident (b) Back Home (Returnee) (c) Non-Resident, Visiting

6. Ethnic Group: (a) Igbo (b) Isoko (c) Urhobo (d) Yoruba (e) Hausa-Fulani
(f) others
7. Religion: (a) Christianity (b) Islam (c) Traditional
8. Relationship to Household Head (HH): (a) Self (b) Spouse (c) Child (d) Parent (e) Other, specify.....
9. Size of the HH
10. How long have you been living in this area? (a) 0-2 yrs (b) 3-5 yrs (c) 6-9 yrs (d) 10 yrs and Above
11. Education: (a) NO formal education (b) Primary School (c) Secondary School
(d) Tertiary (Excluding University) (e) University Graduate (f) University Post Graduate

SECTION B: Health Status

1. How do you manage your health conditions when sick? (a) Attend hospital/clinic (b) Buys drugs from nearby chemist (c) Traditional medicine (d) None (e) Others Specify.....
2. If you do attend hospital/clinic, when last did you visit one? (a) last six months (b) last one year (c) last five years (d) more than five years ago (e) Never visited one.
3. Please tick one or more of the under-mentioned ailment/sickness, you suffer from most accordingly?

Ailment		Ailment	
Whooping Cough		Rheumatism	
Tuberculosis		Rashes	

Asthma		Eczema	
Dysentery		Ringworm	
Diarrhoea		Eye pains	
Cholera		Cataract	
Pile		Glaucoma	
Hypertension		Typhoid fever	
Congestive health problem		Malaria	
Pneumonia		Sickle cell anaemia	
Sexually transmitted diseases		Epilepsy	

7. Do you think your health condition will be affected by the proposed intervention? (a) YES (b) NO
8. If yes, how? (a) Contamination of ground water (b) Contamination of surface water (c) Provide breeding site for disease vectors (d) Noise/air pollution (e) Others, specify:.....
9. Please suggest how this can be averted during construction and implementation.....

SECTION C. Standard of Living / Socio-Economic Activities

1.0 Assets

1.1 What sort of housing does your household live in?					
a. Construction material - Walls		Plastered mud	c. Number of rooms		1-2
		Cement blocks			3-4
		Other (specify)			Other (specify)
b. Construction material - roofing		Corrugated roofing	d. Other structures on plot		Animal Pen
		Aluminium			Granary
		Asbestos			Shops
		Tile			Kiosks
		Other (specify)			Other (specify)
e. Construction material - floor		Earthen			
		Concretes			
		Tiles			
		Other (specify)			
f. Toilet Facility		Pit latrine			
		Water closet			
		Toilet facility outside dwelling			
		Pier latrine			
		Other (specify)			
g. Tenure of housing		Owned			
		Rented			
		Occupied rent free			
		Other			
h. Tenure of land		Owned			
		Rented			
		Occupied rent free			
		Lease hold			

		Others specify
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1.2 Indicate household refuse disposal for solid waste? (Multiple options) (a) Depositing refuse at backyard of the house (b) Dumping in water body (c) Dumping in community refuse/garbage pit/dumpsite (d) Burning after gathering together (e) Waste collector (f) Other specify.....

2.0 Household Services

2.1 Rank in order of availability and usability the source(s) of lighting for the household? (please use 1, 2,...in hierarchical order with 1 indicating the most available and used source)

(a) PHCN	(b) Generator	(c) Lantern	(d) Candle	(e) Palm Oil Lamp	(f) Torchlight Battery	(g) Wood	(h) Kerosene	(i) Gas
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2.2 Using the method in 2.1, indicate major source of energy for cooking?

(a) Fire Wood	(b) Coal	(c) Kerosene	(d) Electricity	(e) Animal dropping	(f) Gas	(g) Crop Residue/saw dust	Others
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3.0 Sources of Water

	for drinking	for cooking	for bathing and washing
Well			
Borehole/Water pump			
Community tap			
Piped water outside dwelling			
River			
f. Rain harvesting			
g. Water vendor			
h. Tanked water			
Other (specify)			

4.0 Income

State your main income per month	₦
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4.1 Remittances

1. Does anyone in the family who lives elsewhere send money to you?	1	YES	2	NO
2. If yes, how much (per month)	₦			

5. In your opinion, how has the standard of living of your household changed over the previous three years?
(a) Same (b) Better (c) Worse
6. Is the option in 5 propelled by the state of the environment? (a) YES (b) NO
7. If 6 is YES, do you think the proposed intervention will improve the situation? (a) YES (b) NO
8. If 7 is YES specify how the project will improve the situation

SECTION D: Gender-Based Violence/Sexual Exploitation and Abuse

1. Are there any provisions which restrict women's access to health and other social services? In particular which:
(Please specify in the space provided for this purpose "yes" or "no")
- () require the consent of a male relative/husband for a married woman's medical examination or treatment or access to contraceptives or abortion,
 - () require parental consent in case of adolescents' access to contraceptives or abortion;
 - () allow medical practitioners to refuse provision of a legal medical service on grounds of conscientious objection
 - () prohibit certain medical services, or require that they be authorized by a physician, even where no medical procedure is required; in particular:

- () IUDs (intrauterine devices) or hormonal contraceptives
 () Emergency contraceptives, including the morning-after pill,
 () Sterilization on request;
 () Early abortion (in first trimester of pregnancy) at the pregnant woman's request
 () Medically assisted reproduction (e.g., in vitro fertilization)
2. Are the following acts criminalized?
(Please specify in the space provided for this purpose "yes" or "no")
 () transmission of HIV or other venereal diseases by women only
 () female genital mutilation
 () child marriage
 () home births with an obstetrician or midwife
 () abortion
3. Are the following acts criminalized?
(Please specify in the space provided for this purpose "yes" or "no")
 () adultery
 () prostitution
 (If yes, who is criminally responsible – please circle the appropriate answer: the sex worker, the procurer and/or the customer)
 () sexual orientation and gender identity (homosexuality, lesbianism, transgender, etc.)
 () violations of modesty or indecent assault (e.g. not following dress code)
4. If yes, does it cover: *(Please specify in the space provided for this purpose "yes" or "no")*
 () prevention of sexually transmitted diseases
 () prevention of unwanted pregnancies
 () promotion of a healthy lifestyle, including prevention of dietary disorders of teenage girls, including anorexia and bulimia
 () psychological/psychiatric training on self-control of aggression, including sexual aggression
5. Are there any measures and programs undertaken in order to increase women's safety e.g. in public urban spaces, in public transportation, etc.?
 YES () NO ()
6. Are there specific training programs for medical and legal professionals on the issue of gender-based discrimination in the area of health and safety?
 YES () NO ()
7. Do they cover: *(Please specify in the space provided for this purpose "yes" or "no")*
 () the issues connected with specific women's needs in area of health
 () specific women's vulnerability to be victims of gender-based violence or specific crimes
 () the nature of gender-based violence,
 () its occurrences and symptoms
 () methods of detection
 () medical protocols
 () influence of gender-based violence, in particular of sexual violence on the future behaviors of victims (post-traumatic stress symptoms etc.)
8. How do you ensure gender equity in the community? (a) Women are elected in public office (b) Females are given equal opportunity and access to education and employment (c) Quotas on genders are ensures in leadership of community-based organizations (d) Others specify.....

SECTION E: Resources/ Cultural Property

1. Please indicate the environmental problems which your settlement/community experiences? (a) Soil infertility (b) Poor drainage system (c) Bad road (d) Bad lands (e) environmental degradation (f) Degraded land (i) Destruction of infrastructures (j) Others (specify)
2. Please indicate the environmental problems which your settlement/community would likely experience and whose cause can be linked to the proposed intervention project during construction? (a) Soil infertility (b) Poor drainage system (c) Bad road (d) Low visibility (e) Erosion Problems (f) Flooding (g) Environmental degradation (h) Destruction of infrastructures (i) encroachment of land properties (j) Pollution (air, surface water, ground water, noise) (j) Others (specify)
3. Please indicate the environmental problems which your settlement/community would likely experience and whose cause can be linked to the proposed intervention project during operation? (a) Soil infertility

- (b) Poor drainage system (c) Bad road (d) Low visibility (e) Erosion Problems (f) Flooding
- (g) Environmental degradation (h) Destruction of infrastructures (i) encroachment of land properties
- (j) Pollution (air, surface water, ground water, noise) (k) Others (specify)

4. Do you think the proposed intervention project will affect any valued resource/cultural/archaeological property in your area? (a) YES (b) NO

5. If yes mention the name(s) of the valued resource/cultural/archaeological property

.....

6. How will valued resource/cultural/archaeological property be affected? (a) Displacement of such valued cultural properties (b) Vandalisation of sacred items/locations (c) Possible theft of sacred/archaeological items (d) Others, specify:

SECTION F: Intervention Project Activities Impact Evaluation

Are you aware of the proposed intervention by SAPZ? (a) YES (b) NO

If yes, from which source (a) Community meetings (b) Media (TV, Radio, Newspaper, Internet)

(c) Others specify.....

Do you think the proposed intervention project can cause restiveness in your community?

(a) YES (b) NO

If 3 is yes how will the proposed intervention result in restiveness? (a) Disrespect of norms and culture by contractors (b) loss of farmland / Property (c) Possible theft of sacred/archaeological items (d) local people not employed during construction (e) Others, specify:

5. How will the proposed intervention project impact on your livelihood and environment?

Positive impacts	Negative impacts
(a)	
(b)	
(c)	
(d)	
(e)	
(f)	

6. Can you name some of the animals and other habitat that may be affected by the proposed intervention project?

7. What do you expect from the activities of SAPZ intervention? (a) employment of Locals during construction (b) compensation for those whose properties will be affected (c) capacity building for maintenance during implementation (d) community input into final engineering design (e) Others please specify.....

8. Are there any other issue(s) of concerned as regards the intervention project in your area, please state clearly?

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