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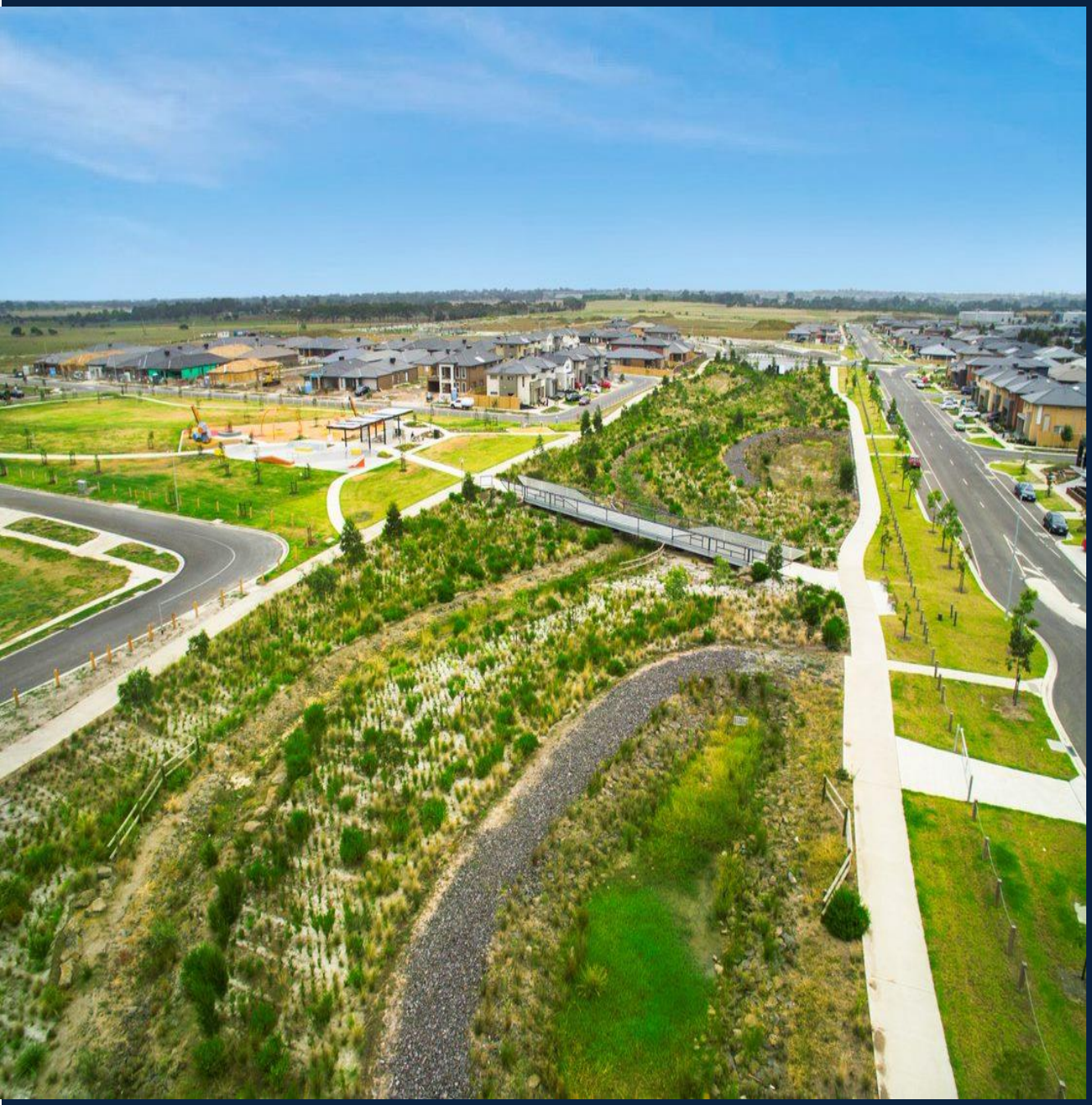

SMEC INTERNAL REF. 7115024

Ekiti SAPZ ESIA Draft Report

Environmental and Social Impact Assessment of Ekiti Special Agro-Industrial Processing Zone in Nigeria

GOVERNMENT OF EKITI STATE NIGERIA
LAND OF HONOUR
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Approvals	Name	Designation	Date
Author	Tpl. Barnabas Atiyaye FNITP	Team Lead	20-06-2022
	Tpl. Nathaniel Atebije FNITP	Supervision and Internal Review	20-06-2022
	Seth Dauda	Environmental Analysis (Water, Soil, Air, Noise)	20-06-2022
	Osunsanmi Gbolabo	Community Consultations	20-06-2022
	Tpl. Samson Olusegun	Socio-Economic Analysis	20-06-2022
	Theophilus Usman Louis	Socio-Economic Analysis, GIS, and Mapping	20-06-2022
	Mohammed Lawal Shaibu	Research, Report Writing/Editing	20-06-2022
	Silas Barnabas	Technical Assistance	20-06-2022
Reviewer	Hamza Usman	Project Manager	21-06-2022

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Company Details

Approved by	Paulo Trindade		
Address	Commercial 3rd Floor, Office 5, One Airport Square, Accra | Ghana		
Telephone	+233 556 109 493	**Facsimile**	N.A.
Email	paulo.trindade@smec.com	**Website**	www.smec.com
Signature			

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Executive Summary

This Environmental and Social Impact Assessment (ESIA) Report is part of a consultancy service for the development of a Special Agro-Industrial Processing Zone (SAPZ) in Ekiti State, Nigeria. The Ekiti SAPZ is an initiative of the Ekiti State Government to boost agricultural development within the state for the purpose of attracting foreign direct investment (FDIs), ensuring food security, generating employment, and boosting the GDP of the state. The Ekiti SAPZ spans from Oye to Ikole Local Government Areas (LGAs) of Ekiti State covering about 55,000 hectares and is proposed to comprise of extensive farmlands and agro-allied industries. Within the SAPZ, a 500-hectare land area has been selected in an accessible centre for which a Concept Master Plan has been developed. This report refers to this area as the Processing Hub situated in Ikole LGA between Itapaji and Oke-Ako communities. The Processing Hub comprises of processing industries, logistics warehouses, skills development and empowerment centres, technical support services, and other supporting amenities. It is to be implemented in three phases, starting with a 110-hectare start-up area.

The objective of the ESIA is to predict the potential positive and negative environmental and social impacts of the Ekiti SAPZ with a view to developing appropriate measures to mitigate the predicted negative impacts through an Environmental and Social Management Plan (ESMP). It was guided by applicable Federal and State legislating and regulatory frameworks such as the Environmental Impact Assessment Act No. 86, 1992 (as amended by EIA Act CAP E12 LFN 2004), The Federal Environment Protection Agency (FEPA) Act of 1988, the Nigerian Urban and Regional Planning Law referred to as CAP N138 LFN 2004, and various other policies and international conventions presented in the first chapter.

The project is needed to boost Nigeria's agricultural sector which is the highest employer of Nigerians despite an array of challenges such as constrained access to land, low level of irrigation development, poor access to markets, poor technological applications, and poor industrialisation. With an estimated value of N880m (through sale of farmlands) or N498m (through seven-year lease of farmlands) for the SAPZ and an estimated cost of USD204million for the development of the Processing Hub, the project is envisaged to be sustainable based on the socio-economic benefits it stands to offer to the project affected communities as presented in Chapter 2. The SAZ is also expected to contribute significantly to seven of the United Nations Sustainable Development Goals. As such, the timely implementation of the project is identified to be the most beneficial alternative, ahead of a no project or delayed project option.

The Ekiti SAPZ is accessed primarily by road while closest airports, seaports, and railway stations are outside the State boundary, accessible by major inter-State roads. The site has favourable climate, geology, topography, vegetation, and resources for the purposed activities within the site. However, power is sourced from the national gird which is insufficient for the day-to-day activities of Nigerians who have continued to experience epileptic power supply. The Ekiti SAPZ Processing Hub Concept Plan addresses the power shortage with a proposal of a power plant (stand-by emergency power) and 132/11kV power substation. The details of the concept plan including the phases of development, land use plan, infrastructure plan, and financial estimations are presented in this report's third chapter.

The ESIA involved the collection of socio-economic and environmental data of the project area through the administration of questionnaires, interviews, stakeholder meetings, community consultations, and quality tests for collected air, water, and soil samples presented in Chapter 4. Stakeholder meetings were held on the 16th of November 2021, involving relevant government Ministries, Departments, and Agencies who expressed (and eventually followed through) willingness to cooperate with the ESIA process through the provision of government data and resources required for the success of the SAPZ. Site visits were conducted from 16th to 19th November to collect primary data. Community consultations were held with seventeen (17) identified Project Affected Communities (PACs) through a Rapid Rural Approach from 20th to 23rd December 2021. The consultations improved awareness of the communities about the SAPZ project and all communities, except one, expressed their support of the project under the condition that they enjoy its benefit and that any land acquisition process is transparent and just.

Based on the assessment of all data collected, and with focus on the Processing Hub, the following positive and negative impacts are predicted in Chapter 5.

Positive Impacts	Negative Impacts
• Job Creation • Improvement of Local Economy • Profitable Use of Land and Land Resources • Communal Participation • Capacity Building • Increased Infrastructure Development • Reduced Loss of Farm Yield • Increase in Revenue Generation • Attraction of FDIs • Contribution to FOREX • Increased Urbanisation • CSR to Host Community • Improvement in Food Security • and Improvement of State's Brand.	• Deforestation • Impacts on the Ecosystem • Pollution • Waste Generation • Increase in Storm Water Run-Off • Predisposition of Soil to Erosion • Risk of Accidents • Noise Generation • Traffic Generation • Increased Pressure on Community Infrastructure • Increased Risk of Diseases • Occupational/Industrial Hazards to Workers • Increased Water Demand • Increased Power Demand • Increased Risk of Gender Based Violence and Harassment • Increased Risk of Crime and Juvenile Delinquency • Threat to Community Culture • Risk of Child Labour • Risk of Slum Development / Squatter Settlements.

Recommendations to enhance the positive impacts and measures to mitigate the negative impacts are proposed in the report (Chapter 6) through an Environmental and Social Management Plan (ESMP). The ESMP, presented in Chapter 7, outlines the institutions responsible for ensuring that the negative impacts are mitigated along with an implementation and monitoring schedule. In the event of decommissioning of the site, remediation plans are also proposed with recommendation options to repurpose the site for creative industries, tourism and recreation, or mass housing.

Under the condition of the implementation of the mitigation measures, this ESIA concludes that the Ekiti SAPZ (and the Processing Hub) is generally more beneficial to the environment and society than it is negatively impactful. On this basis, it is recommended that necessary approvals are granted for the development of the SAPZ.

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List of Acronyms

Acronym	Meaning	Description
AfDB	Africa Development Bank	A multilateral development finance institution that provides project finances to African governments and private companies.
APHA	American Public Health Association	An American health society that champions the health of all people and communities through advocacy of public health issues and policies with scientific backing.
AVR	Automatic Voltage Regulator	AVR is a solid-state electronic device for automatically maintaining generator output terminal voltage at a set value. It will try and do this as the generator load or operating temperature changes. The AVR is part of the alternators excitation system.
BOD	Biochemical Oxygen Demand	Biochemical oxygen demand (BOD) represents the amount of oxygen consumed by bacteria and other microorganisms while they decompose organic matter under aerobic (oxygen is present) conditions at a specified temperature.
Ca	Calcium	Calcium occurs in water naturally. One of the main reasons for the abundance of calcium in water is its natural occurrence in the earth's crust. It may dissolve from rocks such as limestone, marble, calcite, dolomite, gypsum, fluorite, and apatite. Calcium is a determinant of water hardness.
Cd	Cadmium	Cadmium is an extremely toxic metal commonly found in industrial workplaces. Due to its low permissible exposure limit, overexposures may occur even in situations where trace quantities of cadmium are found. Cadmium is used extensively in electroplating, although the nature of the operation does not generally lead to overexposures. Cadmium is also found in some industrial paints and may represent a hazard when sprayed.
Cfu/g	Colony forming units per gram	The number of colonies counted on a petri dish.
CH_4 Methane		Methane is a one-carbon compound in which the carbon is attached by single bonds to four hydrogen atoms. It is a colourless, odourless, non-toxic but flammable gas (b.p. -161°C). It has a role as a fossil fuel, a member of greenhouse gas and a bacterial metabolite
CI^-	Chloride Ion	Chloride Ion is a chlorine anion that forms the negatively charged part of certain salts, including sodium and hydrogen chloride salts, and is an essential electrolyte located in all body fluids responsible for maintaining acid/base balance, transmitting nerve impulses, and regulating fluid in and out of cells.
CITES	Convention on International Trade and Traffic Endangered Species	This is an international task force that meets to discuss and strengthen responses to illegal trade in specimens of CITES-listed tree species.
Cm	Centimetre	This is a metric unit of length, equal to one hundredth of a metre.
CO	Carbon Monoxide	A colourless, doorless, and tasteless gas that is a product of the incomplete combustion of solid, liquid, and gaseous carbon-based fuels. CO results from the burning of gasoline, natural gas, coal, oil, etc. Breathing CO reduces the ability of blood to transport oxygen to body cells and tissues; cells and tissues need oxygen to work.
COD	Chemical Oxygen Demand	The amount of dissolved oxygen that must be present in water to oxidize chemical organic materials, like petroleum.
Cond.	Conductivity	A measure of water's capability to pass electrical flow. This ability is directly related to the concentration of ions in the water 1. These conductive ions come from dissolved salts and inorganic materials such as alkalis, chlorides, sulphides, and carbonate compounds
Cr	Chromium	A lustrous, brittle, hard metal; a chemical element with the symbol Cr and atomic number 24.
CROWCON GASMAN/MSA ALTAIR	Detection Instrument	An intrinsically safe personal gas detector is designed to warn the user of dangerous conditions in the immediate vicinity. It is designed to monitor for the presence of flammable gases, enrichment of oxygen, also for presence of other toxic gases.

Cu	Copper	Copper is a chemical element with the symbol Cu (from Latin: cuprum) and atomic number 29. It is a soft, malleable, and ductile metal with very high thermal and electrical conductivity. A freshly exposed surface of pure copper has a pinkish-orange colour.
dB(A)	Decibel (Scale A)	The unit for expressing the ratio between two physical quantities, usually amounts of acoustic or electric power, or for measuring the relative loudness of sounds. One decibel (0.1 bel) equals 10 times the common logarithm of the power ratio.
DO	Dissolved Oxygen	Dissolved Oxygen is the amount of gaseous oxygen (O2) dissolved in the water. Oxygen enters the water by direct absorption from the atmosphere, by rapid movement, or as a waste product of plant photosynthesis.
EA	Environmental Audit	An assessment of the extent to which an organization is observing mitigation practices which minimizes harm to the environment.
EAR	Environmental Audit Report	The documentation of the mitigation practice and its effectiveness during the operation of the project against what was predicted in the EIA report.
EIA	Environmental Impact Assessment	Environmental Impact Assessment (EIA) is a systematic and integrative process for considering possible impacts prior to a decision being taken on whether or not a proposal should be given the approval to proceed or not.
EIS	Environmental Impact Statement	A government document that outlines the impact of a proposed project on its surrounding environment.
EMP	Environmental Management Plan	This is a plan that outlines the environmental monitoring requirement, frequency, responsible parties, and cost of implementation.
EMS	Environmental Management System	An Environmental Management System (EMS) is a set of processes and practices that enable an organization to reduce its environmental impacts and increase its operating efficiency.
ESIA	Environmental and Social Impact Assessment	Environmental and social impact assessment consists of a multidisciplinary approach, which combines the evaluation of the economic aspects of a project - based on cost-benefit ratios - with the environmental consequences of undertaking the project.
ESMP	Environmental and Social Management Plan	The ESMP provides a roadmap for implementation of enhancement and mitigation measures of the identified impacts.
FAO	Food and Agriculture Organisation	The Food and Agriculture Organization of the United Nations is a specialized agency of the United Nations that leads international efforts to defeat hunger and improve nutrition and food security.
Fe	Ferrous (Iron)	Iron is an integral part of the natural environment, and many important chemical reactions involve changes in iron that are caused by an electron being transferred to the iron from other minerals, water or biological agents.
FEPA	Federal Environmental Protection Agency	The functions of FEPA were taken up by the Federal Ministry of Environment when that agency was incorporated into its structure. Thus, it is the Ministry that carries out environmental impact assessments (EIAs) and only the Minister is empowered to issue an environmental impact statement (EIS).
FMARD	Federal Ministry of Agriculture and Rural Development	A Nigerian government ministry that foresees agricultural and rural development within the country.
FMEnv	Federal Ministry of Environment	A Nigerian government organization that works to ensure environmental protection, natural resources conservation and sustainable development.
G	Gramme	A unit of weight. One thousand grammes are equal to one kilogramme.
GDP	Gross Domestic Product	The standard measure of the value added created through the production of goods and services in a country during a certain period.
GF	Green Field	Land (such as a potential industrial site) which have not been previously developed or polluted.
GSM	Global System for Mobile Telecommunications	The Global System for Mobile Communications (GSM) is a standard developed by the European Telecommunications Standards Institute (ETSI) to describe the protocols for second-generation (2G) digital cellular networks used by mobile devices such as mobile phones and tablets.

GW	Ground Water	Groundwater is the water found underground in the cracks and spaces in soil, sand and rock. It is stored in and moves slowly through geologic formations of soil, sand and rocks called aquifers. Contemporary examples are boreholes and wells.
H_2S	Hydrogen Sulphide	Hydrogen sulphide is a colourless gas with the characteristic's foul odour of rotten eggs; it is heavier than air, very poisonous, corrosive, and flammable. It often results from the bacterial breakdown of organic matter in the absence of oxygen gas, such as in swamps and sewers.
H_2SO_4	Tetraoxosulhphate VI acid	Tetraoxosulphate (VI) acid is commonly known as sulfuric acid and trioxonitrate (V) acid is commonly known as nitric acid. The former has a characteristic pungent smell in contrast to the latter. Both are corrosive mineral acids
HCs	Hydrocarbon	Any class of organic chemical compounds composed only of the elements carbon and hydrogen.
Hg	Mercury	Mercury is a chemical element with the symbol Hg and atomic number 80. It is commonly known as quicksilver and was formerly named hydrargyrum from the Greek.
$HN0_3$	Trioxonitrate V Acid	Nitric acid, red fuming appears as a pale yellow to reddish-brown liquid generating red-brown fumes and having a suffocating odor. Very toxic by inhalation. Corrosive to metals or tissue. Prolonged exposure to low concentrations or short-term exposure to high concentrations may result in adverse health effects.
hr.	Hour	This is a period of 60 minutes used to measure time.
HSE	Health, Safety, and Environment	A HSE is a type of company or organizational policy that comprise of an integrated approach to effectively manage or reduce the risk of anticipated hazards.
ITDZ	Inter-Tropical Discontinuity Zone	a narrow zone near the equator where northern and southern air masses converge, typically producing low atmospheric pressure
IRR	Internal Rate of Return	A mathematical and economic metric used in financial analysis to estimate the profitability of potential investments.
K	Potassium	Potassium is a chemical element with the symbol K and atomic number 19 and an essential mineral that is needed by all tissues in the body that helps muscles to contract and supports normal blood pressure.
Kg	Kilogram	This is a measure of weight that is made up of 1000 grammes.
kV	KiloVolt	A unit of potential difference equal to 1000 volts.
LCA	Life cycle analysis	Life cycle analysis (LCA) is a method used to evaluate the environmental impact of a product or project through its life cycle encompassing extraction and processing of the raw materials, manufacturing, distribution, use, recycling, and final disposal.
LGA	Local Government Area	A local government area (LGA) is an administrative division of a country that a local government is responsible for. The size of an LGA varies by country but it is generally a subdivision of a state, province, division, or territory.
M	metre	The fundamental unit of length in the metric system and in the International Systems of Units (SI). ... The metre is now thus defined as the distance travelled by light.
m/s	*meters*/second	The metre per second is an SI-derived unit of both speeds (scalar quantity) and velocity equal to the speed of a body covering a distance of one meter.
MDAs	Ministries, Departments, and Agencies	Refers to government run organisations.
Mg	Magnesium	Magnesium occurs in significant amounts in most limestones and especially in dolomites. The dissolution of these rocks brings magnesium into water.
mg/kg	Milligram per kilogram	Unit for toxicological data: the amount of substance divided per the mass of the animal used in the test.
mg/l	Milligrams per litre	A measure of the concentration by weight of a substance per unit volume in water or wastewater.
Ml	millilitre	A millilitre is a unit of volume for liquids and gases that is equal to a thousandth of a litre. E.g., 100 millilitres of blood
Mm	Milligrams	A milligram is a unit of weight that is equal to a thousandth of a gramme.

Mm	millimetre	Millimetre is a unit of length in the metric system, which is equal to one thousandth of a metre.
Mn	Manganese	Manganese occurs naturally as a mineral from sediment and rocks or from mining and industrial wastes. It is relatively non-toxic to animals but toxic to plants at high level.
MT	Million tonnes	This is the equivalent of 1 billion kilograms used in measuring the weight of a massive object.
MVA	Megavolt Ampere	The capacity of larger transformers is normally measured in terms of megavolt-amperes, where one MVA is one million volt-amperes.
MW	Megawatts	Megawatts are used to measure the output of a power plant, or the amount of electricity required by an entire city, representing 1,000,000 watts.
Na	Sodium	Sodium is a very soft silvery-white metal. Sodium is the most common alkali metal and the sixth most abundant element on Earth, comprising 2.8 percent of Earth's crust.
Nd	Neodymium	Neodymium is a chemical element with the symbol Nd and atomic number 60. It is the fourth member of the lanthanide series and is traditionally considered to be one of the rare-earth metals. It is a hard, slightly malleable, silvery metal that quickly tarnishes in air and moisture.
NEPC	NEPC	The Federal Government of Nigeria's apex institution for the promotion, development, and diversification of exports.
NEPZA	Nigeria Export Processing Zones Authority	A Nigerian agency that establishes, licenses, regulates and operates Free Zones by providing incentive schemes, support facilities and service for export manufacturing and other commercial activities.
NESREA	National Environmental Standards and Regulation Enforcement Agency	NESREA is an environmental agency of the Federal Government of Nigeria which was established by law in 2007 to "ensure a cleaner and healthier environment for Nigerians" by maintaining and regulating environmental standards at all sectors. The agency functions as a parastatal of the Federal Ministry of Environment and is headed by a Director-General who is also the chief executive officer.
NH_3	Ammonia	Ammonia is a colourless gas with a pungent odour that is noticeable at a concentration above 50ppm. It is poisonous if inhaled in great quantities and irritating to the eyes, nose, and throat in lesser amounts.
Ni	Nickel	Nickel is a transition element extensively distributed in the environment, air, water, and soil. It may derive from natural sources and anthropogenic activity.
NIPC	Nigerian Investment Promotion Commission	An agency of the Federal Government established to encourage, promote, and coordinate investments in Nigeria.
NO_2	Nitrogen Oxide	Nitrogen dioxide (NO_2) is a red-brown pungent gas that is typically formed because of combustion processes. It is heavier than air with a vapor density of 1.58 compared to 1.0 for standard air. The odor threshold for NO_2 is between 1-6 parts per million (1,880-11,280 ug/m^3). Nitrogen dioxide gas is highly reactive, corrosive to metals, and is a strong oxidizing agent
NO^-_3	Nitrate Ion	Nitrate is a nitrogen oxoanion formed by loss of a proton from nitric acid. Principal species present at pH 7.3.
NOx	Oxides of Nitrogen	Oxides of nitrogen are a mixture of gases that are composed of nitrogen and oxygen. Two of the most toxicologically significant compounds are nitric oxide (NO) and nitrogen dioxide (NO2).
NURPL	Nigerian Urban and Regional Planning Law	The Nigeria Urban and Regional Planning (Decree No. 88, 1992) is the Planning law enacted in 1992 to guide orderly physical development in modern Nigeria. The birth of the Decree was preceded by forty – six years of outdated Town and Country Planning Law of 1946
ODS	Ozone Depleting Substances	Ozone depleting substances are chemicals that destroy the earth's protective ozone layer. They include chlorofluorocarbons (CFCs), halons, carbon tetrachloride (CCl4), methyl chloroform (CH3CCl3), hydrobromofluorocarbons (HBFCs), hydrochlorofluorocarbons (HCFCs), methyl bromide (CH3Br) and bromochloromethane (CH2BrCl).
O2	Oxygen	A colourless, odourless reactive gas, the chemical element of atomic number 8, and the life-supporting component of the air. The air we breathe comprises of it.
P	Potassium	The name is derived from the English word potash. The chemical symbol K comes from kalium, the Mediaeval Latin for potash, which may have derived from the Arabic word *qali,* meaning alkali. Potassium is a soft, silvery-white metal, member of the alkali group of the periodic chart.

		Its presence is used to measure soil quality and it is also essential for the healthy growth of plants.
PACs	Project Affected Communities	These are communities that stand to be affected by a particular project either positively or negatively.
Pb	Lead	Lead occurs naturally in the environment. However, most lead concentration that is found in the environment is a result of human activities. Due to the application of lead in gasoline an unnatural lead-cycle has consisted of.
pH	Hydrogen ion Concentration	This is the concentration of hydrogen ions in a medium $_{P}H$ that affects the availabilities of various forms of nutrients and metals and affects the various processes of water treatment that contribute to the removal of viruses, bacteria, and other harmful organisms. It influences the toxicity of pollutants.
PM	Particulate matter	PM stands for particulate matter (also called particle pollution): the term for a mixture of solid particles and liquid droplets found in the air. Some particles, such as dust, dirt, soot, or smoke, are large or dark enough to be seen with the naked eye.
PO^{3-}_{4}	Phosphate Ion	The phosphate ion has a molar mass of 94.97 g/mol and consists of a central phosphorus atom surrounded by four oxygen atoms in a tetrahedral arrangement. It is the conjugate base of the hydrogen phosphate ion H (PO. 4) 2− , which in turn is the conjugate base of the dihydrogen phosphate ion H.
PPE	Personal Protection Equipment	Personal protective equipment, commonly referred to as "PPE", is equipment worn to minimize exposure to hazards that cause serious workplace injuries and illnesses.
Ppm	Part per million	Parts per million (ppm) is the number of units of mass of a contaminant per million units of total mass.
SAPZ	Special Agro-Industrial Processing Zone	In the context of this report, an area in Ekiti State reserved for the promotion and development of agriculture and industries, inclusive of a Processing Hub.
SDG	Sustainable Development Goals	The Sustainable Development Goals are a collection of 17 interlinked global goals designed to be a blueprint to achieve a better and more sustainable future for all.
SEPA	State Environmental Protection Agency	A government parastatal under supervision of the State's Ministry of Environment. It is charged with specific environmental functions that relate to environmental protection.
SO^{2-}	Sulphate Ion	The sulphate anion consists of a central sulphur atom surrounded by four equivalent oxygen atoms in a tetrahedral arrangement. The symmetry is the same as that of methane.
SO^{2}	Sulphur Oxides	Sulphur dioxide SO_2 is a colourless, water-soluble gas that is reactive and has a pungent odour. Sulphur dioxide is detectable in the human nose at a concentration of around 0.5-0.8 parts per million. Concentrations of SO_2 in ambient air typically occur because of combustion processes in particular the burning of high Sulphur fuels, although specific industries such as fertilizer manufacturing also discharge SO_2.
Sox	Oxides of Sulphur	The most common sulphur oxide is sulphur dioxide (SO2). Sulphur trioxide (SO3) is an intermediate product during the manufacture of sulphuric acid (contact process). Sulphur dioxide is a colourless gas with a penetrating, choking odour.
SP	Suspended Particulate	Particulates – also known as atmospheric aerosol particles, atmospheric particulate matter, particulate matter (PM), or suspended particulate matter (SPM) – are microscopic particles of solid or liquid matter suspended in the air. Sources of particulate matter can be natural or anthropogenic.
SPM	Suspended particulate matter	Suspended particulate matter comprises lithogenic material, including quartz, feldspars, hydrous aluminium silicate clays (such as kaolinite, illite, chlorite, and montmorillonite), and iron and manganese oxides.
Sq.km	Square kilometre	Square kilometre or square kilometre (American spelling), symbol km2, is a multiple of the square metre, the SI unit of area or surface area.
SS	Suspended solids	Suspended solids (SS) are the amount of tiny solid particles that remain suspended in water and act as a colloid.

STDD	Satellite Towns Development Agency	Satellite Towns Development Agency (STDA) is a subsidiary of the FCTA vested with the statutory responsibilities of opening up/developing the satellite towns by providing infrastructure to the teeming rural dwellers, thereby improving their living standards; providing enabling environment which would further reduce the pressure already brought to bear on the city; developing and upgrading the satellite towns and finally, developing linkages between the Satellite Towns and the Federal Capital City (FCC).
SW	Surface water	Surface water is any body of water above ground, including streams, rivers, lakes, wetlands, reservoirs, and creeks.
T	Tonnes	A tonne is a metric unit of mass equal to 1,000 kilograms. It is also referred to as a metric ton.
T/d	Tonnes per day	Mass flow of metric tons across a threshold per unit time of a day.
TCN	Transmission Company of Nigeria	Emerged from the defunct National Electric Power Authority (NEPA) as a product of the merger of the electricity Transmission and Operations sectors, TCN Operate, expand/upgrade transmission facilities for efficient and effective wheeling of generated electricity in Nigeria.
TSS	Total suspended solids	Total suspended solids are particles that are larger than 2 microns found in the water column. Anything smaller than 2 microns (average filter size) is considered a dissolved solid.
TDS	Total dissolved solids	Total Dissolved Solids (TDS) are the total amount of mobile charged ions, including minerals, salts or metals dissolved in each volume of water, expressed in units of mg per unit volume of water (mg/L), also referred to as parts per million (ppm).
TH	Total Hardness	Water hardness is the amount of dissolved calcium and magnesium in the water. Hard water is high in dissolved minerals, both calcium, and magnesium.
THC	Total hydrocarbon content	THC is used to describe the quantity of the measured hydrocarbon impurities present. Usually expressed as methane equivalents.
TOC	Total organic carbon	Total organic carbon is a measure of organic compounds contained in a water sample.
Ug/g	Microgramme per gramme	This is a measure of density which is equivalent to 1/1000000 grammes.
uS/cm	Micro Siemens per centimetre	Microsiemens Per Centimeter (µS/cm) is a unit in the category of Electric conductivity.
USEPA	United State Environmental Protection Agency	This is an agency of the United States federal government whose mission is to protect human and environmental health. Headquartered in Washington, D.C., the EPA is responsible for creating standards and laws promoting the health of individuals and the environment.
V	Volts	Volts are the base unit used to measure Voltage. One volt is defined as the "difference in electric potential between two points of a conducting wire when an electric current of one ampere dissipates one watt of power between those points."
VOC	Volatile organic Compound	Volatile organic compounds are compounds that have a high vapor pressure and low water solubility. Many VOCs are human-made chemicals that are used and produced in the manufacture of paints, pharmaceuticals, and refrigerants.
WHO	World Health organization	This is an international health organization founded in 1948 with the core mandate of preventing and eradicating epidemics and to improve the nutritional, sanitary, hygienic and environmental conditions of people around the world.
Zn	Zinc	Zinc is a metal that is normally found in small amounts in nature. It is used in many commercial industries and can be released into the environment during mining and smelting (metal processing) activities.
>	Greater than	Symbol depicting a value greater than another based on comparison
<	Less than	Symbol depicting a value less than another based on comparison
%	Percentage	Symbol used in reflecting the fraction of a value by 100 units.

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- Representatives of the Project Affected Communities

EIA Preparers

For this study, the following team members have made valuable contributions:

Name		Specialization in the ESIA Report
Tpl. Barnabas Atiyaye FNITP	-	Team Lead
Tpl. Nathaniel Atebije FNITP	-	Supervision and Internal Review
Seth Dauda	-	Environmental Analysis (Water, Soil, Air, Noise)
Osunsanmi Gbolabo	-	Community Consultations
Tpl. Samson Olusegun	-	Socio-Economic Analysis
Theophilus Usman Louis	-	Socio-Economic Analysis, GIS, and Mapping
Mohammed Lawal Shaibu	-	Research, Report Writing/Editing
Silas Barnabas	-	Technical Assistance

1 Introduction

1.1 Background

Before the discovery of crude oil in the Niger-Delta, all regions of Nigeria contributed to the exportation of cash crops as the country's main source of foreign exchange, making agriculture the major contributor to Nigerian economic revenue. Such crops, among other agricultural produce, included palm oil and kernels from the east, cocoa and coffee from the west, groundnuts, hide and skin from the north, and rubber from the south (Okotie, 2017). The discovery of oil and eventual boom in global oil prices made crude oil Nigeria's main export, providing up to 60% of government revenue and 90% of foreign exchange earnings by 2012 (Asagunla & Agbede, 2018). When global oil prices crashed between 2014 and 2016, Nigeria experienced an economic shock that led to heightened calls for reduced reliance on oil revenue through economic diversification (Arndt, et al., 2018; Okoi, 2019; PWC, 2016). Meanwhile, despite suffering neglect and decline during the oil boom era (Sertoğlu, Ugural, & Bekun, 2017), the agricultural sector remained a significant contributor to the country's local economy, attributing for an average of 22.87% of Gross Domestic Product (GDP) since 1981 to 2020 according to World Bank data (The Global Economy, 2021). As such, and having once been the main foreign economic driver, agriculture presents a probable option for Nigeria's economic diversification.

The agricultural sector, engaged in by about 70% of Nigerians, is, however, faced with issues such as poor land tenure system, low level of irrigation, and land degradation (FAO, 2021). In addition, due to insecurity, farmers fear for their safety while carrying out their agricultural activities. These issues significantly reduce agricultural productivity (which is mostly small-scale) and prevent the country from meeting its agricultural potential. To boost agriculture, it is therefore necessary for the Nigerian government at Federal and State levels to drive initiatives that facilitate agricultural industrialisation and attract investments, both local and foreign, into the sector.

Ekiti State has realised the necessity to improve agricultural productivity and has identified agriculture and agribusiness promotion as a way to reduce poverty and improve the lives of its people. The State seeks to boost agricultural investments by "relying on its favourable agronomic conditions that can enable its farmers to achieve yields above the national average, the availability of land for investment and the location of the State in relation to the main consuming and urban centres including Lagos, Ibadan and Abuja" (Government of Ekiti State, 2018, p.1). To do this, over 40,000Ha of farmland has been allocated to agriculture sector investors in an area defined as the Ekiti Special Agro-Industrual Processing Zone (SAPZ). Within the SAPZ land area, 500Ha has also been earmarked for the development of processing industries, research and development centres, fertilizer distribution centres, and other facilities to support agricultural productivity. This area is herein refered to as the Processing Hub (or 'Hub').

The SAPZ (exclusive of the Hub) has the potential of directly generating an internal rate of return (IRR) of about 13% in seven years if developed for sale or lease at estimated project values of N880m and N498m respectively (Government of Ekiti State, 2020). Beyond the direct financial benefit of the project, it has the potential to create jobs and provide local employment, enhance agricultural production, and place Ekiti State as a major agricultural production hub both at the local, national, and international levels. With the economic benefits of the project having been established, there remains a need to assess the potential environmental and social benefits and/or losses the project may generate through an Environmental and Social Impact Assessment (ESIA) for Ekiti SAPZ. The ESIA serves to maintain economic, environmental, and social balance by informing decision-makers and the public on the environmental and social consequences of developing the SAPZ, which can be evaluated in comparison to the already established economic benefits.

This draft report presents information on the ESIA for the Ekiti SAPZ with specific focus on the Hub in some parts. It is the second in a series of three reports that documents the process of the assessment, present its findings, and make recommendations to ensure that environmental and social components in the Ekiti SAPZ are sustained to be best practices or enhanced. The structure of the report is presented in Section 1.6 (Page 18).

1.2 Objective

The objective of the ESIA is to predict the potential positive and negative environmental and social impacts of the Ekiti SAPZ with a view to developing appropriate measures to mitigate the predicted negative impacts through an Environmental and Social Management Plan (ESMP).

1.3 Scope

To achieve the stated objective of the ESIA, the scope of the assessment involved three main activities. These are the collection of baseline information for environmental and social impact assessment, the proposal of mitigation measures, and the development of an ESMP as hereby discussed.

1.3.1 Environmental and Social Impact Assessment (ESIA)

The ESIA involved the collection of major environmental and socio-economic data of the SAPZ project area and its populace, carried out through project site visits, structured interviews, and enumeration. Data collected, among others, include characteristics of water, air, soil, culture, history, economy, society, health, etc. of the SAPZ project affected communities (PACs). The data underwent a series of tests and analyses to generate baseline information which served as a benchmark for impact predictions to be made. The assessment processes were done to conform to the African Development Bank's (AfDB) Environmental and Social Assessment Procedures (ESAP) and the Federal Ministry of Environment's (FMEnv) Environmental Impact Assessment (EIA) standards.

1.3.2 Mitigation Measures

This involved the proposal of cost-effective and practical measures to avoid, reduce, or mitigate the predicted negative impacts of the project and enhance the predicted positive impacts. It comprised of the design and introduction of general and specific measures to protect the project environment and enhance societal cohesion and stability. It also involved the evaluation of proposed mitigation measures to determine the extent which they will reduce the predicted negative impacts. All mitigation measures for the predicted negative impacts and enhancement measures for the predicted positive impacts were proposed to be consistent with Nigeria's laws.

1.3.3 Environmental and Social Management Plan

The ESMP contains statement of actions to be carried out for the implementation of the proposed mitigation and enhancement measures. It outlines the entities responsible for carrying out the stated actions, the cost implications, and a specific programme to monitor its execution. The ESMP has been developed to be project and site specific and suitable for direct inclusion in the Ekiti SAPZ Master Plan and construction specifications.

1.4 Legal And Administrative Framework

This ESIA was guided by applicable Federal and State legislating and regulatory frameworks such as the Environmental Impact Assessment Act No. 86, 1992 (as amended by EIA Act CAP E12 LFN 2004) and the AfDB's ESAP. Other relevant legislative and administrative frameworks under which the assessment was carried out are discussed as follows.

1.4.1 National Legislations

Specific laws, guidelines and standards that regulate all developmental activities in Nigeria which were adhered to include:

i. The Federal Environment Protection Agency (FEPA) Act of 1988 (as amended by Decree 59 of 1992) which established penalty for discharging hazardous wastes in the environment.
ii. The Harmful Wastes Decree of 1988 which made the transportation, dumping or trading of harmful waste within Nigeria or its exclusive economic zone illegal if it does not have permit of the Ministry of Environment.

iii. The National Environmental Protection Agency Act of (1991) which requires that every industry installs abatement equipment, restricts release of toxic waste, and obtain permit from Ministry of Environment for storage, treatment, and transportation of toxic waste.
iv. The Guidelines and Standards for Environmental Pollution Control in Nigeria issued by FEPA (1991) and containing guidelines and standards, for industrial effluent, gaseous emissions and noise limitation, management of solid and hazardous/dangerous chemicals and volatile organic compounds.
v. The National EIA Decree No. 86 of 1992 which requires that EIA report be prepared for all new major development activities, as well as the accompanying EIA procedural and technical guidelines.
vi. The National Environmental Standards and Regulations Enforcement Agency Act 2007 (NESREA Act). After repealing the Federal Environmental Protection Act of 1988, the NESREA Act of 2007 became the major statutory regulatory institution to guide and enforce on environmental matters in Nigeria.

1.4.1.1 The Environmental Impact Assessment (EIA) Act Cap E12 LFN, 2004 22

The EIA Act which makes it mandatory for any person, authority, corporate body private or public, to conduct EIA before the commencement of any new major development or expansion that may likely have a significant effect on the environment shall be adhered to. The Act sets the EIA objectives and the procedures for consideration of EIA of certain public or private projects. The proposed Ekiti SAPZ project fits the description of a major project which shall impact on the environment and the livelihood of the people who shall be directly affected. Therefore, full compliance with the guidelines of the EIA Act is required.

1.4.1.2 The Nigerian Urban and Regional Planning Law

The need for development control in Nigeria came about to curb haphazard development after the outbreak of the bubonic plague which ravaged the city of Lagos in 1928. Prior to this period, the building regulation laws of the country were based on the Great Britain's town and country planning law of 1932. By 1946, an indigenous Town and Country Planning Ordinance was carved of this. The Ordinance continued to be operative until 1992 when a new Urban and Regional Planning Law was promulgated backed by the Decree 88 of 1992. It became an Act of Parliament after Nigerian transited into democracy known and referred to as CAP N138 LFN 2004.

It is the section 27(1) of this law that concerns development control, stating that the Control Department, at the Federal level shall have over the Federal land. The State's Control Departments shall in turn have control power over the State lands. While at the Local Government level the power of development control shall be within the jurisdiction of the Local Government. The Control Departments should be a multi-disciplinary department charged with responsibility of matters relating to development control and implementation of physical development plans. All land development should require the approval of the relevant control department. Also, a developer should submit a development plan for approval to the Development Control Department as stated in section 28.

Section 31, sub section c of the Nigerian Urban and Regional Planning Decree No 88 states that "an applicant for a development permit may be rejected, if in the opinion of the control department, the development is likely to have major impact upon the environment, facilities or inhabitants of the community."

Further, section 33 of the decree provides that "a developer shall submit application for development to the Development Control Department together with a detailed EIA for an application to develop his proposed project." Section 33, of the Nigerian Urban and Regional Planning Decree No. 88 states that, "a developer shall submit application for the development to the Development Control Department together with a detailed EIA for an application to development his proposed project of the following magnitudes:

i. Residential land more than 2 hectares;
ii. Permission to build or expand a factory or for the construction of an office building more than four floors or 5,000 square meters of lettable space; or,
iii. Permission for a major recreational development.

1.4.1.3 The Land Use Act

The Land use Act No. 6 of 1978 (Cap L5, LFN 2004) vests all land comprised 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 the Act. It protects the rights of all Nigerians to use and enjoy land in Nigeria which must be protected and preserved. Land acquisition must follow all the due process of law.

The law also allows the compulsory acquisition of land in the public interest or for a public purpose, the legislation enables the State to acquire land (more precisely, to abrogate leases and other authorizations to occupy land). The Act also specifies the procedures the State must follow to take possession and defines the compensatory measures the State must implement to compensate the people affected.

1.4.1.4 Other Laws and Policy Instruments

Other laws and policy instruments that the assessment adhered to are summarised in Table 1.1.

Table 1.1: National Laws and Policy Instruments

Policy Instrument		Year	Provisions
1	National Policy on the Environment	1989 revised 1991	Describes the conceptual framework and strategies for achieving the overall goal of sustainable development in Nigeria.
2	Nigerian Urban Development Policy	2012	Promotes efficient urban development and management through the three levels of government and sectoral programmes in environment and other fields to make them more responsive to the country's urban problems.
Legal/Regulatory Instrument			
3	Forestry Act	1994	Provides for the preservation of forests and the setting up of forest reserves.
4	Endangered Species Act	1985	Provides for the conservation and management of Nigeria's wildlife and the protection of some of her endangered species in danger of extinction because of over-exploitation
5	FEPA/FMEnv EIA Procedural Guidelines	1995	The Procedural Guidelines indicate the steps to be followed in the EIA process from project conception to commissioning to ensure that the project is implemented with maximum consideration for the environment.
6	National Guidelines and Standards for Environmental Pollution Control	1991	Provide guidelines for management of pollution control measures
7	S.I.15 National Environmental Protection (Management of Solid and Hazardous Wastes) Regulations	1991	Regulates the legal framework for the effective control of the disposal of toxic and hazardous waste into any environment within the confines of Nigeria.
8	Workmen Compensation Act	1987 reviewed 2010	Occupational Health and Safety
9	The Endangered Species Act	CAP E9, LFN 2004	Focuses on the protection and management of Nigeria's wildlife and some other species in danger of extinction because of overexploitation

Public Private Partnership Laws

This law was enacted by the Ekiti State House of Assembly as Law No. 12 of 2011, which establishes an office and advisory board tasked with facilitating infrastructural development through public and private partnership. This is elaborated under section 7 of this law. Section 12 elaborates the powers of the government in partnering with limited liability companies to finance projects which would be of benefit to both public and private stake holders (Government of Ekiti State, 2021).

Health

Ekiti State has two recognized laws under the health sector enacted by the Ekiti State House of Assembly, the first is the Ekiti State Mental Health law (No. 20 of 2021) which installs a steering committee in charge of managing mental health facilities, ensuring that the facilities meet required standard, fund raising and implementation of campaigns. The second is the Ekiti State Drugs Law (No. 14 of 2021) which establishes an agency charged with the responsibility of ensuring the distribution and regulation of quality drugs and health supplies within the Ekiti State (Government of Ekiti State, 2021).

1.4.2 Ekiti State Legislation

In Ekiti State, several laws have been deliberated and enacted through the Ekiti State House of Assembly. As regards to the ESIA preparation, other laws, policies, or relevant state bodies that influenced the ESIA are identified as follows:

1.4.2.1 Ekiti State Ministry of Environment

The Ekiti State Ministry of Environment was created to ensure environmental sustainability within Ekiti State, and at the same time domesticating the provisions of the national environmental legislation within Ekiti State for the provision of a habitable and aesthetically pleasing environment for the Ekiti people. The State Ministry is made up of six departments namely: Administration and supplies, forestry, finance and accounts, environmental health sanitation, nature conservation, and planning research and statistics. The Ekiti State Ministry of Environment is also charged with the supervision of two other government parastatals namely the State Environmental Protection Agency (SEPA) and Ekiti State Waste Management Board.

1.4.2.2 Ekiti State Environmental Protection Agency

The Ekiti State Environmental Protection Agency is a government parastatal under supervision of the State's Ministry of Environment. It is charged with specific environmental functions that relate to environmental protection. These functions include but are not limited to:

- The preparation and reception of Environmental Impact Assessment
- Erosion and Flood Control
- Environmental Education and Awareness
- Planning and Monitoring
- Pollution Abatement Technology
- Watershed Management

1.4.2.3 Ekiti State Ministry of Agriculture and Food Security

The Ekiti State Ministry of Agriculture is dedicated to agronomic development within the State. It has the mission of creating an enabling environment for Agricultural businesses and at the same time, attracting private investment in agriculture in order to ensure food security and economic development. The Ministry is made up of eight (8) departments and affiliated with three other agencies namely: Farm Settlement and Peasant Farmers Development, Fountain Agricultural Marketing Agency and; the Agricultural Development Programme/FADAMA III Project.

1.4.3 International Conventions

Nigeria, as a member of the United Nations, is also guided by or signatory to certain principles and declarations on environment and development as presented in Table 1.2 and Table 1.3.

Table 1.2: International Treaties and Conventions

Treaties and Conventions		Year	Agreement
1.	The United Nations Environmental Guidance Principles	1972	Provide guidelines for protecting the integrity of the global environment and the development system.
2.	Montreal Protocol on Substances that deplete the Ozone Layer	1987	An international treaty to eliminate Ozone depleting chemical production and consumption.
3.	United Nations Convention on Biological Diversity	1992	Places general obligations on countries to observe sustainable use and equitably share the plants and animals of the earth.
4.	United Nations Framework Convention on Climate Change	1994	It calls on developed countries and economies to limit her emissions of the greenhouse gases which cause global warming.
5.	Convention on International Trade in Endangered Species of Wild Fauna and Flora	1973	Restricts the trade of fauna and flora species termed as endangered Species.
6.	Convention on Conservation of Migratory species of Wild animals (Bonn Convention)	1979	Stipulates actions for the conservation and management of migratory species including habitat conservation.
7.	Vienna Convention for the Protection of the Ozone Layer	1985	Places general obligation on countries to make appropriate measures to protect human health and the environment against adverse effects resulting from human activities, which tend to modify the ozone layer.
8.	Paris Agreement	2016	An agreement with a goal to keep the rise in global average temperature to well below 2°C above the pre-industrial levels, and to pursue efforts to limit the increase to 1.5°C recognizing that this would substantially reduce the risks and impacts of climate change.

Table 1.3: International Bodies and Conventions Applicable to Ekiti SAPZ

Organization/Agreement	Description
African Development Bank	The objectives of the African Development bank are directed towards facilitating sustainable economic development amongst member countries. The organization has done this by funding various agricultural projects within various countries. Nigeria being a member of the African Development bank has benefitted from the organization through funding of various projects within different Nigerian States.
Food and Agricultural Organization	Nigeria is a signatory and a member of the FAO as at 11th October 1960. The FAO is a specialized Agency with the United Nations with the Sole aim of ensuring food security and defeating hunger. The Ekiti State government being a part of Nigeria has embraced this vision through the SAPZ project.
Sustainable Development Goal	The Sustainable Development Goals (SDGs) is an international policy document in which Nigeria is a Signatory. Goal number two out of the seventeen goals elaborates on Zero hunger which can be achieved through massive investment in Agricultural projects. The Ekiti State government is on a path to achieving this goal through the implementation of the SAPZ project.
UN Convention on Climate Change	Nigeria is a signatory of the United Nations Framework Convention on Climate Change. Nigeria's Second National Communication under the United Nations Framework Convention on Climate Change in 2014.
Convention on Biodiversity	Nigeria signed the Convention on Biological Diversity (CBD) in 1992 and ratified it in 1994, committing itself to promoting sustainable development and recognizing that biological diversity is composed not just of flora and fauna, but that human actors also play an active role in conserving the environment in which they live. Nigeria also has a National Biodiversity Strategy and Action Plan.

1.4.4 The EIA Process in Nigeria

The Federal Ministry of Environment (FMEnv) developed guidelines to be used in conducting EIA in compliance with the EIA Act. This process as illustrated in Figure 1.1 informed the conduction of the assessment and generation of this ESIA report.

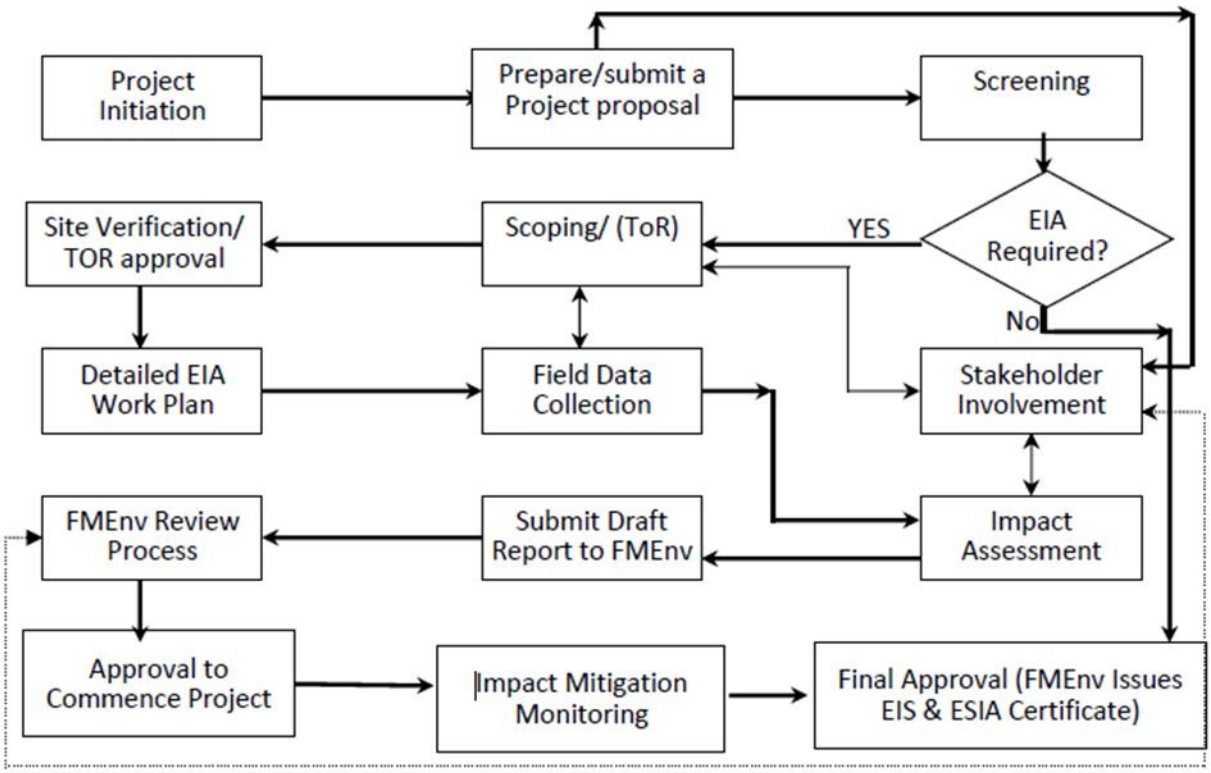

Figure 1.1: EIA Process in Nigeria

Source: (Federal Ministry of Environment)

1.4.5 African Development Bank's Environmental and Social Policies

AfDB is a multilateral development bank and, in keeping with global best practices as other international financial institutions such as the World Bank and the Department of International Development (DFID), it has adopted environmental and social policies, guidelines and procedures to ensure that its operations avoid adverse impacts on people and the environment. Its safeguard policies and processes cover three Global Environmental Facilities (GEF) Minimum Standards namely:

i. Environmental and Social Impact Assessment,
ii. Involuntary Resettlement, and
iii. Accountability and Grievance Systems.

The Bank has adopted various environmental and social policies and procedures to ensure its projects to meet these minimum standards to prevent, minimize or mitigate any potential adverse impacts on people, communities, and the environment. Such policies have also influenced the preparation of this ESIA.

1.5 ESIA Methodology

Environmental and Social Impact Assessment consists of different distinct but inter-related activities. Beginning with a project briefing, the assessment involved some preliminary activities, data collection including socio-economic, physical, and biological surveys, data collation and analyses, and presentations in an inception, this draft, and an eventual final report. The procedure is summarised in Figure 1.2. This section presents the detailed information on the process in which the ESIA was conducted.

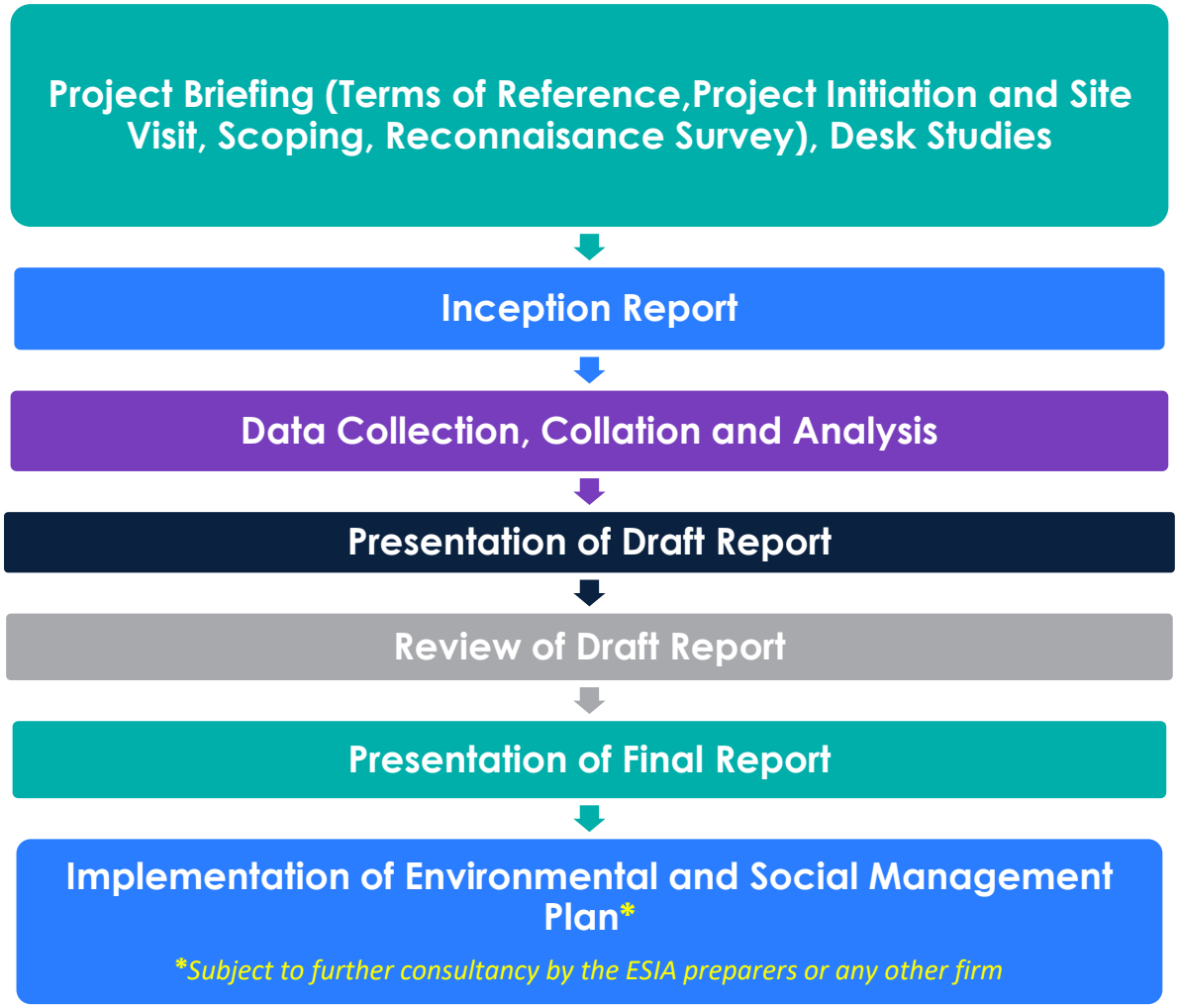

Figure 1.2: Ekiti SAPZ ESIA Process
Source: (Prepared by the ESIA Report Authors)

1.5.1 Preliminary Activities

The preliminary activities for the project involved actions made to kick-off the project and a reconnaissance survey, identification and involvement of stakeholders, interactions with such stakeholders in project scoping workshops, and desk studies to source secondary data.

1.5.1.1 Project Initiation and Reconnaissance Survey

The project initiation involved actions leading up to the contract signing between the consultants (SMEC Nigeria Limited) and the client (Ekiti State and its ministries), and arrangements made ahead of a reconnaissance survey to the project site for project scoping, stakeholder meetings including inception meeting with the clients and its representatives, and primary data collection.

1.5.1.2 Stakeholder Involvement

Stakeholder involvement occurred at various stages of the ESIA to ensure that relevant entities are carried along in the process with their interests collectively protected. The following entities were identified as critical stakeholders to be consulted in the project:

i. Africa Free Zones Association
ii. Agricultural Farmland and Industry Operators and Investors
iii. Community Based Organisations (including women, youth, and farmers organisations)
iv. Ekiti State Bureau of Statistics
v. Ekiti State Development and Investment Promotion Agency
vi. Ekiti State Electricity Board
vii. Ekiti State Government (appointed Client team for Ekiti SAPZ project)
viii. Ekiti State Ministry of Agriculture and Food Security
ix. Ekiti State Ministry of Environment and Natural Resources
x. Ekiti State Ministry of Finance and Economic Development
xi. Ekiti State Ministry of Public Utilities
xii. Ekiti State Ministry of Works and Transportation
xiii. Ekiti State Polytechnic
xiv. Ekiti State Water Corporation
xv. Federal Ministry of Agriculture and Rural Development (FMARD)
xvi. Federal Ministry of Environment
xvii. Federal Ministry of Works & Housing
xviii. Manufacturers Association of Nigeria
xix. Ministry of Investment, Trade and Industry of Ekiti State
xx. National Bureau of Statistics
xxi. Nigeria Export Processing Zones Authority (NEPZA)
xxii. Nigerian Investment Promotion Commission (NIPC)
xxiii. Nigerian Export Promotion Council (NEPC)
xxiv. Project Affected Communities (PACs)

1.5.1.3 Project Scoping Workshop

The project scoping workshop involved meetings with the identified stakeholders to discuss details of the project. It helped to give an understanding on the context, scope, project, and relevance of the project. It also presented the opportunity to source data from the stakeholders and to assess their expectations from the project. Details of events from project scoping workshops was presented in a separate Ekiti SAPZ ESIA Scoping Report and summarised in Section 4.1 this report.

1.5.1.4 Desk Studies

This involved collection, studies, and review of secondary data which provided background information on the project and study area, information on the value of industrial zones (particularly agriculture industries), relevant legislative framework and more. Data sources included books, reports, journal articles, satellite imagery, maps, studies and reports on the project area, etc.

1.5.2 Socio-Economic Parameters

A socio-economic survey was carried out involving communities, farmlands, and agricultural industries within and around the SAPZ. Data was collected using a structured questionnaire, interviews, active observations, focus group discussions, and reports and statistics from relevant Government Ministries, Departments and Agencies (MDAs). Target groups included Traditional Rulers, Communities, Community Based Organizations, Non-Governmental Organizations, Faith Based Organizations, Related Government Institutions and MDAs. Additional secondary data was obtained from State institutions and MDAs to support primary data from the socio-economic survey. The pressure exerted by the activities of the population on natural resources was studied through market surveys and economic evaluation of resources in the area.

To ensure accurate data collection, computer applications deployed on mobile devices were used to conduct interviews and questionnaire administration. This method provided quality control mechanism as all data collected was tagged with their geo-location and time of collection.

More details on the methodology for socio-economic data collection are presented are contained in Section 4.3.1 of this report.

1.5.3 Physical and Biological Parameters

The ESIA involved the analysis of physical and biological data based on samples collected from the study area. The samples were collected in November 2021, during the (end of the) wet season. To meet two-season assessment standard, secondary data was relied upon from an approved ESIA with dry season samples collected from a location that has similar climatic and geographic chrematistics as the SAPZ.

The number of samples collected across the SAPZ are:

i. 17 air and noise samples and 1 control,
ii. 4 surface water samples,
iii. 8 ground water samples, and
iv. 17 top-soil and sub-soil samples each (including control point samples)

1.5.3.1 Air Quality

Eighteen (18) air and noise sample collection and control points were established at designated location within the SAPZ, and the components measured are presented in Table 1.4. Noise measurement was done at designated points from identified sources of noise in the study area. The level of noise was measured with a CEL Precision integrating Sound Level Meter Type 493 fitted with half-inch condenser microphone and wind that is re-calibrated with CEL Pistonphone. Additional information on the methodology for air quality tests are presented in Section 4.2.1.

Table 1.4:Air Quality Analytical and Test Methods

Components	Measurement	Type/Method
Carbon Monoxide (CO)	Field	Crowcon GASMAN (Handheld detection instrument, In Situ)
Ammonia (NH3)	Field	Crowcon GASMAN (Handheld detection instrument, In Situ)
Sulphur Oxides (SOX)	Field	Crowcon GASMAN (Handheld detection instrument, In Situ)
Hydrogen Sulphide (H2S)	Field	Crowcon GASMAN (Handheld detection instrument, In Situ)
Nitrogen oxides (NOX)	Field	Crowcon GASMAN (Handheld detection instrument, In Situ)
Oxygen/ Methane/ Hydrogen (O2, CHX, H2S, CO)	Field	MSA ALTAIR (Multi Gas Monitor) (Handheld detection instrument, In Situ)
Suspended Particulate matter	Field	Haz- Dust particulate matter, In situ
Noise Meter/Relative Humidity/ Temperature	Field	Environmental Meter, In situ

1.5.3.2 Hydrogeology

To determine the water quality, Surface Water (SW) and Ground Water (GW) samples were collected from the SAPZ. The physio-chemical and biological characteristics investigated in comparison to FMEnv limits were levels of heavy metals including Pb, Cu, Zn, Cd, Ni, Mn, Fe. Other parameters including PH, Electrical Conductivity, Alkalinity, Hardness, Total Dissolved Solids (TDS), Ca, Mg where relevant. Also, BOD, COD, were also analysed. Microbiology analysis of water samples were also carried out.

Five (5) Surface water samples were collected from existing water bodies within the Zone. The direction of flow of rivers and streams were also recorded using current mater to identify the drainage/flooding pattern for each season and recording water uses within the study area. Eight (8) underground water samples were collected from wells and boreholes within the SAPZ and environs.

Properties such as water temperature, pH, Turbidity, Total Dissolved Solids (TDS), Dissolved Oxygen (DO) were analysed in-situ while other collected water samples were preserved and transported for laboratory analyses. The components to be tested

from the water samples collected are presented in Table 1.5. Additional information on the methodology for water quality assessment are presented in Section 4.2.2.

Table 1.5: Physio-Chemical Characteristics of Water Samples to be Tested

Parameters (units in mg/l)					
A	**PHYSICAL TESTS**	**B**	**CHEMICAL TESTS**	**C**	**HEAVY METAL TESTS**
1	Temperature (^{0}c)	7	Total Hardness (mg/L)	17	Manganese (mg/L)
2	pH	8	Magnesium Hardness (mg/L)	18	Iron Total (mg/L)
3	Conductivity (µs/Cm)	9	Calcium Hardness (mg/L)	19	Copper (mg/L)
4	Dissolved Oxygen (mg/L)	10	Phosphate (mg/L)	20	Cadmium (mg/L)
5	Total Dissolved Solids (mg/L)	11	Nitrate as Nitrogen (mg/L)	21	Zinc (mg/L)
6	Total Suspended Solid (TSS) (mg/L)	12	Nitrite as Nitrogen (mg/L)	22	Lead (mg/L)
		13	Aluminium (mg/L)	23	Nickel (mg/L)
		14	Bod (mg/L)		
		15	Cod (mg/L)		
		16	Sulphate (mg/L)		

1.5.3.3 Soil Studies

Eighteen (18) top-soil and sub-soil samples each were collected across the project area with the use of Portable Hand Auger. About 500g soil samples were collected for topsoil and subsoil depths of 0-30cm and 31-60cm respectively for each location. To avoid contamination of samples, disposable rubber gloves were used in collecting the samples directly into plastic polythene bags. Subsoil samples for microbial analysis were collected in sterilized 100ml McCartney bottles and stored in a cool box. Samples for hydrocarbon analysis were also collected into glass jars with closures, and those for other physicochemical parameters as listed in Table 1.6 were be collected in polythene bags. Additional information on the methodology for soil studies are presented in Section 4.2.24.2.3.

Table 1.6: Physiochemical Characteristics of Soil Samples to be tested

Parameters (Units in mg/kg)					
1	Temperature (°C)	8	Magnesium	14	Manganese
2	pH	9	Aluminium	15	Copper
3	Phosphate	10	Moisture Content (%)	16	Iron
4	Sulphate	11	Soil Porosity (%)	17	Zinc
5	Nitrate	12	Wet Density (g/cm^3)	18	Cadmium
6	Nitrite	13	Dry Density (g/cm^3)	19	Lead
7	Calcium				

Sediment Sampling

Sediment samples were collected within the area where surface water using Eckman Grab sample. The sample collection, handling, preservation and control followed the same procedure for the collection of soil samples. The samples were then emptied into a sieving device for processing.

Benthic Fauna

Benthic samples were taken from the bottom sediment around the project area for analysis. The collected samples were emptied into a sieving device for direct processing. These samples were then be washed through a 0.5mm mesh before a replicate sample was collected.

The benthos samples collected were stored in wide-mouthed plastic containers, preserved in 10% formalin solutions and stored in cool boxes on board the study vessel for onward transportation to the Reference laboratory for benthic communities' identification. A detailed note was kept on the size and general nature of samples and at least one sample was be photographed from the site.

Soil/Sediment Microbiology

Soil and sediment samples for microbiological analysis were collected in plastic containers. Sample handling and preservation procedure followed that of water sample collection for microbiological analysis.

1.5.3.4 Sample Handling, Preservation and Transportation

All samples were collected, stored, preserved, and transported using the methods as presented in Table 1.7.

Table 1.7: Water Sample Parameters, Collection, Preservation, and Handling

S/N	Determination	Minimum sample vol.	Container	Preservation	Holding time	Container pre-treatment	Remark
1	Appearance, Colour, Odour, Water animals' General description	Record observation on-site and notebook					
2	In situ Parameters Temp., pH, Conductivity, Salinity, TDS., DO, Turbidity, Redox.,	Measure on-site Collect 2L for check-in in the lab.	Plastic or glass	Cool, 4^{0}C	0.25h	Rinsed with distilled water	Not filled to the brim.
3	Metals (general)	1.0L	Plastic or glass	Add conc. HNC3 to Ph<2	6 months	Rinsed with 1+1 HNO3	Not filled to the brim.
4	Chromium (vi)	1.0L	Plastic or glass	Cool, 4^{0}C	24h	Rinsed with 1+1 HNO3	Not filled to the brim.
5	Phosphate	100ml	Plastic or glass	Add conc. HNC3 to Ph<2 &Cool, 4^{0}C	28d	Rinsed with distilled water	Not filled to the brim.
6	Nitrate, Sulphate, Chloride	2.0L	Plastic or glass	Cool, 4^{0}C	28d	Rinsed with distilled water	Not filled to the brim.
7	Acidity, Alkalinity, BOD	2.0L	Plastic or glass	Cool, 4^{0}C	24d 6h	Rinsed with distilled water	Not filled to the brim.
8	Hydrocarbon, (TPH) oil/Grease	1.0L	G, (wide mouth calibrated)	H2SO4 to pH<2, & cool, 4^{0}C	28d	Rinsed with Solvent	Not filled to the brim.
9	Hardness	100ml	Plastic or glass	Add HNO3 or H2SO4 to pH<2, & cool, 4^{0}C	6moths	Rinsed with Solvent	Not filled to the brim.
10	COD	100ml	Plastic or glass	Add H2SO4 to pH<2, & cool, 4^{0}C	7d		Not filled to the brim.
11	Phenols	500ml	Plastic or glass	Cool, 40C, add H2SO4 to Ph<2, & Cool, 4^{0}C			Not filled to the brim.
12	Microbiology analysis of Coliform, E.coil, Enterococci, HUB, etc.	200ml	Wide-mouthed glass bottles	Cool, 4^{0}C	As soon as possible	Sterilised	Not filled to the brim.
13	Phyto/Zooplankton	1.0- 6.0L whole water	Plastic	10% Formalin			Not filled to the brim.

Sample Labelling

The sample containers were secured with a label indicating the following information:

- Name of site sampled
- Sampling point
- Date and time of sampling
- Analysis required
- Time limitations
- Name of personnel sampling
- Preservatives used if any.

The content of each container was verified to ensure that the information on the labels correspond to its content before being transferred to the laboratory.

Sample Transportation

All samples for laboratory analysis were transported to Zabson Laboratory located at Masaka, Nasarawa State, our affiliate licenced laboratory. Certified results of the analyses are presented in Appendix A. The samples were stored in mobile refrigerating units and preserved according to FMEnv guidelines and standards.

1.5.3.5 Laboratory Inspection

Reference laboratory officials carefully inspected all the samples on arrival to the laboratory. Our sample receptionist used the completed Chain of Custody and Analysis Request Forms to receive samples in good condition. No damage was reported to the Laboratory Coordinator for immediate action.

1.5.3.6 Laboratory Analysis

All analysis and testing were based on ASTM, APHA and APH standards as in Reference Laboratory Work Instruction (WI). Major equipment used in the reference laboratory were electrometric probes, colourimeters, atomic absorption spectrophotometers, visible/Ultraviolet spectrophotometers, tetrameters, Fourier transformer intra-red spectrophotometers, balances, geotechnical coring boxes, etc.

Proposed Quality Assurance/Quality Control (QA/QC)

- Only adequately trained personnel were involved in the laboratory analysis.
- Personnel were briefed on the scope of work.
- Complete adherence to written analytical work instructions available to staff involved in project execution was maintained and verified.
- Routine auditing and checking of results at every stage of analysis was implemented. Quality control solutions and midpoint standards were introduced in every batch of samples or every set of ten samples. Analyses for which deviation of these quality control/midpoint standards are outside 90% to 110% of expected concentration ranges were repeated.
- Equipment was adequately calibrated before use and checked by the supervising officer.
- Care was taken ensure that quenching did not occur in UVF measurement during sediment analysis for total hydrocarbon.
- Sediments were be dried before extraction took place.
- The solvent used was as low to boiling point as possible. When evaporations were necessary, solvents were reduced or removed with great care at temperatures no higher than 300C.
- Analysis schedule indicating analysts assigned to carry out various tests were relied upon. This aided in planning and ensuring that the targets date is met. Requirements and instructions for carrying out analyses were clearly defined at this stage.
- During benthic analysis, internal standards were added before extraction took place.
- Analytical errors were controlled by duplicate analysis at a pre-determined interval, sample spiking, etc.
- No results of blank spiked and control analyses were reported.

Parameters For Analysis

The parameters presented in Table 1.8 were measured during the ESIA:

Table 1.8: Parameters for Analysis

Parameters	Analysis Indicators
Soil	i. Heavy Metals: (Mn, V, Ni, Cr, Fe, Pb, Cu, Zn, Hg, As) ii. Soluble salts and cations distribution and electrical conductivity iii. Sodium adsorption ratio, exchange sodium potential iv. Cation Exchange Capacity v. PH, TDS, soil texture, and soil moisture vi. THC vii. Sulphide, sulphates, nitrates viii. Soil microbiology (Hydrocarbon utilising bacteria, Total heterotrophic bacteria and fungi)
Sediment (where surface water is obtained)	Physico-chemical properties: i. Particle size distribution ii. Salinity iii. Sulphides, sulphates, nitrates, phosphates iv. Total hydrocarbon content, v. Heavy metals: (Mn, v, Ni, Cr, Fe, Pb, Cu, Zn, Hg, As).
Air Quality	i. Temperature ii. Dust/Particulate matter iii. H2S, SOx, COx, NOx
Water Quality	Physico-chemical properties i. pH ii. Temperature iii. Dissolved Oxygen, Turbidity iv. Salinity as chloride v. Sulphides, Sulphates, nitrates, vi. Total suspended Solids vii. Total dissolved solids viii. Total hydrocarbon concentrations phenols, ix. Heavy metals: (Mn, V, Ni, Cr, Fe, Pb, Cu, Zn, Hg, As) Water biology i. Phytoplankton and zooplankton diversity, density population and productivity. ii. Fisheries studies (identification, fresh body weight, condition factor physical deformities heavy metal content in fish tissues, and species composition. iii. Benthic macrofauna (identification, composition, diversity and relative abundance. Water microbiology i. Hydrocarbon utilising bacteria ii. Total heterotrophic bacteria and fungi.

Analytical Methods

The analytical methods, techniques, and detection limits available in the out laboratory are indicated in Table 1.9.

Table 1.9: Analytical Methods and Detection Limits

Parameter		Analytical Method	Detection Limit
1.	pH	APHA SM 4500-HB	
2.	Total Dissolved Solids	APHA 2510A	
3.	Salinity as Chloride	APHA 2520A	
4.	Oil and Grease	ASTM D3291	1.0mg/l
5.	Temperature	APHA SM 2520B	
6.	Conductivity	APHA 2570A	
7.	Total Suspended Solids	APHA 209D	

8.	Total Organic Carbon	APHA 2540E	
9.	Dissolved Oxygen	APHA SM 4500G	
10.	Biological Oxygen Demand	APHA 5210D	1.00mg/l
11.	Chemical Oxygen Demand	APHA 5220D	4.00mg/l
12.	Turbidity	APHA SM 2130B / ASTM D1889	
13.	Alkalinity	ASTM 1067B	1.00mg/l
14.	Phenol	APHA 5530D	1.00mg/l
15.	Sodium	APHA 3111B/ASTM D3561	0.10mg/l
16.	Chromium	APHA 3111B/ASTM D3561	0.10mg/l
17.	Copper	APHA 3111B/ASTM D3561	0.05mg/l
18.	Manganese	APHA 3111B/ASTM D3561	0.10mg/l
19.	Zinc	APHA 3111B/ASTM D3561	0.05mg/l
20.	Iron	APHA 3111B/ASTM D3561	0.05mg/l
21.	Nickel	APHA 3111B/ASTM D3561	0.10mg/l
22.	Lead	APHA 3111B/ASTM D3561	0.20mg/l
23.	Vanadium	APHA 303C	0.20mg/l
24.	Arsenic	APHA 3111B/3030B	0.001mg/l
25.	Mercury	APHA 3112B	0.0002mg/l
26.	Nitrates	EPA 300	0.013mg//
27.	Sulphates	APHA 416C	0.2mg/l
28.	Phosphate	APHA 414E	0.002mg/l
29.	Hydrocarbon Utilizing Bacteria	APHA 9215	
30.	Hydrocarbon Utilizing Fungi	APHA 9610	
31.	Total Heterotrophic Bacteria	APHA 9215	
32.	Total Heterotrophic Fungi	APHA 9610	
33.	Phytoplankton	APHA 10200A-F	
34.	Zooplankton	APHA 10200G	
35.	Fisheries	APHA 10600	
36.	Benthos	APHA 10500A-D	
37.	Marine Wildlife	APHA 10900	
38.	Climatic Temperature		
39.	Wind Speed and Direction		
40.	Radiation	ASTM D 3441	0.1mR/h
41.	HxCx	ASTM D 6209	0.01%
42.	H2S	ASTM D 4913	1.00ppm
43.	CO	ASTM D 5835	1.00ppm
44.	Sox	ASTM D 5835	1.00ppm
45.	Suspended Matter	ASTM D 4096	1-2ug/cm3

Documentation/Collation of Result

Reference laboratory analysis documented results obtained from all laboratory analysis including in-situ measurements carried out in the field into Laboratory Database. The laboratory Coordinator shall examine the analysis results and format of documentation to ensure quality assurance and quality control. All fieldwork and laboratory results from the various experts shall be collated, evaluated, interpreted for presentation in the ESIA report.

1.5.4 Impact Assessment Methodology

The methodology adopted for the assessment of the associated and potential impacts of the proposed project was be based on the ISO 14001 approach for assessing environmental aspects and impacts as illustrated in Figure 1.3. The legal/regulatory

requirement, risk, frequency, and importance of every negative impact was evaluated as high, medium, or low with point allocation of 3, 2, or 1 respectively. The mean point served as the evaluation of the impact.

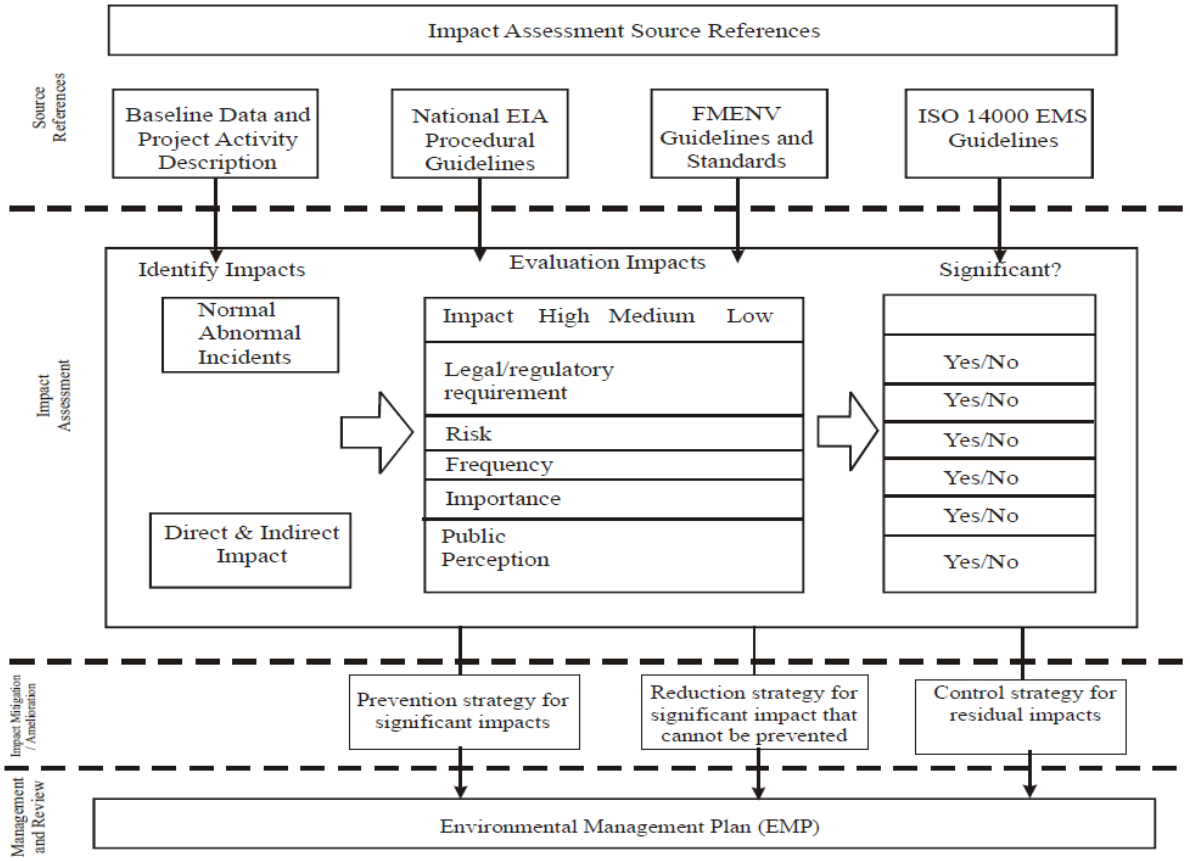

Figure 1.3: ISO 14001 Approach for Assessing Environmental Aspects and Impacts
(Lawrence, Andrews, Ralph, & France, 2002)

1.5.4.1 Evaluation of Impact Significance

The significance of identified negative impacts were evaluated based on clearly defined criteria based on their probability of occurrence across different considerations for safety/health, public disruptions, environmental aspects, and financial aspects which formed the Risk Assessment Matrix employed as presented in Table 1.10.

Table 1.10: Risk Assessment Matrix

		Probability					Probability Category	Definition
Consequence		A	B	C	D	E	A	Possibility of Repeated Incidents
	I						B	Possibility of Isolated Incidents
	II						C	Possibility of Occurring Sometime
	III						D	Not Likely to Occur
	IV						E	Practically Impossible

	Considerations			
Consequence Category	Safety/Health	Public Disruption	Environmental Aspects	Financial Aspects
I	Fatalities/ Serious Impact on Public	Large Community	Major/Extended Duration/Full Scale Response	High

II	Serious Injury to Personnel/ Limited Impact on Public	Small Community	Serious / Significant Resource Commitment	Medium
III	Medical Treatment for Personnel/ No Impact on Public	Minor	Moderate / Limited Response of Short Duration	Low
IV	Minor Impact on Personnel	Minimal to None	Minor / Little or No Response Needed	None

1.5.4.2 Mitigation

All significant negative impacts were considered for mitigation. Specific mitigation measures were recommended where practicable. The effectiveness of the mitigation measures is stated in the Environmental and Social Management Plan. A two-dimensional mitigation approach that utilizes a combination of significance of impact and probability of occurrence as shown in Figure 1.4 was employed. This is to determine the most appropriate mitigation requirement (avoidance, formal, informal or physical control measure, or training). The figure shows the mitigation procedure which considers the nature and magnitude of negative environmental impact that are unavoidable and steps to minimize their impact on the impact are stated in details. Recommendations to enhance the positive impacts of the proposed project are also made.

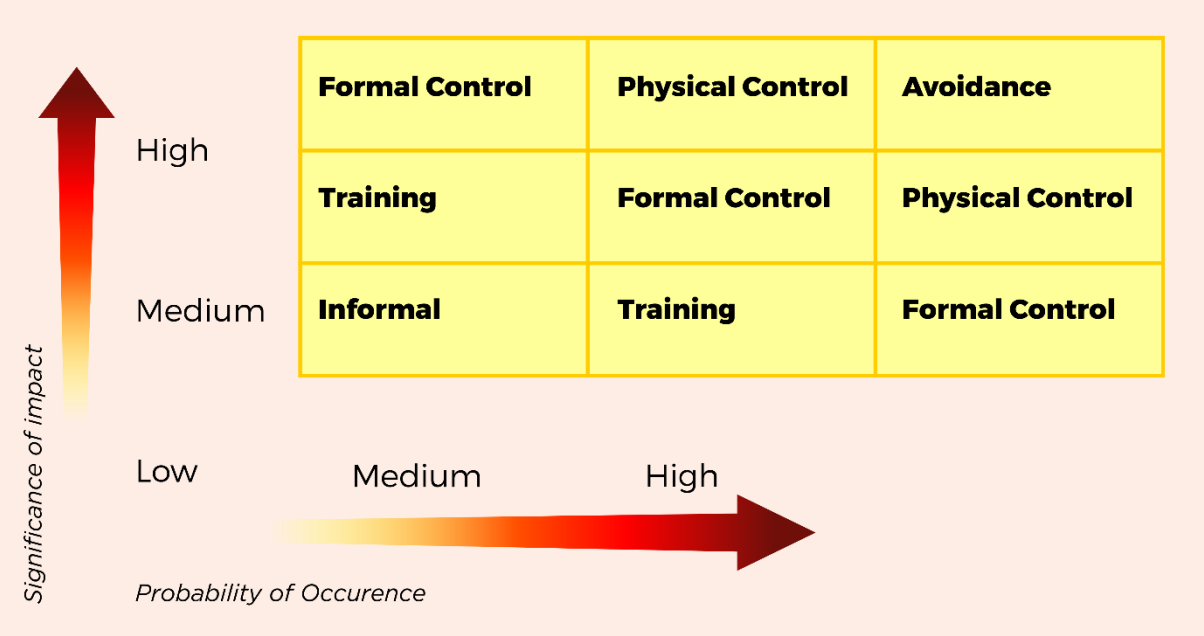

Figure 1.4: Matrix for Determination of Mitigation Measures

Commitment to Mitigation

A clear schedule of the time and manner of applying mitigation measures was prepared and is presented in the Environmental and Social Management Plan (ESMP) in Chapter 7. Where uncertainty over impact magnitude or effectiveness of mitigation over time exists, monitoring programmes were developed into the ESMP to enable subsequent adjustment of mitigation measures as may be required. The plan includes a detailed list of mitigation measures for all negative impacts, with agencies responsible for implementing them and financial costs where applicable, recommendations to enhance the positive impacts, schedule for implementation and monitoring, and institutional arrangement of stakeholders involved. In addition, recommendations for actions for the restoration or repurposing of the environment in case the project is decommissioned closed or abandoned has been prepared and is presented in Chapter 8.

1.5.5 Guiding Documents

Guidelines or documents which were followed or consulted in undertaking the ESIA and in the preparation of an ESIA report containing Mitigation Measures and ESMP include the ESIA Format for the Federal Ministry of Environment (Appendix B), ESIA Format for the AfDB, Format of Environmental and Social Management Plan of the AfDB, and case studies of similar projects. The details of these documents were presented in this Assessment's Inception Report.

1.6 Structure of the Report

This ESIA report is presented in nine chapters as follows:

Chapter	Title	Description
1	Introduction	Presents a relevant background information of the project, the objectives and scope of the ESIA, and statutory regulations. It also presents the methodology for which the ESIA was conducted (expanded in other chapters as necessary).
2	Project Justification	Discusses the need, value, and envisaged sustainability of the project with a view to justify its selection as appraised against other alternatives.
3	The Project Description – Ekiti SAPZ	Describes the Ekiti SAPZ project including the project site and presents the Ekiti SAPZ Processing Hub Concept Plan.
4	Baseline Information (Description of the Environment)	Presents information collected through site assessment visits, stakeholder meetings, environmental analysis (involving quality tests for air, soil, and water), questionnaire administration, and community consultations.
5	Potential and Associated Environmental and Social Impacts	Outlines, evaluates, and estimates the significance of potential positive and negative impacts at the site preparation, site development, operation, and decommissioning stages of the Processing Hub.
6	Mitigation Measures	Outlines practical measures proposed to reduce or eliminate the negative impacts of the Processing Hub at the site preparation, development, and operation stages.
7	Environmental and Social Management Plan	Presents a plan for the implementation of mitigation measures against the negative impacts and enhancement of the positive impacts. Implementation schedule and institutional arrangement and responsibilities are also presented.
8	Remediation Plans after Decommissioning/Closure	Recommends a line of action for the possible decommissioning/closure of the Processing Hub comprising of evacuation, demolition (where necessary) disinfection, and repurposing.
9	Conclusions and Recommendations	Presents a summary conclusion of the contents of the reports and recommendations for further actions.

2 Project Justification

2.1 Need for the Project

Agriculture remains the base of the Nigerian economy, providing a source of livelihood for majority of Nigerians. However, the sector is faced with a plethora of challenges that keep agricultural productivity low. Notable among these challenges are an outdated land tenure system that constrains access to land, a very low level of irrigation development (less than 1 percent of cropped land under irrigation), limited adoption of research findings and technologies, high cost of farm inputs, poor access to markets, and poor industrialisation (FAO, 2021). The sector also faces massive losses of food produce which perishes due to lack of storage and processing facilities (Oni, 2013). In presenting these challenges, Udemezue (2019) stated that "the current situation of agriculture in Nigeria is despicable, deplorable, unspeakable, disgraceful, deceptive, tragic, retrogressive and not even befitting a nation that is rich and endowed with natural resources" (p. 134).

These stated issues highlight the need for intervention in the agricultural sector to make productive use of the country's resources. The southwestern region is endowed with arable land and human (labour and intellectual) resources supported by an agriculture friendly climate that begs to be harnessed through mechanised farming (Akinfenwa, 2022). The problems persist despite several intervention efforts by the Federal Government such as policy formulation that support local agriculture and farmer empowerment through providing access to funding (loans, subsidies, and grants) and other necessary resources (Aderemi, 2017; Okojie, 2021).

The Ekiti State Government, through this project, seeks to contribute to the much-needed interventions and help render highly condemning comments like Udemezue's null. The Ekiti SAPZ shall provide land area for agricultural investors, access to technology and machinery to increase agricultural production, infrastructure and facilities to ensure that agricultural activities are carried out efficiently, and an avenue for industrial development to process and diversify agricultural produce. This, in effect, shall increase agricultural production, storage, processing, and trading.

2.2 Value of the Project

From the conducted pre-feasibility research conducted, the financial value of the SAPZ is estimated at N880m for the sale of farmlands or N498m for lease of farmland for seven years (Government of Ekiti State, 2020). The Master Plan of the Industrial Hub is estimated to cost N14,996,424,280 (USD24,994,040 at a suggested exchange rate of N600 to USD1) and generate total revenues of N158,400,000,000 (USD264million) after a ten-year period (Surbana Jurong & SMEC, 2022).

2.3 Envisaged Sustainability of the Project.

The project is envisaged to be sustainable based on the socio-economic benefits it stands to offer to the project affected communities which shall earn their support in ensuring continuity of the project for future generations. The community consultations engaged in (see Section 4.4) as part of this ESIA show that most of the communities welcome the project provide that it grants them the benefits it promises. It is on this bases that the project is deemed sustainable as if offers the following socio-economic benefits.

Economically, the project shall create improved income and livelihood for the locals in the project affected communities by increasing the value of agricultural produce with agriculture being the main source of income as presented in Section 4.3.2.10. It shall also result in an increase in employment opportunity providing jobs beyond direct farming such as within the Processing Hub in industries, exhibition centres, education and health facilities, service provision, etc. The project shall contribute to maintaining agriculture as the highest employer of Nigerians and boost its potential to be the base of the Nigerian economy.

Socially, the project is expected to result in a better standard of living of the PACs with better access to education and health facilities through provision of such facilities in the Hub and increased financial capacity, reduced crime rate and social vices through profitable engagement of the local population, improvement in mental health caused by socio-economic related

depressions, capacity building through training and empowerment programmes, improved communal governance structure through coordination of agricultural activities, and improvement in social status.

Additionally, the project helps in achieving some of the United Nations Sustainable Development Goals which social and urban development programmes of member countries strive for as presented in Table 2.1.

Table 2.1: Sustainable Development Impacts of the Project

Goal*		Envisaged Sustainability Impact
1	No Poverty	Provision of employment opportunities, improved local economy, and financial empowerment of PACs.
2	Zero Hunger	Increased agricultural productivity and financial empowerment of the PACs.
3	Good Health and Well-Being	Financial empowerment of the PACs, provision of health and sanitation infrastructure.
4	Quality Education	Provision of educational and research facilities, knowledge sharing and capacity building.
8	Decent Work and Economic Growth	Provision of employment opportunities, improved local economy, and financial empowerment of PACs.
9	Industry, Innovation and Infrastructure	Enhancement of industrial activities, provision of educational and research facilities that can spur innovation.
12	Responsible Consumption and Production	Reduction in waste of agricultural yield through enhanced industrial production.

*Source: (United Nations, 2015)

2.4 Project Alternatives

The identification and appraisal of alternatives is an important aspect of the ESIA Process as it provides a comparative framework for the acceptance of the project. As this project is a government initiative, the alternatives considered herein are not market competitive but related to the action or inaction of the government in initiating or implementing the project. The alternatives considered are the No Project Options, Delayed Project Option, and Timely Implementation Option. Based on the considerations, the timely implementation of the project is the most beneficial alternative.

2.4.1 No Project Option

In the event that the no project option is decided, there will be no adverse impact on the biophysical environment, noise level will be maintained, and there will be no displacement of terrestrial and aquatic ecosystems within the area as environmental dignity will be maintained. There will also be no disruption in water flow and water quantity and quality will be maintained. Conversely, the no project decision will also mean that the envisaged social and economic benefits of the projects will be missed, leaving the project area's agricultural potential untapped. This will therefore reduce the chances of achieving some of the Sustainable Development Goals as presented in Table 2.1.

2.4.2 Delayed Project Option

Another considered alternative is the event that the project is approved with all necessary green lights lit, but implementation is delayed for any reason. This is expected to have the following consequences:

1. Changes in the environmental, social, and economic characteristics of the SAPZ which shall affect the significance and applicability of all studies and plans made thus far.
2. Loss of investor trust who have shown interest in being a part of the SAPZ project through the acquisition of farmland and willingness to develop industries.
3. Loss of community trust who have indicated that such projects and land acquisition schemes have been introduced in the past by the government through promises which have not resulted in visible actions and positive impacts. This could also become aggressive as communities may feel that they have been taken advantage of in land acquisition for the project.

2.4.3 Timely Implementation Option

If the project is implemented in a timely manner, the positive impacts of the project as presented in this report shall be enjoyed and the negative impacts shall be mitigated (through the implementation of the ESMP). Ultimately, the socio-economic benefits of the projects as envisaged shall also be enjoyed.

3 The Project Description – Ekiti SAPZ

3.1 Background of the Project

This project is the Ekiti Special Agro-Industrial Processing Zone (SAPZ). The zone comprises of a collection of allocated farmlands, other farm holdings, and community settlements in Ikole and Oye Local Government Areas (LGAs) of Ekiti State, covering an area of about 55,000Ha. The project "aims to integrate Ekiti's production hubs with processing facilities and the already existing institutions in Ado Ekiti and Oye-Ikole" (Government of Ekiti State, 2020, p. 5). It is one of the priority projects of the Ekiti State government to generate revenue, increase job and value creation, and position Ekiti as a center for agricultural production. The project shall focus on rice and cassava as the initial products as they experience a supply shortfall despite being main staples of local consumption and they have potential for major industrial input and more employment generation (Government of Ekiti State, 2020). The project was developed based on the recommendations of the Ekiti Agricultural Investment Strategy, particularly the first, fourth, and sixth strategy approaches which are to improve the agribusiness environment and investment climate to encourage private investors, to signal that Ekiti State is 'open for business' by using Government assets as a bait to attract outside investors, and to develop infrastructural systems that support agribusiness and rural investment (Government of Ekiti State, 2018). The project shall involve the preparation of a Master Plan for a site selected as the SAPZ Processing Hub which shall guide strategic siting of land uses, services, infrastructure, and utilities.

3.2 Project Site Characteristics

3.2.1 Site Location

The project is located in Ekiti State which is in the south-west geo-political region on Nigeria. The State is bounded by Kwara State at the North, Kogi State at the East, Ondo State at the South, and Osun State at the west as presented in Figure 3.1. The Ekiti SAPZ falls within the latitudes of 860000mN - 900000mN and longitudes of 740000mE – 800000mE, in Ikole and Oye LGAs as presented from Figure 3.2 to Figure 3.5. This section presents information on the physical and socio-economic features of Ekiti State at a general level collected from secondary sources precede the eventual collection and presentation of primary data that relates particularly to the project and project site area.

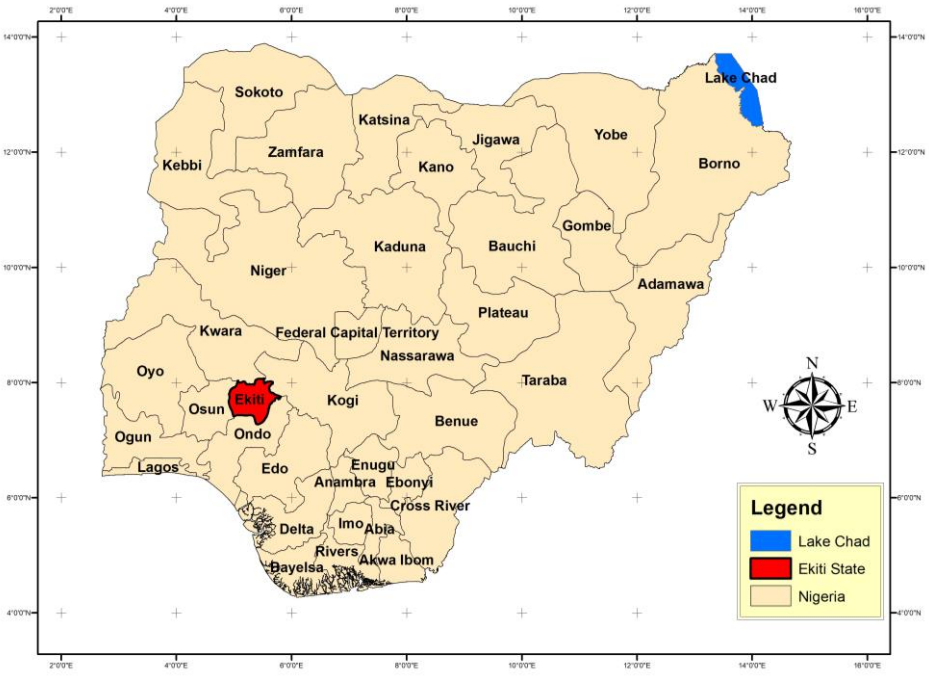

Figure 3.1: Map of Nigeria Showing Ekiti State
(Developed using ESRI Data on ArcGIS)

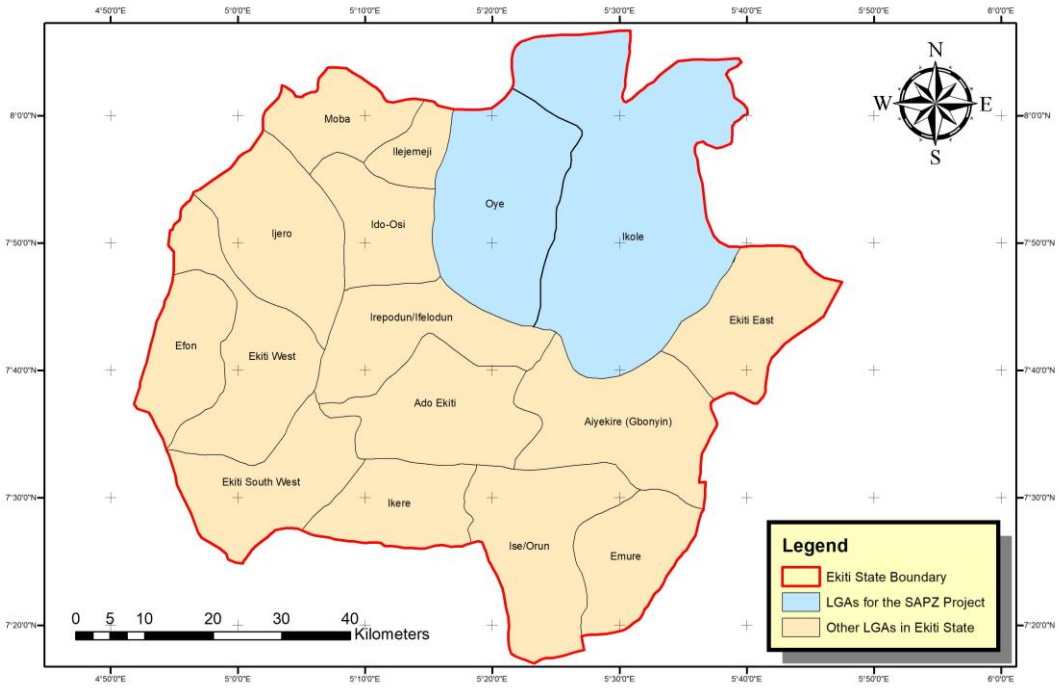

Figure 3.2: Map of Ekiti State Showing Ikole and Oye LGAs

(Developed using OSGOF Data on ArcGIS)

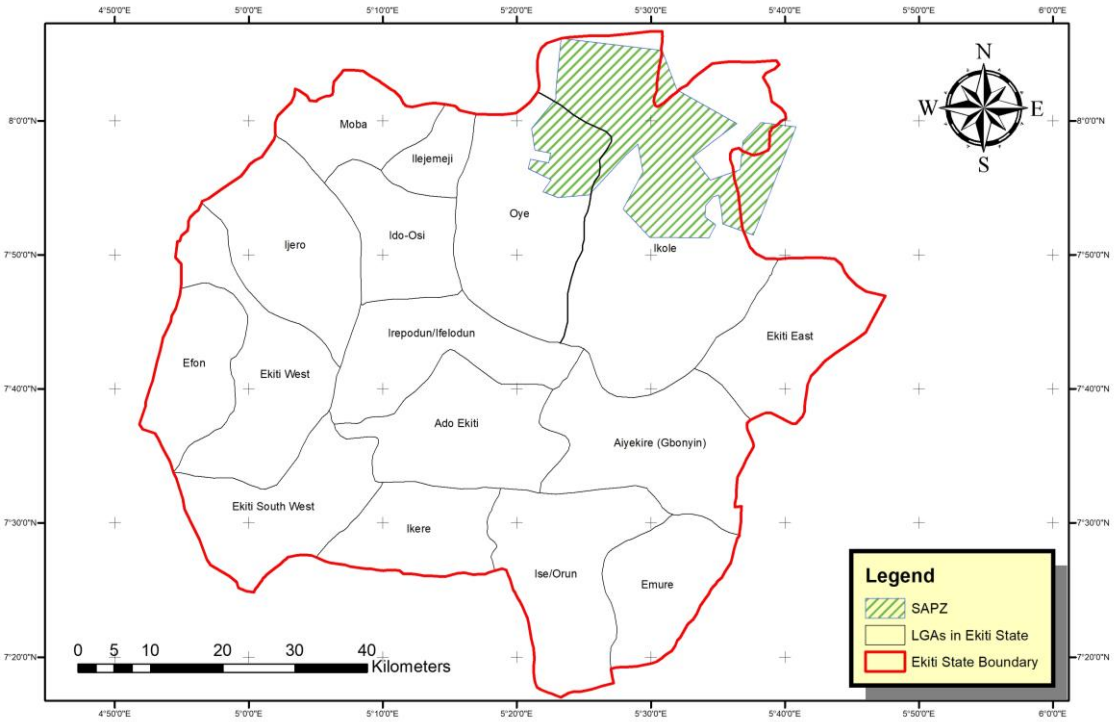

Figure 3.3: Map of Ekiti State Showing the General SAPZ

(Developed on ArcGIS using OSGOF and Office of the Surveyor General, Ekiti State, data.)

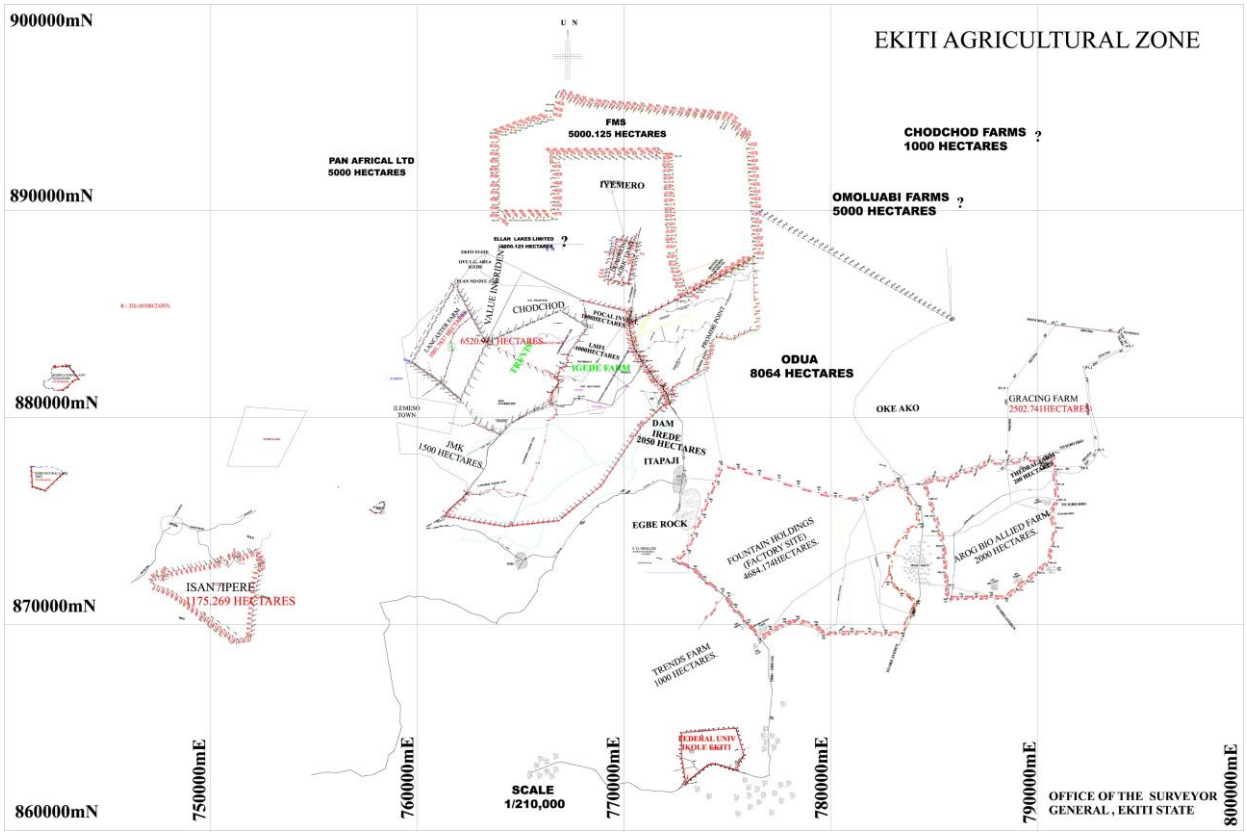

Figure 3.4: Map of Allocated Farmlands in the General SAPZ
(Office of the Surveyor General, Ekiti State)

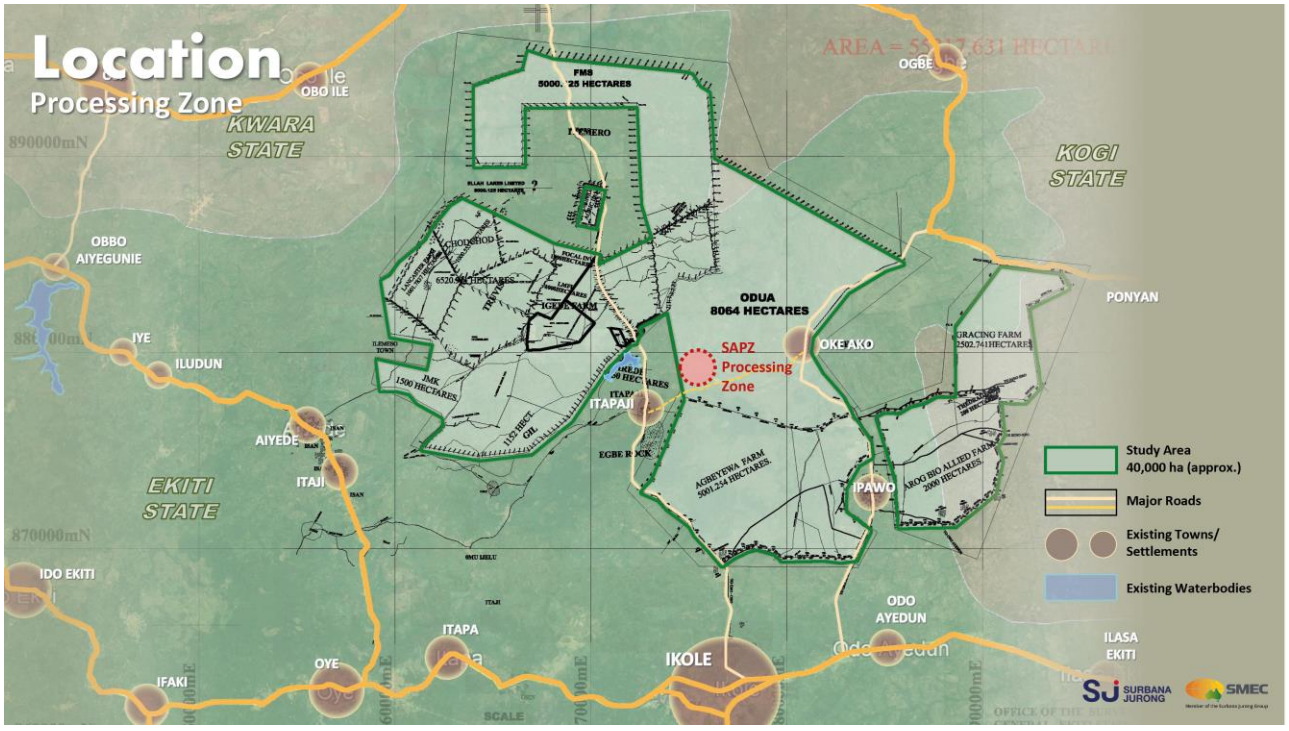

Figure 3.5: Location of the SAPZ in the Context of Allocated Farmlands
Source: (Surbana Jurong & SMEC, 2022)

3.2.2 Climate

Ekiti State has a tropical climate which is peculiar to the southern part of Nigeria. It has an average annual temperature of 25ºC, and the highest daily temperature is experienced between 12pm and 4pm. The hottest month in the year is the month of February with an average temperature of 27.2ºC while the Coolest month is the month of August with an average of 22.9ºC (Climate Data, 2021).

There are primarily two major seasons which are the dry season that occurs between the month of November and March, and the rainy (wet) season that occurs between the month of April and October annually. Ekiti has a precipitation of 1478mm yearly with the lowest precipitation in the month of December averaging 9mm and the highest experienced in September averaging 220mm. The month with the highest days of rainfall is the month of July with an average of 27.2 days of rain fall while the month of December has the lowest days of rainfall which is an averagely 2 days. The month with the highest relative humidity in Ekiti is the month of September (88.19%) and while the month with the lowest relative humidity is the month of January (47.38%) (Climate Data, 2021). The climatic information od Ekiti State is summarised in Table 3.1.

Table 3.1: Climatic Data of Ekiti State

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature °C (°F)	26.6 °C (79.9) °F	27.2 °C (80.9) °F	26.7 °C (80.1) °F	25.8 °C (78.5) °F	24.9 °C (76.9) °F	23.8 °C (74.8) °F	23.1 °C (73.6) °F	22.9 °C (73.3) °F	23.3 °C (74) °F	24 °C (75.1) °F	25.2 °C (77.4) °F	26 °C (78.8) °F
Min. Temperature °C (°F)	21.1 °C (70) °F	22.4 °C (72.3) °F	23.2 °C (73.7) °F	23 °C (73.5) °F	22.6 °C (72.7) °F	21.8 °C (71.2) °F	21.1 °C (70) °F	20.9 °C (69.6) °F	21.2 °C (70.2) °F	21.6 °C (70.9) °F	22 °C (71.6) °F	21 °C (69.9) °F
Max. Temperature °C (°F)	33.8 °C (92.8) °F	34.1 °C (93.5) °F	33.1 °C (91.6) °F	31.3 °C (88.3) °F	29.6 °C (85.2) °F	27.9 °C (82.3) °F	27 °C (80.7) °F	26.8 °C (80.3) °F	27.7 °C (81.8) °F	28.7 °C (83.7) °F	30.6 °C (87.1) °F	32.7 °C (90.8) °F
Precipitation / Rainfall mm (in)	13 (0.5)	30 (1.2)	77 (3)	118 (4.6)	172 (6.8)	205 (8.1)	198 (7.8)	205 (8.1)	220 (8.7)	186 (7.3)	45 (1.8)	9 (0.4)
Humidity (%)	47%	57%	72%	81%	85%	88%	88%	87%	88%	87%	78%	57%
Rainy days (d)	2	5	11	15	18	20	20	20	20	19	7	2
avg. Sun hours (hours)	8.7	8.0	6.9	5.8	4.8	4.0	3.7	3.3	3.8	4.6	6.5	8.5

Source: (Climate Data, 2021)

3.2.3 Geology

Ekiti State is characterized by hilly outcrops that are seen all over the State. According to Ayodele (2013) who carried a geological mapping of certain areas in the State, it has a geology dominated by metamorphic rocks that are mostly precambrian in age. These identified rocks are branded gneiss, granite gniess and magmatite gniess found around Iworoko, Are and Afao Ekiti. Majority of the rocks found in Ekiti are heterogenous in nature because they are made of both magmatite and granite gniess compositions.

3.2.4 Topography

Ekiti State has an undulating terrain with an upland height which is 250 meters above sea level. The ancient plains have been broken by steep sided outcropping dome rock. These rocks either stand alone or form a “ridge-like” pattern of hills. The state is characterized by hills, which informed the naming of the state as the term ‘okiti’ in the locally spoken Yoruba language is used to denote hilly areas (Government of Ekiti State, 2021).

3.2.5 Vegetation

Ekiti State is predominantly characterized by the tropical rain forest. There however exist some traces of guinea savannah around the northern periphery of the State. Being predominantly a tropical rain forest, there is a heavy concentration of

different tree species within the State. Olajuyigbe & Jeminiwa (2018) identified 60 tree species within Ekiti Eda Forest as shown in Table 3.2.

Table 3.2: Tree Species within Ekiti State

S/N	Species	Family
1.	*Afzelia bipindensis Harms*	*Caesalpiniaceae*
2.	*Albizia adianthifolia (Schumach) W.*	*Mimosaceae Wight*
3.	*Alstonia congensis Engl.*	*Apocynaceae*
4.	*Alstonia boonei De Wild.*	*Apocynaceae*
5.	*Aningeria robusta (A. Chev.) Aubrev. & Pellegr*	*Sapotaceae*
6.	*Antiaris toxicaria Lesch*	*Moraceae*
7.	*Blighia sapida K. Konig.*	*Sapindaceae*
8.	*Bombax buonopozense P. Beauv.*	*Bombacaceae*
9.	*Brachystegia eurycoma Harms*	*Caesalpiniaceae*
10.	*Brachystegia kennedyi Hoyle*	*Caesalpiniaceae*
11.	*Bridelia atroviridi Wild.*	*Euphorbiaceae*
12.	*Ceiba pentandra (L.) Gaertn.*	*Bombacaceae*
13.	*Celtis zenkeri Engl.*	*Ulmaceae*
14.	*Chrysophyllum albidum Linn.*	*Sapotaceae*
15.	*Cola gigantea A. Chev.*	*Sterculiaceae*
16.	*Cordea millenii Baker*	*Bignoniaceae*
17.	*Cynometra megalophylla Harms*	*Caesalpiniaceae*
18.	*Dialium guineense Willd*	*Caesalpiniaceae*
19.	*Daniella ogea (Harms) Rolfe ex. Holland*	*Caesalpiniaceae*
20.	*Diospyros mespiliformis Hoshst.*	*Ebenaceae*
21.	*Distemona bentamianus Baill.*	*Caesalpiniaceae*
22.	*Enantia chlorantha Oliv.*	*Annonaceae*
23.	*Entandrophragma angolensis (Welw.) C. DC.*	*Meliaceae*
24.	*Etandrophragma cylindricum Sprague*	*Meliaceae*
25.	*Erythrophylum suaveolens (Guill. & Perr.) Brenan*	*Caesalpiniaceae*
26.	*Ficus exasperata Vahl*	*Moraceae*
27.	*Ficus mucuso Welw. Ex. Ficalho*	*Moraceae*
28.	*Funtumia elastica (Preuss) Stapf.*	*Apocynaceae*
29.	*Gossweilodendron balsamiferum J.*	*Caesalpiniaceae*
30.	*Hildergardia barteri (Mast) Kosterm*	*Sterculiaceae*
31.	*Hollarrhena floribunda (G. Don) Dur & Schinz*	*Apocynaceae*
32.	*Khaya ivorensis A. Chev.*	*Meliaceae*
33.	*Kigelia africana (Lam) Benth*	*Bignoniaceae*
34.	*Lophira alata Banks ex.*	*Ochnaceae*
35.	*Lovoa trichilioides Harms*	*Meliaceae*
36.	*Mansonia altissima A. Chev*	*Sterculiaceae*
37.	*Milicia excelsa (Welw.) C.C. Berg.*	*Moraceae*
38.	*Milletia aboensis (Hook. F.) Baker*	*Papilionaceae*
39.	*Mitragyna ciliate Aubrev & Pellegr.*	*Rubiaceae*
40.	*Monodora myristica (Gaertn) Dunal*	*Annonaceae*
41.	*Musanga cecropioides R. Br.*	*Moraceae*
42.	*Nesogordonia papaverifera (A. Chev.) R. Capuron*	*Sterculiaceae*
43.	*Newbouldia laevis (P. Beauv.) Seem*	*Bignoniaceae*
44.	*Parinari excelsa Sabine*	*Chrysobalanaceae*
45.	*Pentaclethra macrophyla Benth*	*Mimosaceae*
46.	*Piptadeniastrum africanum (Hook F.) Brenan*	*Mimosaceae*
47.	*Pterocarpus erinaceus Poir*	*Papilionaceae*

48.	*Pterygota macrocarpa K. Schum*	*Sterculiaceae*
49.	*Pycnantus angolensis (Welw) Warb.*	*Myristicaceae*
50.	*Ricinodendron heudelotii (Baill) Pierre*	*Euphorbiaceae*
51.	*Sterculia rhinopetala K. Schum*	*Sterculiaceae*
52.	*Sterculia tragacantha Lindi*	*Sterculiaceae*
53.	*Strombosia pustulata Oliv.*	*Olacaceae*
54.	*Terminalia ivorensis A. Chev.*	*Combretaceae*
55.	*Terminalia superba Engl. & Diels*	*Combretaceae*
56.	*Pterocarpus osun Craib.*	*Papilionaceae*
57.	*Tetrapleura tetraptera Taub.*	*Mimosaceae*
58.	*Triplochiton scleroxylon K. Schum.*	*Sterculiaceae*
59.	*Xylopia aethiopica (Dunal) A. Rich*	*Annonaceae*
60.	*Zanthoxylum zanthoxyloides (Lam) Zepern*	*Rutaceae*

Source: (Olajuyigbe & Jeminiwa, 2018)

3.2.6 Site Resources

The population of Ekiti State is characterized by a relative equal proportion of male and female genders. Agriculture is the main source of economic revenue as it contributes 42.4% of the State's GDP (Ekiti State Bureau of Statistics, 2021). Approximately 36.1% of the State's population are the active labour force while a cumulative 60.3% of the population are dependents (Ekiti State Bureau of Statistics, 2021).

3.2.6.1 Natural Resources

Ekiti State is endowed with rich natural resources which include solid minerals, forests, and agricultural produce. Some of the mineral deposits within Ekiti state include bulk clay, kaolin, dimension stones, feldspar, quartzite, cassiterite, tantalite, columbite, bauxite and gemstones. On the part of agriculture, the State is endowed with crops such as cocoa, kolanut, yam, cassava, rice, maize etc. while forest resources include various timber species (Government of Ekiti State, 2021).

3.2.6.2 Human Resources

Based on the 2006 National Population and Housing census, the population of Ekiti State was 2,398,952. As at the year 2017, with an estimated growth rate of 3.1%, Ekiti State had a population of 3,438,537. It is projected that by the year 2025, Ekiti State will have an estimated population of 4 million people. The ratio of male to female population is almost 1:1 as the male population makes up 50.7% while the female population constitutes 49.3%. The active labour force of Ekiti states makes up 36.1% of the overall population aged between 25-64 years. On the other hand, 63% of the population are less than 25 years (mainly students and apprentices) or over 64 years, contributing to the high dependency ratio of the State (Ekiti State Bureau of Statistics, 2021).

3.2.6.3 Economic Resources

The Economy of Ekiti State is greatly influenced by agriculture. As at the year 2017, the agricultural sector contributed N555,057.93 out of the total GDP of N1,309019.59 generated that year. More so, the Industrial and service sector contributed N642,023.40 and N192,938.27 to the GDP in 2017 respectively. The agricultural contribution to the State's economy is based on the fact that more than 70% of the State's population engage in farming (Ekiti State Bureau of Statistics, 2021).

3.3 Macro Site Assessment

The macro environment of the project site was assessed to present an understanding of the accessibility to the site from a broad national/regional context, and the existing infrastructure and facilities as presented herein.

3.3.1 Accessibility

The Ekiti SAPZ is accessed primarily by road. The closest airports, seaports and railway stations are all outside the State boundary and can be accessed by major inter-State roads. The relative locations of the SAPZ and these stations are presented in Figure 3.6.

3.3.1.1 Trunk Roads

The SAPZ is currently accessible by Trunk A roads which link Oye town, Ikole town, and Ilasa-Ekiti, and connects to Kogi State. From the Northeast, the Trunk A road that accesses the site stems Ife in Ondo State, through the eastern part of Ikole LGA, to Egbe in Kogi State. Trunk B roads then take their access from these roads and run through the SAPZ, also linking stake holder communities such as Ipao and Itapaji with each other. The trunk roads that provide access to the SAPZ project site are presented in Figure 3.6.

3.3.1.2 Railway

There are no rail systems existing within Ekiti state. The closest railway system to the SAPZ location is a National Railway Line about 74km westward in Osun State. Another existing and functional railway system is the Itakpe-Ajaokuta-Warri rail line which is about 83km east of the SAPZ site as presented in Figure 3.6.

3.3.1.3 Sea Ports

There are two categories of ports in Nigeria, the seaports and the inland dry ports which are medium for international trades and conduits for imports and exports of both processed and unprocessed goods. As presented in Figure 3.6, the closest seaport to the SAPZ is the Lekki Deep Sea Port (also commonly known as Dangote Port) and the Lekki Port in Lagos State which are both within 223km linearly. The closest inland port to the SAPZ is the Onitsha River Port in Anambra State which is 250km South-East of the SAPZ when measured linearly.

3.3.1.4 Airports

Air transportation is considered the fastest way to move people and goods from a place to another and its presence in a city or region can foster quicker economic development. There is neither a domestic nor international airport within Ekiti State. The nearest domestic airports are the Akure Airport in Ondo State and Osogbo Airport in Osun State which are 72km and 114km away from the SAPZ respectively. The closest international airport to the SAPZ is the Murtala Mohammed International Airport (280km away) in Lagos State (See Figure 3.6).

However, the Ekiti State Government handed over a site of about 1600Ha for the construction of an Ekiti Agro-Allied Cargo Airport in 2021 (Government of Ekiti State, 2021). With construction expected to be completed before October 2021, based on the administration's promises, the airport shall serve as a fast means for the transportation of agricultural produce from the SAPZ to the local and international markets. The SAPZ transportation plan should therefore aim at providing quick access from the agro-allied industries to the cargo airport.

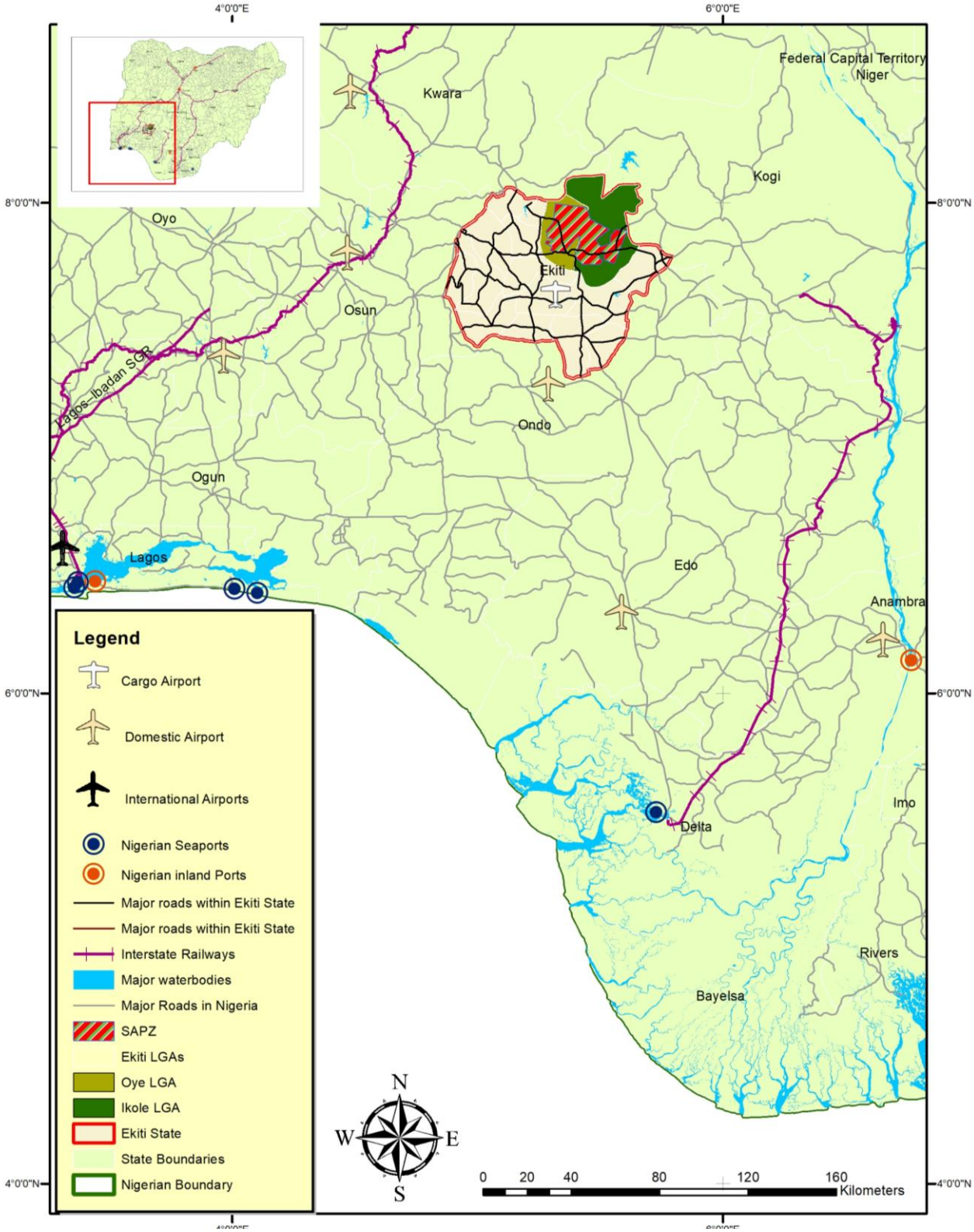

Figure 3.6:Map of Site Showing Airports, Sea Ports, and Railway Stations at large scale.
Source: (OSGOF, GRID3, Hotosm, Surveyor General of Ekiti State)

3.3.2 Utility Infrastructure

3.3.2.1 Power

Like most parts of the country, Ekiti State generally relies on power supply from the national grid which is transmitted and managed along transmission lines and stations (see Figure 3.7 and Figure 3.8). The figures show that the closest line and station to the project site are in Ado-Ekiti. Therefore, the most conventional source of power for Ekiti SAPZ is reliance on the national grid via the Ado-Ekiti Transmission Station. However, the power distributed from the grid is insufficient for the day-to-day activities of Nigerians who have continued to experience epileptic power supply. The State Government plans to boost electricity generation and transmission in the State by building two new substations in Ekiti (Ojomoyela, 2021). Alternative sources of power are also recommended. One potential source of power is the Ekiti State Independent Power Project (IPP) inaugurated by the State Government in 2019. The IPP, when completed will primarily supply power to public institutions and facilities but will be available for interested private sector players on a 'willing buyer, willing seller' basis (NAN, 2021).

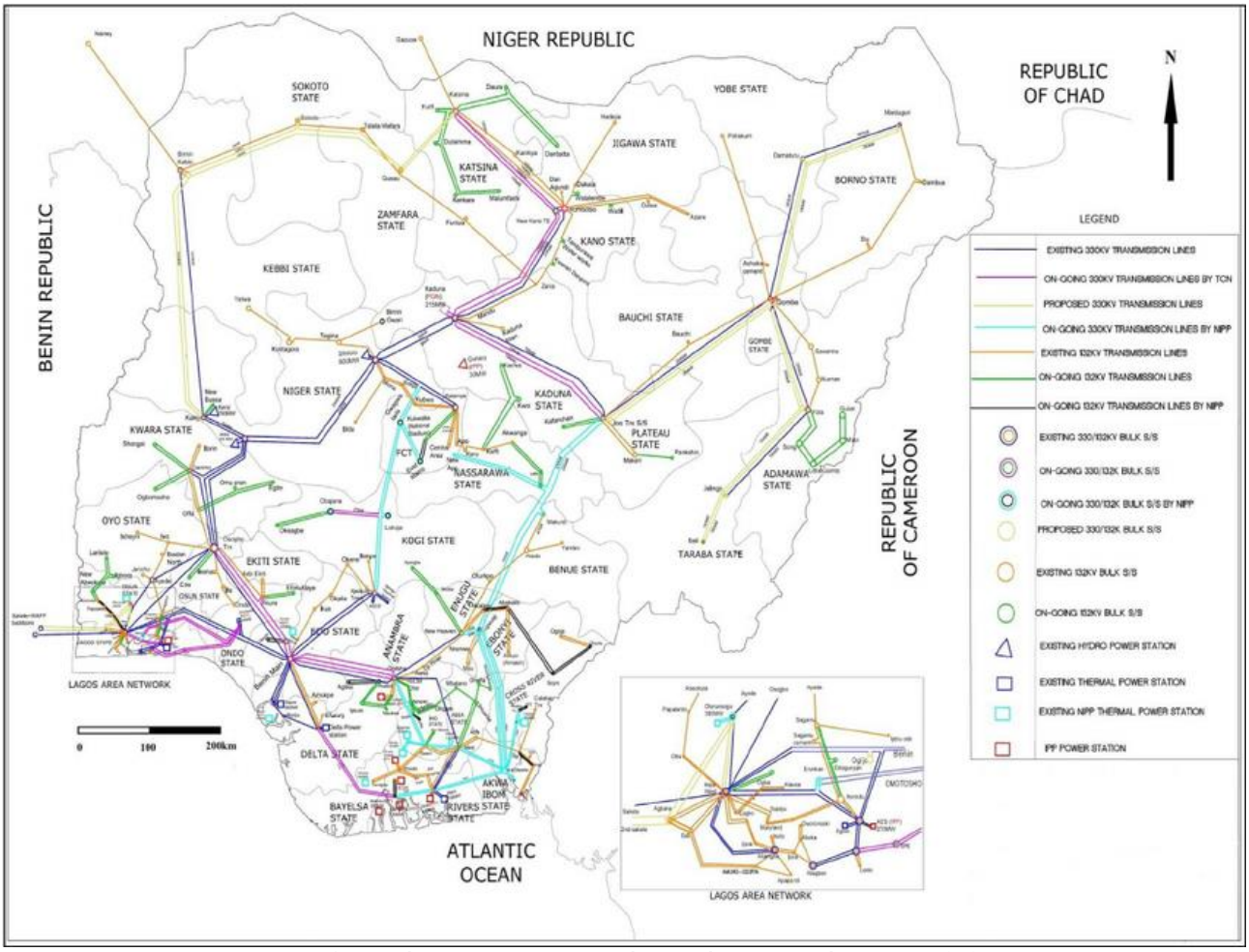

Figure 3.7: Map of Nigeria showing existing, ongoing, and proposed generation and transmission (HV) projects.
Source: TCN data from (Akpan, 2015)

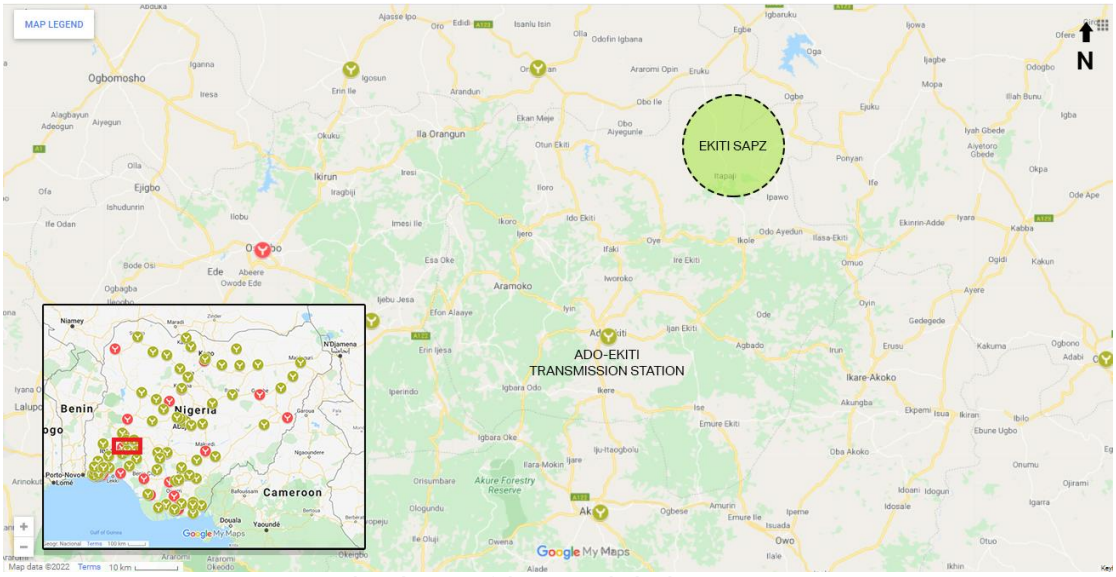

Figure 3.8: Relative locations of Ekiti SAPZ and Ado-Ekiti Transmission Station.
(Source: TCN, 2019, and Google Map Data)

3.3.2.2 Water

Water is one of the most essential resources for agricultural production. The water sources available to the SAPZ include rainwater, surface water, and underground water. Owolabi's (2016) study revealed that Ekiti State had a mean annual total rainfall of about 1367mm in the previous decade. Ado-Ekiti particularly has a tropical climate with a precipitation of about 1478mm per year (Climate Data, n.d.). These amounts of rainfall and precipitation are sufficient for intensive and specialized farming. However, for industrial agricultural activities that require constant supply of water with no dry season shortages; hence alternative sources of water are necessary for irrigation. Irrigation options include the use of underground water through drilling of boreholes, a practice that is considered viable in domestic use as a response to rising public water costs and unreliability in Ado-Ekiti (Oyebode, Oyegoke, Olowe, Onoh, & Adebayo, 2015), or the collection of surface water from accessible water bodies. The closest largest water body is the Itapaji Dam which lies within the SAPZ site boundary. However, as observed during the site visit, the dam does not currently retain adequate water to function to its best capacity. Other close-by water bodies are the Okunrun River (which has the Egbe Dam) to the west and Kampe/Oyi Dam in Kogi State to the north-east as presented in Figure 3.9. The Oyi River in Irele-Ekiti also serves as a potential water source for irrigation.

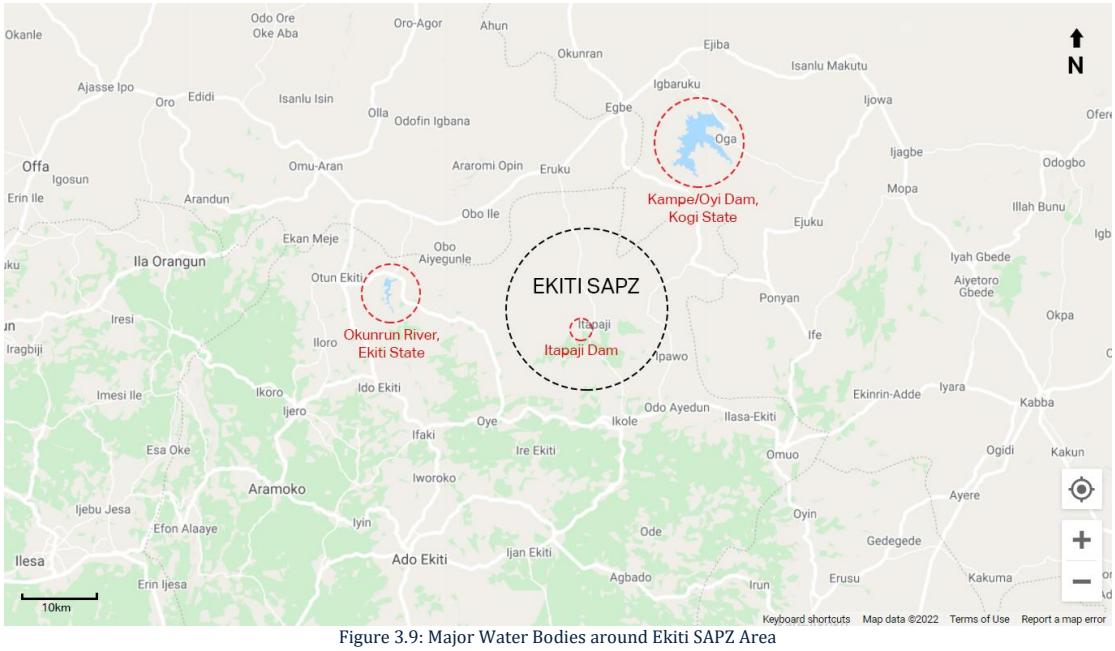

Figure 3.9: Major Water Bodies around Ekiti SAPZ Area

3.3.3 Facilities

A list and spatial distribution of facilities in around the site and in Oye and Ikole LGAs are presented in the Ekiti SAPZ ESIA Scoping Report. It includes details of educational facilities (primary schools, secondary schools, and tertiary institutions), health facilities, security facilities, and industries as acquired from the Federal Ministry of Education, Federal Ministry of Health, and the Geo-Referenced Infrastructure and Demographic Data for Development (GRID3).

3.4 The Ekiti SAPZ Processing Hub Concept Plan

The Ekiti SAPZ Processing Hub is a dedicated area of the SAPZ where industrial activity is planned to be concentrated along with several other support facilities. It is located centrally to the SAPZ, along the Itapaji-Oke Ako Road, about 2km east from the Itapaji Dam and Itapaji and about 4 km west of Oke Ako as presented in Figure 3.10. The selected site covers a land area of about 500Ha on predominantly greenfield site with ample space for potential expansion of the Processing Hub. It is relatively flat with a gently undulating terrain which facilitates natural drainage through gravitational flow southeastwards of the site where the site is at its lowest altitude of 410m, a difference of about 100m from the highest point of 510m northward of the site (see Figure 3.11 and Figure 3.12). It takes access from the Itapaji-Oke Ako Road (a single-lane-per-direction road which is proposed be dualized to accommodate the traffic set to be generated by the hub). The Itapaji Dam shall serve as its primary source of water and is a potential source of hydroelectric power.

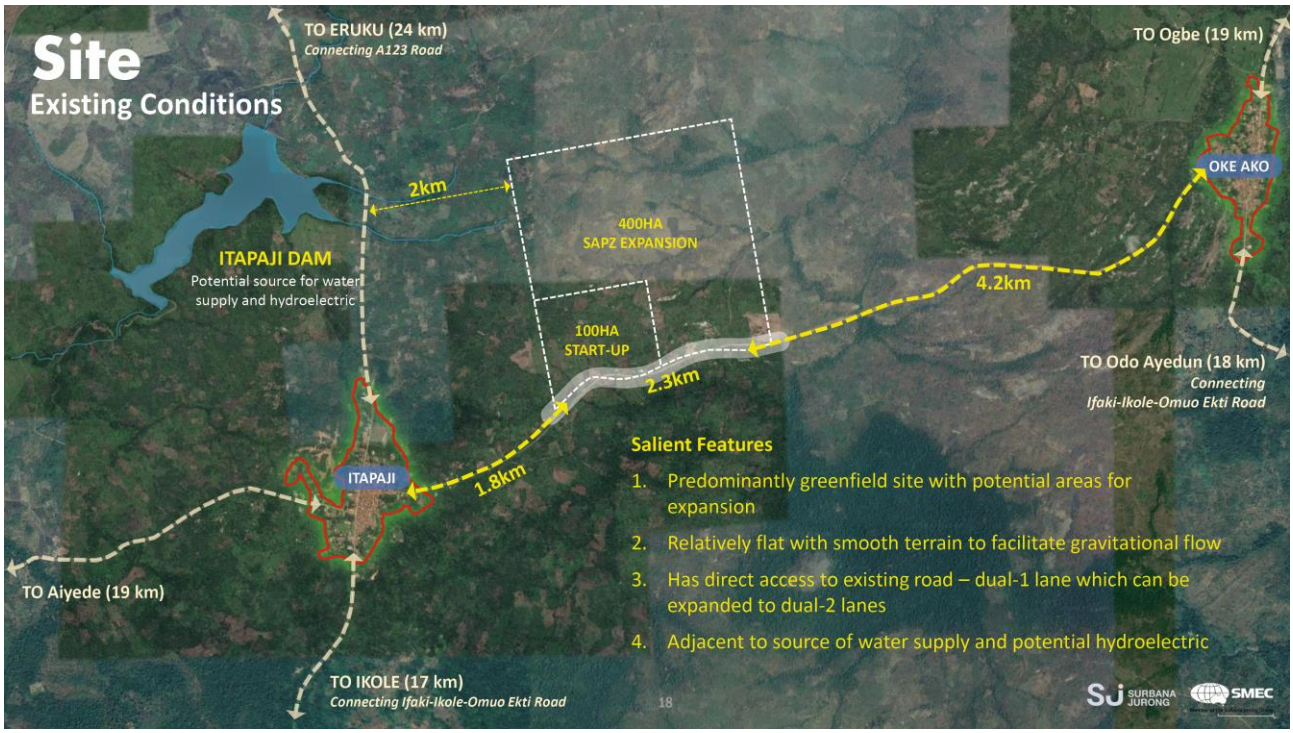

Figure 3.10: Site Location of the Processing Hub
Source: (Surbana Jurong & SMEC, 2022)

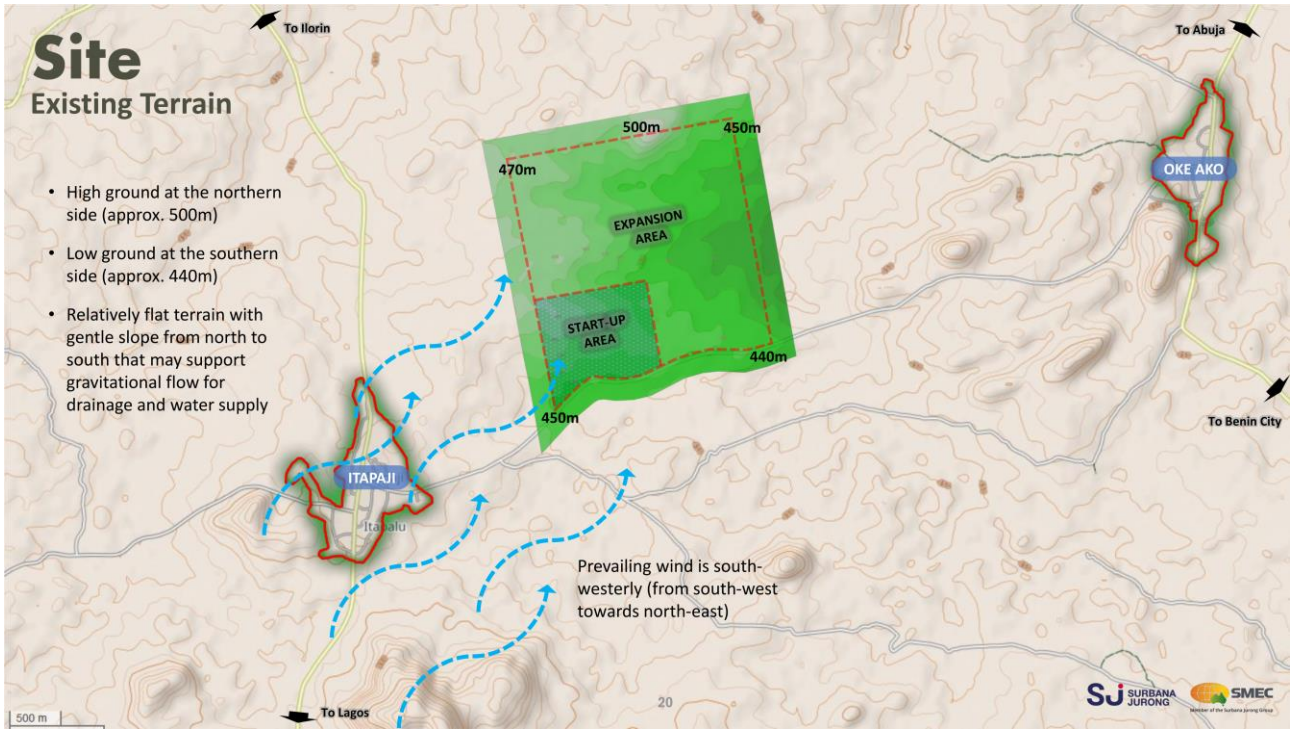

Figure 3.11: Processing Hub Existing Terrain

Source: (Surbana Jurong & SMEC, 2022)

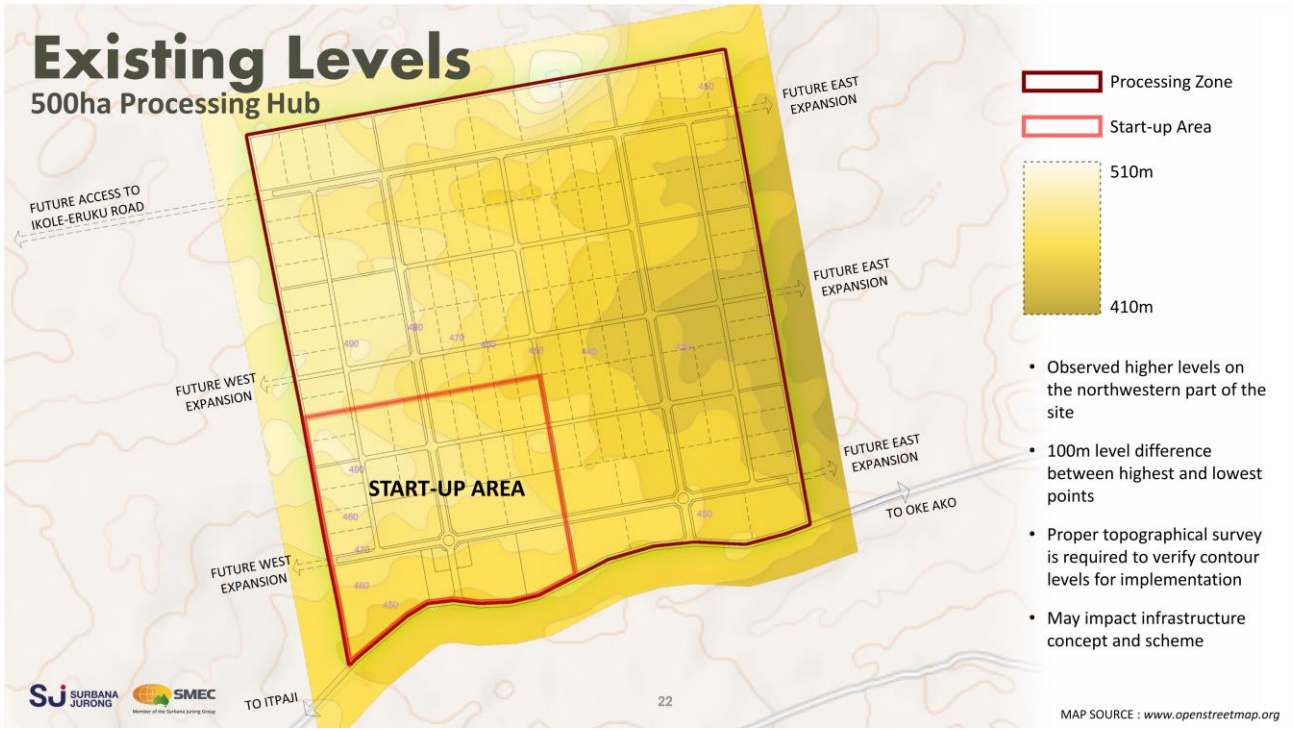

Figure 3.12: Processing Hub Existing Levels

Source: (Surbana Jurong & SMEC, 2022)

3.4.1 Development Intent and Objectives

The Ekiti SAPZ Processing Hub is expected to transform the image profile of the State by integrating efficient farming methods coupled with downstream agro-industrial processing seamlessly and create an integrated agro-industrial ecosystem. The objectives of the Hub are to:

i. Assist farmers with high yielding seeds, access to fertilizers, modernized farming techniques and irrigation methods to improve productivity per hectare.
ii. Process agro commodities produced at site to essential mid & downstream products, reducing reliance on imports & achieve food security & economic growth.
iii. Continuously support and empower farmers with knowledge of weather reports, agro-demand, crop insurance and storage for final produce to seamlessly integrate raw material needs with processing requirements.
iv. Act as key catalyst in the overall transformation of Ekiti State into a food basket of Nigeria, improving the current unemployment scenario and achieve quality standard of living for people in Ekiti State.

The Processing Hub is envisioned to emerge as an integrated food processing cluster with focused farming activities in proximity, thus unlocking the potential for industries to stimulated regional growth and job creation and demonstrating alignment with Ekiti State Government's vision in an eco-system as illustrated in Figure 3.13.

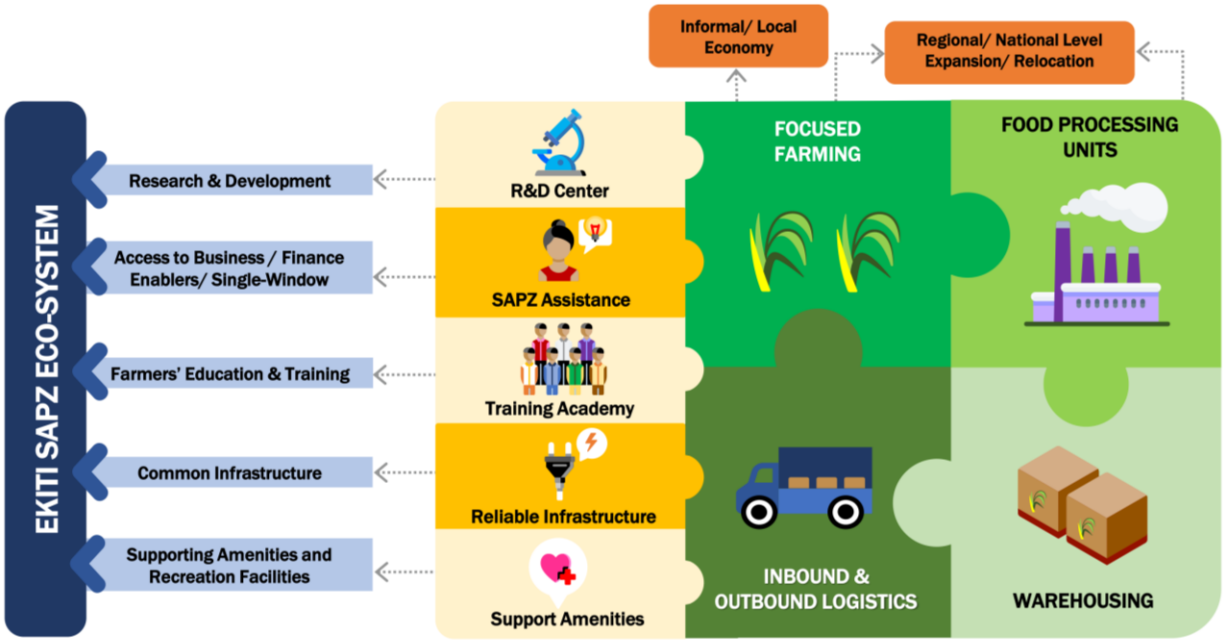

Figure 3.13: Integrated Product Model for Ekiti SAPZ Processing Hub
Source: (Surbana Jurong & SMEC, 2022)

3.4.2 Phases of Development

Industrial developments have been known to attract population especially through migration. The development of Ekiti SAPZ is expected to attract migrant population through industrial employment, warehousing, and other support functions. To progressively serve the growing population and for controlled development, the Processing Hub is divided into three faces with organic–northwards and eastwards outwards expansion. This enables staging of lands to expand in a systematic and modular flow. A fifth of the Processing Hub area is delineated to be developed as the initial Phase 1 with an approximate area of about 100Ha (Figure 3.14). This is a reasonable amount of land for initial demonstration of Hub.

It is projected that the Phase 1 of the project will employ 3,010 people; while Phase II shall employ additional 3,906 people, representing a 130% increase, bringing the total employed population to 6,916 at the end of Phase II of the project. In Phase III, it is estimated that there will be 4,466 new employment migrations, this is a 114% increase from new migrations in Phase

II and a 65% increase in the total employed population, which amounts to 11,382 people when the Processing Hub is fully operational as presented in Figure 3.15

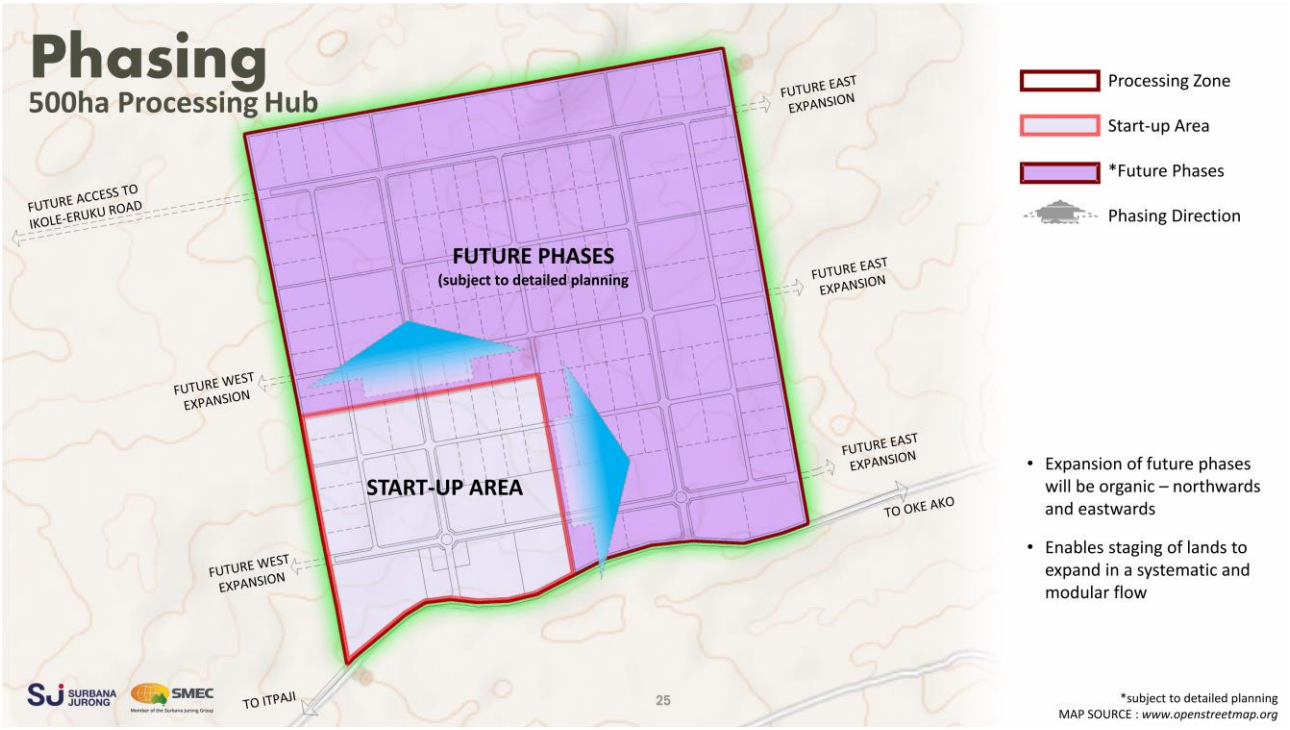

Figure 3.14: Phases of Development of the Processing Hub

Source: (Surbana Jurong & SMEC, 2022)

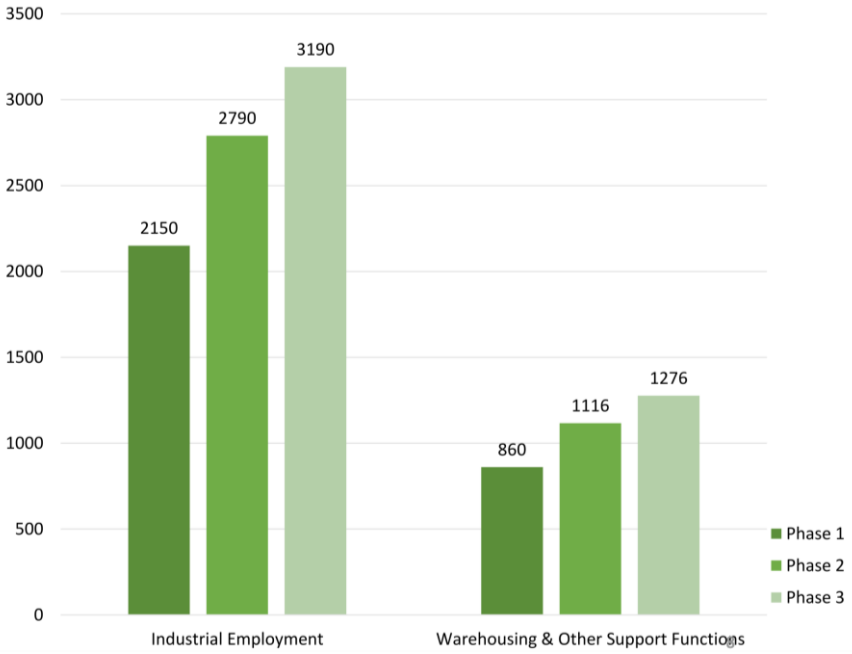

Figure 3.15: Projected Population of the Processing Hub

Source: (Surbana Jurong & SMEC, 2022)

3.4.3 Land Use Plan

The arrangement of activities within the Hub is done in a manner of gradation from least to highest industrial activity, such that the residential and commercial areas are located along the Itapaji-Oke Ako Road to create a vibrant frontage while the processing industries are farthest from the road and settlement to mitigate noise and air pollution. This gradation splits Phase 1 of the hub into four zones with different broad uses as shown in Figure 3.16.

A grid-linear circulation of the Hub's Road network was employed to optimize ease of movement (see Figure 3.17). It allows for a logical loop system that distributes access to all parcels. The circulation pattern provides for future expansion along its major streets while cul-de-sacs have been employed as a safeguarding method in the interim. The designed right-of-way (ROW) for Primary Access is 32m and 28m while secondary local access roads are 20m wide. These specifications are sufficient for the anticipated volume of traffic to be generated (see 3.4.4.1).

The rectangular parcel configuration gives a good mix and variety of plot sizes, which allows for amalgamation and subdivision whenever needed and are optimized for industrial uses. The land use plan and analysis of the Processing Hub are presented in Figure 3.18 and Table 3.3 respectively. The parcelled plan of Phase 1 and 3D renderings of the Processing Hub are presented in Figure 3.19 to Figure 3.22.

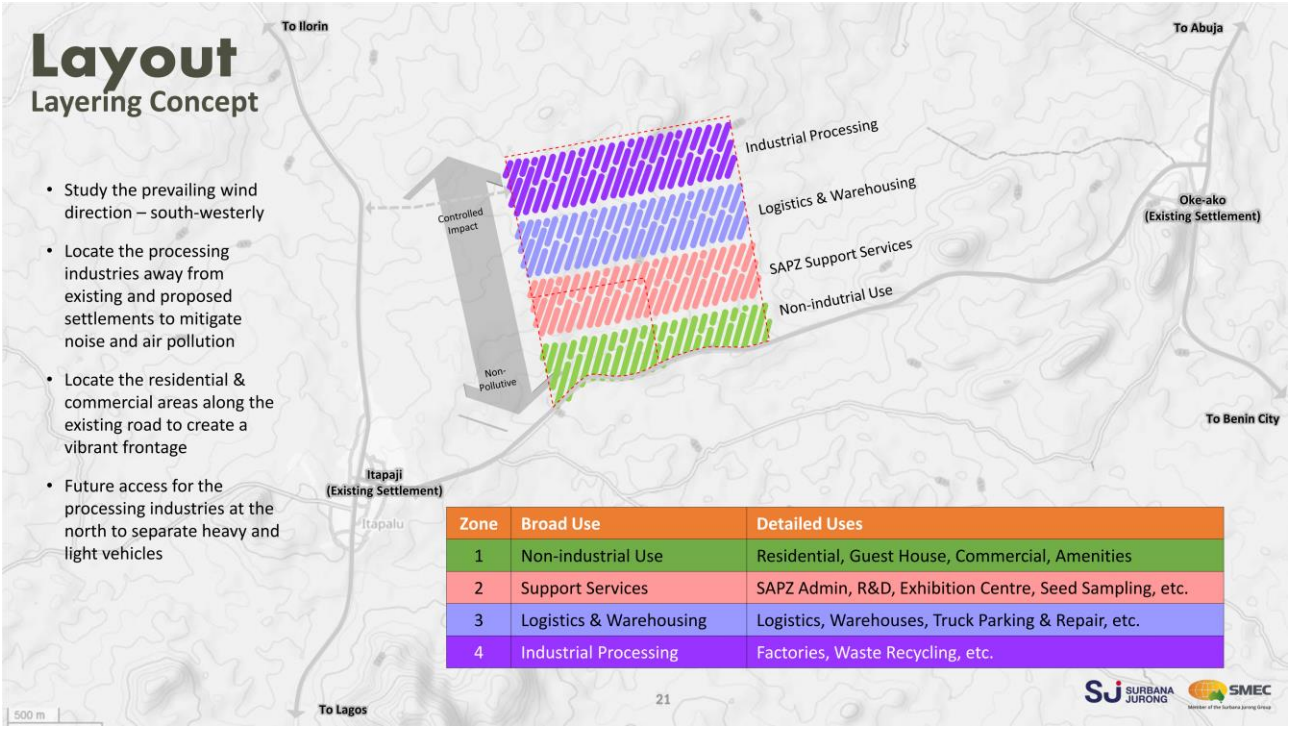

Figure 3.16: SAPZ Processing Hub Layout Layering
Source: (Surbana Jurong & SMEC, 2022)

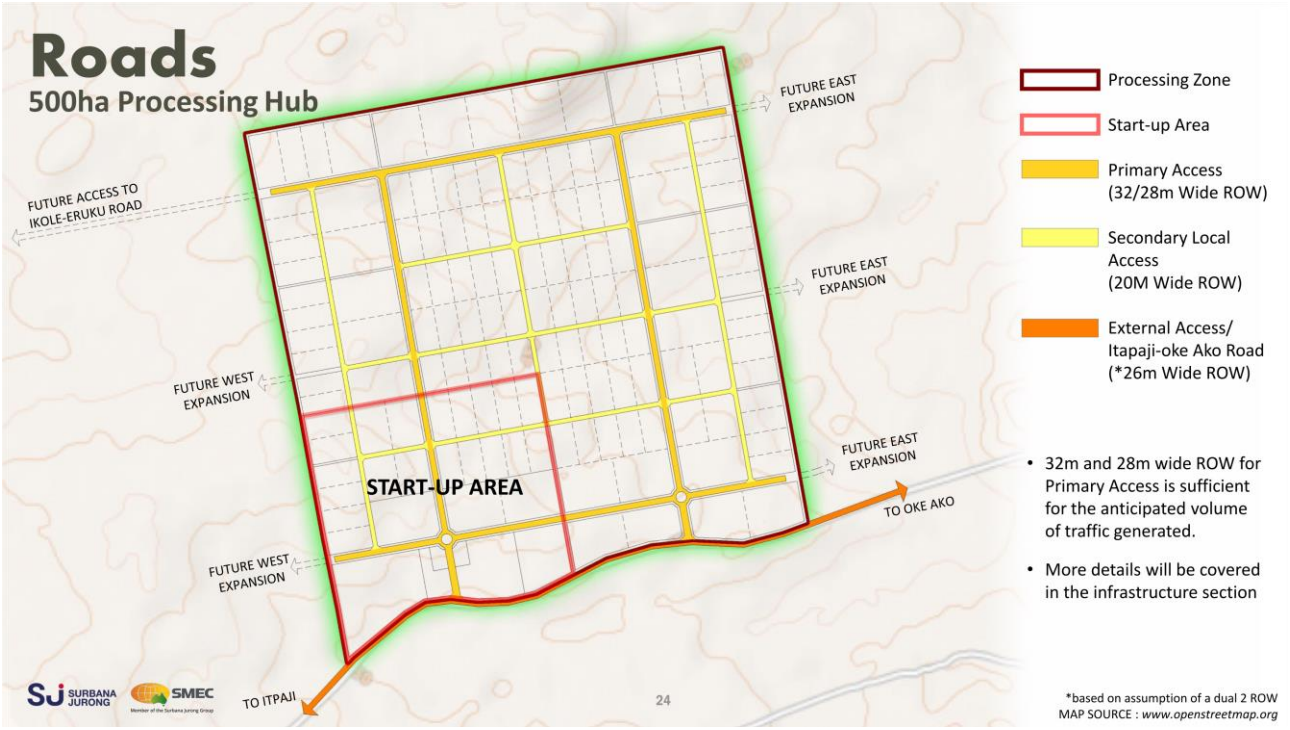

Figure 3.17: SAPZ Processing Hub Circulation Plan

Source: (Surbana Jurong & SMEC, 2022)

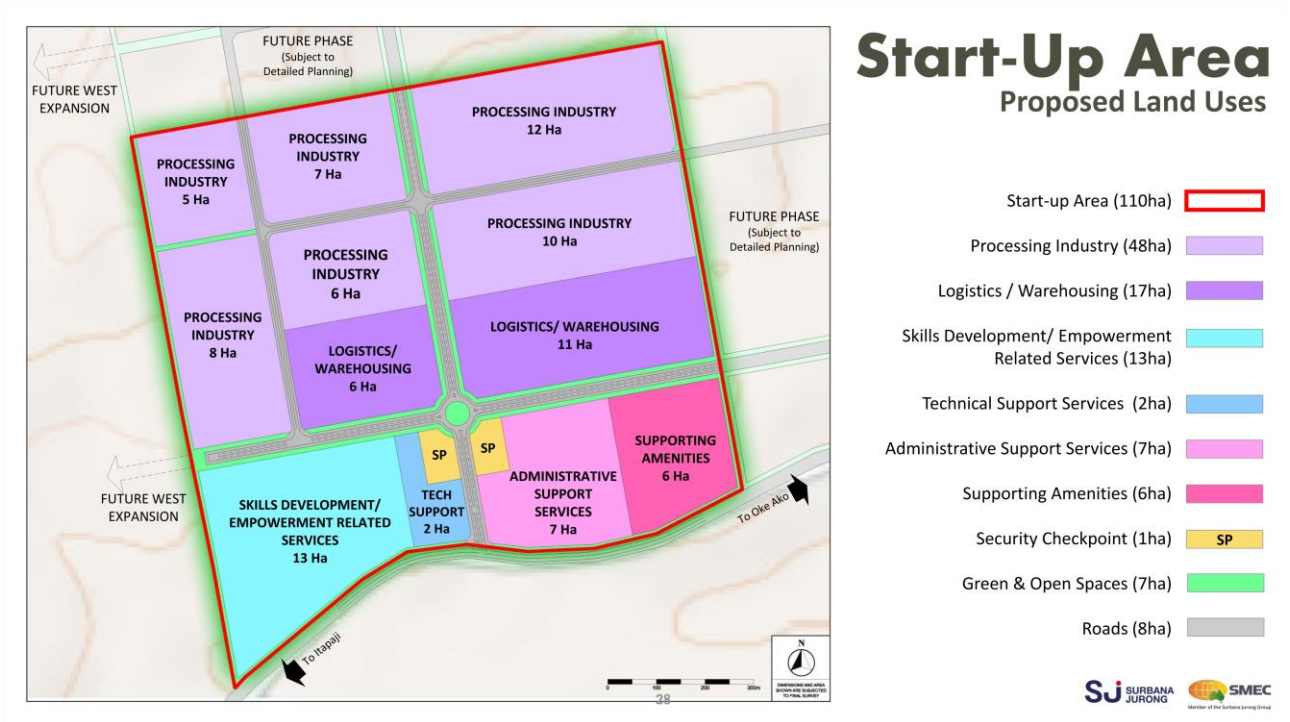

Figure 3.18: Proposed Land Use Plan for Phase 1 of the Processing Hub

Source: (Surbana Jurong & SMEC, 2022)

Table 3.3: Land Use Analysis for Phase 1 of the Processing Hub

Land Use		Area (Ha)	Percentage (%)
Saleable Land*	Processing Industries	48	44
	Logistics/ Warehousing	17	15
	Admin Support Services	7	7
	Skills Development/empowerment related services	13	12
	Technical Support Services	2	2
	Supporting Amenities	6	5
	Sub-Total	93	85
Non-Saleable Land*	Green and Open Spaces	7	6
	Security Checkpoint	1	1
	Road Reserve	8	8
	Sub-Total	17	15
Total		110	100
** Gross area subjected to allocation of infrastructure utilities requirements.*			

Source: (Surbana Jurong & SMEC, 2022)

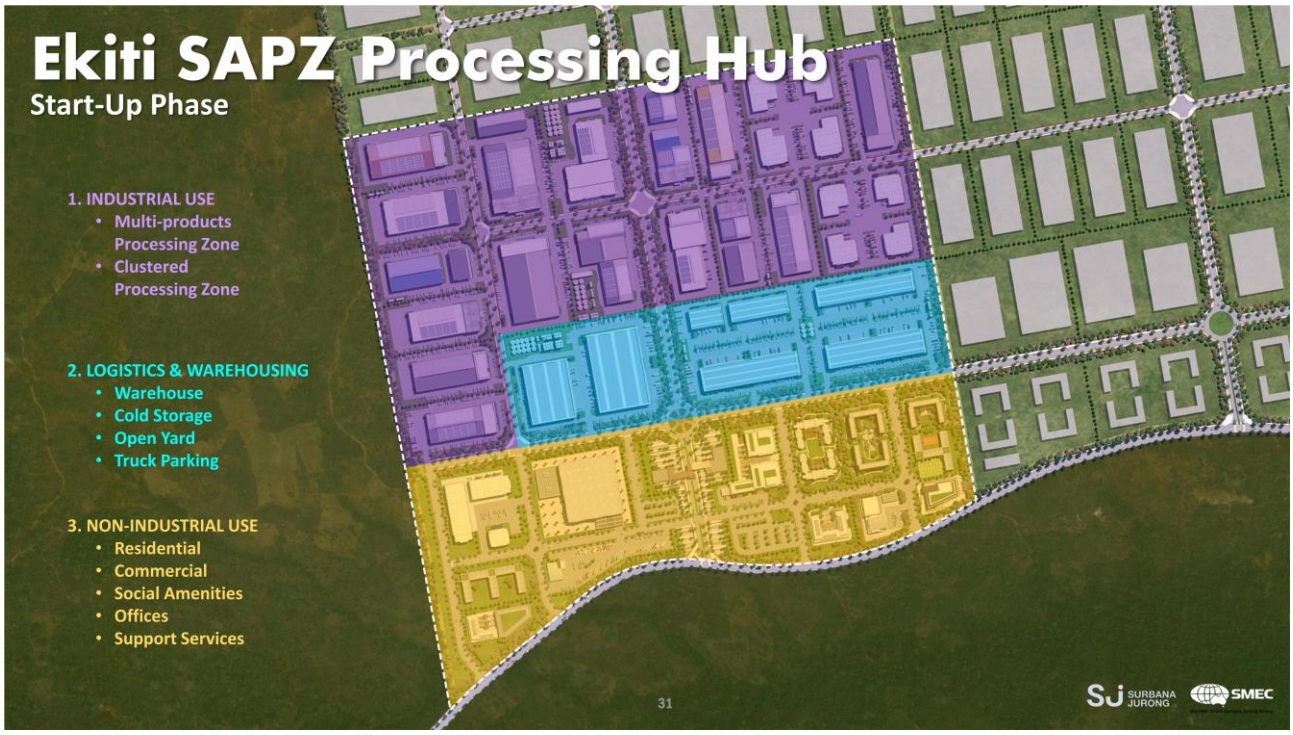

Figure 3.19: Proposed Land Use Zoning for Phase 1 of the Processing Hub

Source: (Surbana Jurong & SMEC, 2022)

Figure 3.20: Non-Industrial Land Use in Phase 1 of the Processing Hub

Source: (Surbana Jurong & SMEC, 2022)

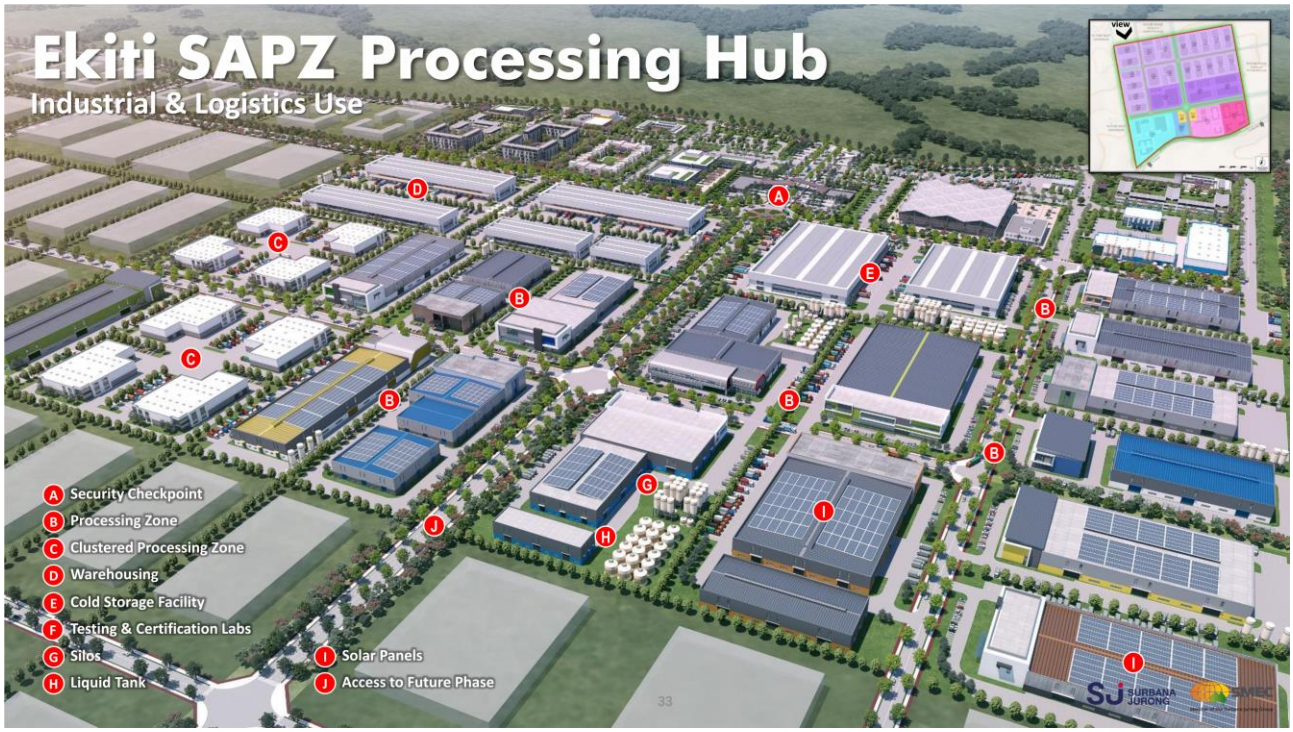

Figure 3.21: Industrial and Logistics Land Use in Phase 1 of the Processing Hub

Source: (Surbana Jurong & SMEC, 2022)

Figure 3.22: Main Gateway of the Processing Hub
Source: (Surbana Jurong & SMEC, 2022)

3.4.4 Infrastructure Plan

The following engineering strategies are discussed in the Infrastructural plan for the Ekiti SAPZ Processing Hub:

- Traffic engineering/Roads
- Water
- Sewer
- Stormwater
- Ducting
- Power

3.4.4.1 Road Engineering

The generated trips in the Processing Hub were calculated using the ITE Trip Generation Manual Rates (ITE, 2021) based on the proposed land uses for each phase as presented in Table 3.4. The following were the assumptions of the generated trips:

- An estimated increase of 3000 students per phase for education/training facilities
- An estimated increase of 500 beds per phase for hospital
- 25% of total trip contribution by heavy duty vehicles

Table 3.4: Projected Daily Trips

Phase	Total Daily Trips (Cumulative)
1	20698
2	29982
3	45336

Source: (Surbana Jurong & SMEC, 2022)

The road pavement shall consist of the following layers:

i. 40mm Asphalt surfacing
ii. 120mm Asphalt base

iii. 400mm C3
iv. 150mm G7
v. 150mm G9

The Road Geometry shall have a desirable minimum road gradient is 0.7%. Where this is not achievable, a cross fall of 2.5% is to be ensured to direct water to the longitudinal stormwater channels. The design speed for all roads is 40km/hr; turning radii are based on industrial standards as considered for the cul-de-sacs in Phase 1 (see Figure 3.23).

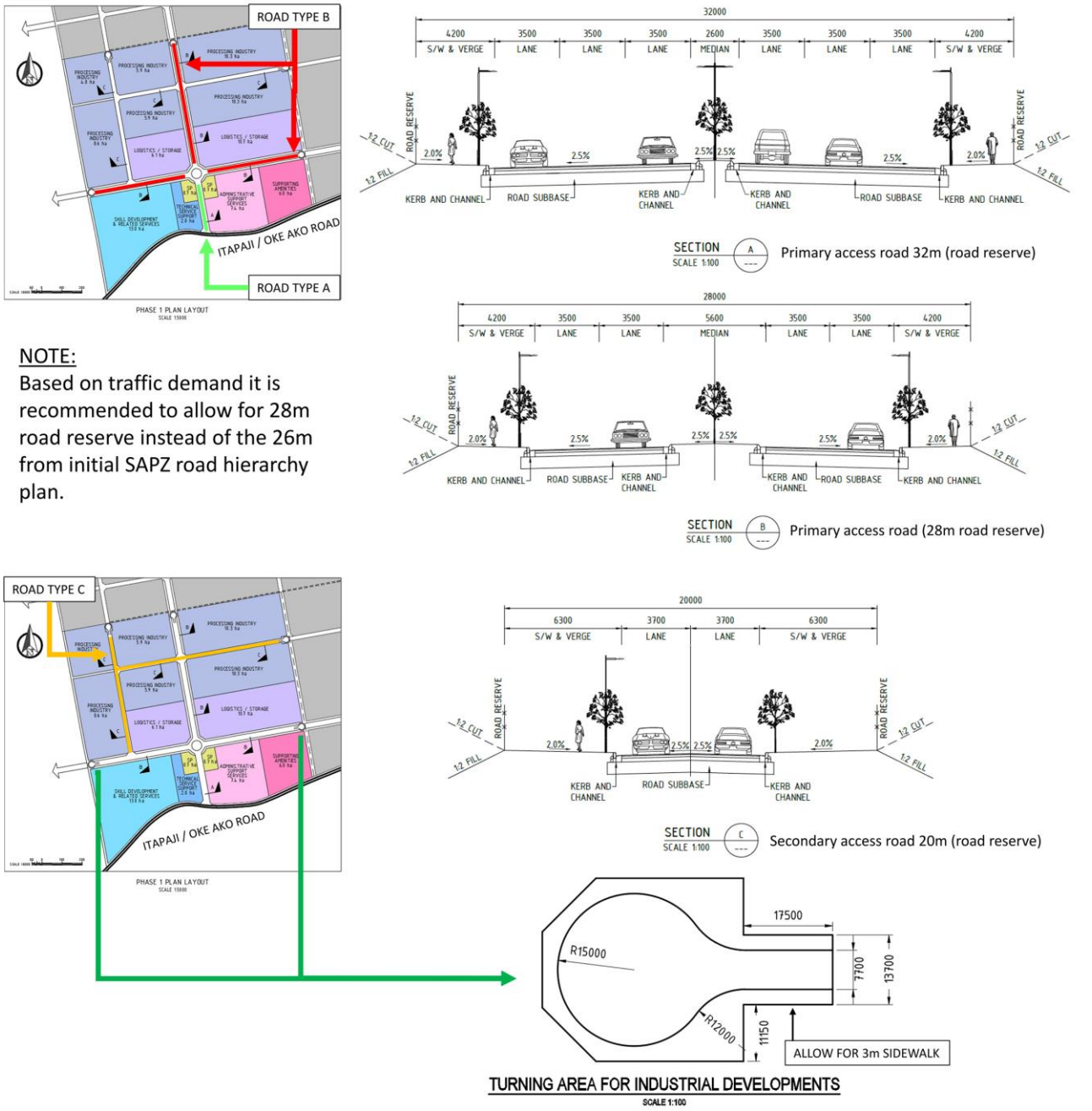

Figure 3.23: Road Engineering Plan
Source: (Surbana Jurong & SMEC, 2022)

3.4.2.2 Water

Water for the Ekiti SAPZ Processing Hub shall be sourced from the Itapaji Dam. The cumulative estimated water demands of the Processing Hub, based on Public Health and Plumbing Engineering CIBSE Guide G:2014 and CoE ES Guidelines (CIBSE,

2014) are presented in Table 3.5. To meet this demand, there shall be a 2-hectare water treatment plant which shall be developed in phases as water demand increases as presented in Figure 3.24. The water network covers all phases of development and is based on supplying water to each land use boundary; however, detailed modelling will need to be done during the implementation stage of Phase 1. 1000mm diameter steel pipes are recommended as external bulk water supply from raw water source to water treatment plant. 250mm – 400mm diameter (m-PVC) are recommended as internal pipes for Phase 1. Fire water will follow similar network once detailed modelling is finalized during Phase 1.

Table 3.5: Cumulative Estimated Water Demand

Phase	Average Annual Daily Demand (Ml/day)	48-hour storage (m^3)
1	2.78	5.56
2	6.41	12.83
3	12.90	25.81

Source: (Surbana Jurong & SMEC, 2022)

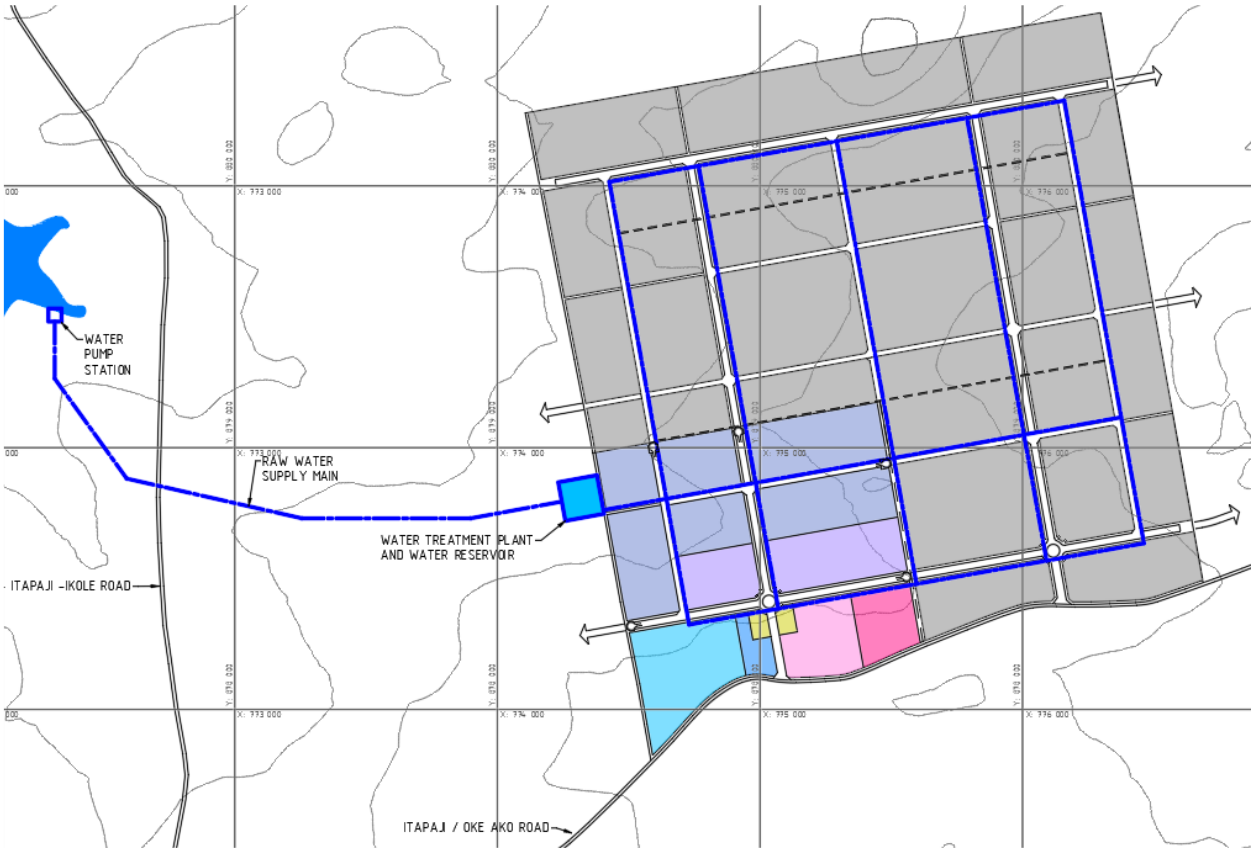

Figure 3.24: Water Engineering Plan
Source: (Surbana Jurong & SMEC, 2022)

3.4.4.3 Sewer

As per the CIBSE Guide G for Public Health and Plumbing Engineering, sewer demands are estimated to be 80% of AADD as presented in Table 3.6. The sewer treatment shall be developed on a 4-hectare site to be built throughout the 3 phases of development (see Figure 3.25). Two 5m drainage servitudes are considered within the 500Ha site for main sewer and stormwater along valley lines. 300mm diameter (u-PVC) Internal pipes are recommended for Phase I. Pipe sizes shall be verified during the construction stage of Phase I and the increase from wet weather conditions in the Ekiti Region.

Table 3.6: Cumulative Estimated Sewer Demand

Phase	Average Daily Flow (Ml/day)
1	2.22
2	5.13
3	10.32

Source: (Surbana Jurong & SMEC, 2022)

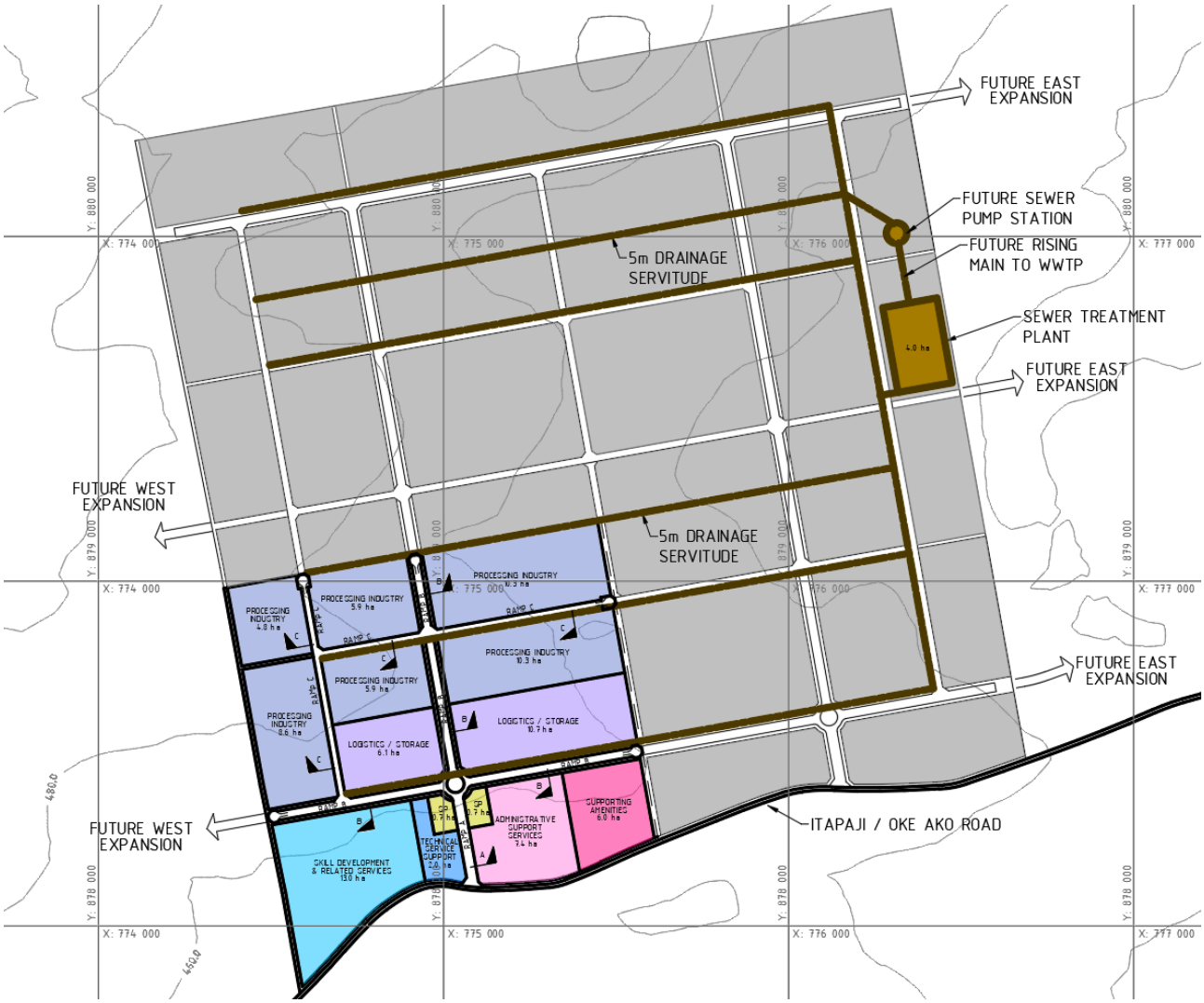

Figure 3.25: Sewer Engineering Plan
Source: (Surbana Jurong & SMEC, 2022)

3.4.4.4 Stormwater

Stormwater drainage routes are planned to be as short as possible to outlet due to very flat grades and to ensure that minimum velocity and natural scouring is achieved. Subsoil drains below the road layer works level have been proposed for the protection of road design layer works by keeping them dry and free draining. Alternative stormwater measures like slot drains or longitudinal stormwater channels with cast iron grids shall be employed where road grades are very flat. Minimum pipe diameter shall be 450mm/500mm. Minimum cover for stormwater conduits shall be 1000mm under roadways and 800mm in verges. A 6-hectare stormwater attenuation facility is recommended for initial development and another 4-hectare stormwater attenuation facility for future development as shown in Figure 3.26.

Figure 3.26: Stormwater Management Plan
Source: (Surbana Jurong & SMEC, 2022)

3.4.4.5 Communications

Ducting shall generate space for utility lines for the installation of adequate telecommunication infrastructure and internet fibre wires services for handling of industrial activities. 4 x 160mm diameter ducts considered with crossing every 100m. Concrete encasement of ducts crossing roads is considered as presented in Figure 3.27.

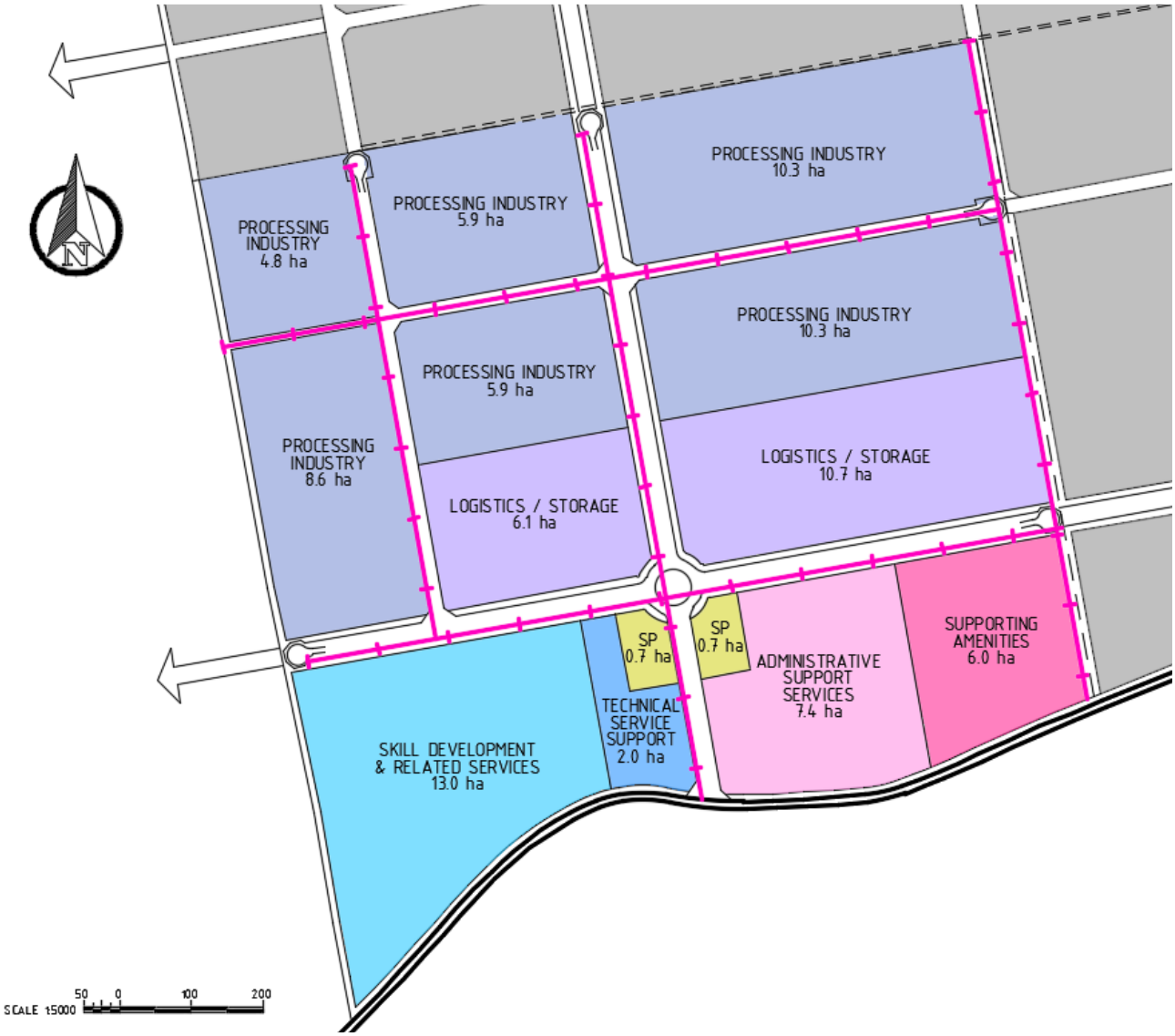

Figure 3.27: Ducting Routes
Source: (Surbana Jurong & SMEC, 2022)

3.4.4.6 Power

A Power Plant (Stand-by Emergency Power) and 132/11kV Substation is proposed to generate and supply power for the Industrial Hub. The load demand (see Table 3.7), high due to high industrial covered by hectare, will require 132/11kV Substation to be met distributed using 11kV network.

Power required for the entire development is more than the proposed power plant can provide; therefore, PV Solar and other renewables shall be considered as alternative power source. Power plant shall only act as standby emergency power. Each block will require more than one (1) 11kV/400V substations as illustrated in Figure 3.28.

The power demand is estimated based on the following criteria:

- Power demand forecast for 20 years
- Power load classes based on land uses
- Estimated power plant capacity = 10MW
- Estimated Total Demand for Phase I = 89MW
- Proposed Substation Capacity = 80 MVA (Approx. 76MW)
- Substation to be built as 4 x Bay Substation initially, transformers to be added in phases as demand grows

- Bay 1 = 20MVA Phase 1.E
- Bay 2 = 20MVA Phase 2.E
- Bay 3 = 20MVA Phase 3.E
- Bay 4 = 20MVA Phase 4.E

Table 3.7: Estimated Power Demand

Land Use	Quantity	Demand (MVA)	Demand (MW)
Processing Industries	40	52	49
Warehousing	11	5	5
Technical Support Services	2	1	1
Administrative Support Services	4	2	2
Skill Development/ Empowerment related services	13	2	2
Support Amenities	6.1	7	6
Common Facilities	33	26	25
Total		94	89

Source: (Surbana Jurong & SMEC, 2022)

Figure 3.28: Proposed Electrical System
Source: (Surbana Jurong & SMEC, 2022)

3.4.5 Financial Estimations

3.4.5.1 Broad Cost Estimate

In preparing the cost estimate, similar experience and rates have been employed. During the detailed design stage, the costs shall be further refined. The estimate is quoted both in Nigerian Naira and United States Dollars for reference. The recent official exchange rate was used in conversions as presented in Table 3.8. The financial implications of development and absorption phasing are presented in Table 3.9 while Table 3.10 while presents a summary of the financial analysis.

Note that:

i. The estimate excludes any taxes and contingencies
ii. Exchange rate is USD 1 = NGN 600
iii. Estimate base date is April 2022
iv. The estimate excludes professional consultancy fees
v. The estimate excludes pre-contract escalation and construction escalation
vi. The estimate excludes water abstraction facility from raw water site and bulk raw water pump station
vii. Estimate based on concept design carried out by SMEC Nigeria Limited.
viii. No geotechnical information and topographical survey are available, and allowance for both these studies have not been made in this cost estimate.
ix. The estimate excludes cost of retaining walls at building interface.
x. High level cost estimates using broad m² or unit rates. This provides an order of magnitude cost and will need to be fully tested and updated based on detailed bills of quantities during phase I design.

Table 3.8: Financial Approach and Assumptions

Particulars	**Unit**	**Details**
Land Development Cost (Gross Land Area)	USD/SQM	30
Contingencies	%	10%
Brokerage	%	1%
Cost Escalation	%	3%
Processing industry land plot – sale price	USD/SQM	56
Warehousing land plot – sale price	USD/SQM	56
Technical and support amenities – sale price	USD/SQM	70
Revenue escalation	%	3%

Table 3.9: Development and Absorption Phasing

Parameters	Year 2023 – 2027	Year 2028 – 2032	Year 2033 – 2037
Processing Industries Plots (Land in SQM)			
Land Development	410,000	730,425	309534
Absorption	410,000	730,425	309534
Warehousing Land (Land in SQM)			
Land Development	110,000	399,946	769,524
Absorption	110,000	399,946	769,524
Technical and support amenities (Land in SQM)			
Land Development	250,000	309,500	211,000
Absorption	250,000	309,500	211,000

Table 3.10: Summary of Financial Analysis

Item	**Description**	**Qty**	**Unit**	**Rate (₦)**	**Amount (₦)**	**Amount ($)**	**Comments**
1	**Preliminary and general items**		**%**	**3%**	**436,789,057**	**727,982**	
2	**Site grading**						
2.1	Road earth works	35,000	m³	6,719	235,165,000	**391,942**	Rate includes cut from stockpile to fill, trimming od banks and grassing
3	**Roadways**						
3.1	Road pavements	45,000	m²	72,891	3,280,095,000	**5,466,825**	Rate includes road layer work, paving and subsoil drainage
3.2	Sidewalk paving (Asphalt surfacing)	50,000	m²	27,785	1,389,250,000	**2,315,417**	Rate includes layer works, paving and excludes landscaping
4	**Stormwater system**						
4.1	Channel and conduits (Concrete)	4,500	m	147,976	665,892,000	**1,109,820**	Rate includes pipe and fitting supply, installation, excavation, backfilling and testing (600mm pipe)
4.2	Dry attenuation pond	60,000	m²	6,623	397,380,000	**662,300**	Rate includes earthworks, construction of dam wall, spillways, channels and landscaping

4.3	Gabion stormwater control structures	500	m^3	7,827	3,913,500	**6,523**	Rate includes gabion weirs and channels
5	**Water system**						
5.1	External bulk water supply pipe 1000mm Ø (Steel)	2,400	m	455,758	1,093,819,200	**1,823,032**	Rate includes pipe and fittings supply, installation, excavation, backfilling, and testing
5.2	pipes up to 250mm - 400mm Ø (MPVC)	2,300	m	129,867	298,694,100	**497,824**	Rate includes pipe and fittings supply, installation, excavation, backfilling, and testing
5.3	Raw water storage	3,000	m^3	157,086	471,258,000	**785,430**	Rate includes excavation, lining of pond, inlet and outlet works
5.4	Water treatment plant	3,000	m^3	261,311	783,933,000	**1,306,555**	Includes base slabs and containerised reverse osmosis water works plant
5.5	Potable water reservoir	6,000	m^3	157,086	942,516,000	**1,570,860**	Includes excavation, foundations, concrete superstructure, inlet, and outlet piping
5.6	Water booster pump station	3,000	m^3/day	134,169	402,507,000	**670,845**	Includes excavation, foundations, pump station building, pumps and pipe work
6	**Sewer system**						
6.1	Gravity pipes up to 300mm Ø (UPVC)	2,400	m	70,631	169,514,400	**282,524**	Rate includes pipes and manholes supply, installation, excavation, backfilling, and testing
6.2	Sewer treatment plant	2,200	m^3/day	746,602	1,642,524,400	**2,737,541**	Includes excavation, base slabs, inlet works, balancing tank, membrane reactor, disinfection plant, sludge handling and admin block
7	**Electrical system**						
7.1	Power plant	10	MVA	46,987,952	469,879,520	**783,133**	Rate includes civil works, generator installation, sub-station, buildings and cabling
7.2	132kV double circuit	100	MW	9,397,590	939,759,000	**1,566,265**	Rate includes cable supply, jointing, installation, excavation, bedding, and backfilling
7.3	11kV Cable Network	100	MW	3,614,458	361,445,800	**602,410**	Rate includes cable supply, jointing, installation, excavation, bedding, and backfilling
7.4	132/11kV Substations	1	no.	361,445,783	361,445,783	**602,410**	Rate includes cable and street lighting supply, jointing, installation, excavation, bedding, and backfilling
7.5	Street lighting	0.63	no.	8,674,699	5,465,060	**9,108**	Rate includes supply and installation into already prepared building room
7.6	MV/MV Substations	5	MW	1,228,916	6,144,580	**10,241**	Rate includes supply and installation into already prepared building room
7.7	MV/LV Substations	20	no.	1,373,494	27,469,880	**45,783**	Rate includes supply and installation into already prepared building room
8	**Ducting**						
8.1	Ducting 4 x 160mm Ø ducts	4,700	m	130,120	611,564,000	**1,019,273**	Rate includes pipe supply, installation, excavation, bedding, and backfilling. Excludes installation of any fibre network.
	TOTAL				**14,996,424,280**	**24,994,040**	

		Total in Naira	**Total in US$**	

4 Baseline Information (Description of the Environment)

Site visits were carried out from 16th to 19th November 2021, to collect primary data relevant to the site assessment and for the generation of baseline information used in assessing potential impacts. The areas visited were Esun, Gede, Ipao, Isan, Itangbagba, Itapaji, Iyemero, New Esun, and Oke Ako. During the site visit, site assessment was carried out (strengthened by secondary data gotten from desk studies), samples for environmental assessment were collected, socio-economic data was collected through administration of questionnaires and conduction of semi-formal interviews, and stakeholder meetings were held. Plans for community consultations were also made which were eventually carried out. Information gotten from all these activities are presented in this chapter. Photo 4.1 to Photo 4.4 show images of the site visitation team on site.

Photo 4.1: Site Visitation Team at Project Site

Photo 4.2: Site Visitation Team observing the Project Site

Photo 4.3: Security Personnel During Site Visit

Photo 4.4: Data Collection During Site Visit

4.1 Stakeholders' Meeting

A meeting between stakeholders of the Ekiti SAPZ and SMEC Nigeria Limited was held on the 16th of November 2021 at the Auxiliary Building at the Office of the Executive Governor of Ekiti State, Government Office Road, Ado Ekiti. The stakeholders involved in the meeting and their representatives are presented in Table 4.1 and in Photo 4.5 to Photo 4.8.

Table 4.1: Stakeholders and Representatives at Stakeholders' Meeting

Stakeholder	Representatives
Ekiti State Bureau of Statistics	Olugbenga Oni
	B. B. Bayedo
Ekiti State Water Corporation	Engr. Alabi A. M.
	Agbeyo Olabisi A.
Ekiti State Fire Service	Omoniyi S. O
Ekiti State Governor's Office	Engr. Ilesanmi S. O.
Ekiti State Ministry of Works and Transportation	Engr. Ilesanmi A. O.
Ekiti State Ministry of Environment and Natural Resources	Abiodun Temitayo Joshua
Ekiti State Electricity Board	Engr. Olanipekun Wale O.
	Engr. Aluko Ebenezer M.
Ekiti State Ministry of Agriculture and Food Security	(The Honourable Commissioner) Adetoyi Olabode
	Engr. Osasona D. J.
	Engr. O. O. Odesanmi
	Prince Cr. Olabode Adetoyi
Ekiti State Office of the Surveyor General	Surv. S. O. Ibidunmoye
Ekiti State Ministry of Finance and Economic Development	Folorunso J. B.
Ekiti State Ministry of Public Utilities	Engr. Olumide Ajayi
Ekiti State Development and Investment Promotion Agency	(The Director General) Damola Ajibade
	Alabi A. Festus
	Kayode Adeniyi
	Ayodele Oluwatoyin B.
	Tunde Owoeye
	Akintifonbo Olamide
Ekiti State Waste Management Authority	Dr. Yemi Adeyemo
EKSGDC	Ogunyemi Bode
SMEC Nigeria Limited	Tpl. Barnabas Atiyaye
	Tpl. Nathaniel Atebije
	Tpl. Samson Olusegun
	Seth A. Dauda
	Mohammed Lawal Shaibu
	Theophilus Usman Louis
	Silas Barnabas

The technical session of the meeting was held with the following proceedings

Tpl. Barnabas Atiyaye appreciated the Ekiti State Government for the Special Agricultural Processing Zone initiative, stating that it is well timed and holds high potential benefits for the people and government of Ekiti State. He thanked the Ekiti State Government for their hospitality since the arrival of the consultants. He expressed belief that all personnel present at the meeting were familiar with the project. He stated that the primary reason for the visit was to source data from the Government and carry out investigations that would facilitate formulation of policy guidelines for protecting the environment while implementing the proposed project. He listed the required data as follows:

- A clear definition of the total land area earmarked for the Ekiti SAPZ as the project area.
- Detailed mapping information of the project area showing topography and natural features such as water bodies within and up to 5km.
- Types of agricultural activities carried out in the planning area.
- List and characteristics of existing settlements within the project area (with relocation or compensation plans if necessary).
- Potential beneficiaries of the Ekiti SAPZ project (new or existing farms, companies, and communities).
- Utility infrastructure such as underground pipelines, telecommunication masts, power lines, etc. within the project area.
- Historical information of the project affected communities (PACs) including evolution of settlements and traditional cultures, titles, and festivals.

- Existing markets within and around the area.
- Past feasibility studies on the Ekiti SAPZ project or other similar projects in the project area.
- Existing land title owners with current land uses.
- Information on existing plot overlap within the planning area.
- Any other information that could be useful in improving understanding of the project site, its physical and socio-economic characteristics, and government intentions and expectations.

He added that another reason for the visit was to carry out on-field survey and source primary data for the ESIA of the project. This would include the following activities:

- Collection of soil and water samples for laboratory tests.
- Assessment of air quality and noise levels in-situ.
- Collection of samples of existing flora and fauna.
- Socio-economic survey through the administration of questionnaires.
- Focus group discussions.

The Honourable Commissioner, Ekiti State Ministry of Agriculture and Food Security, Hon. Adetoyi Olabode, welcomed the consultants to Ekiti State and stated that the project was conceived out of the need to develop Ekiti for sustainable agriculture and boost its economy. He noted that the State was putting a lot of effort into economic development. He assured the consultants that up to 75% of the data requested were available and would be presented accordingly. He introduced the Project's Technical Adviser, Engr. Samuel Kayode Ilesanmi, to shed more light on the project.

Engr. Samuel Kayode Ilesanmi stated that the project was conceived in 2019 and that parcels of land had already been allocated to individuals. He stated that the entire area has been delineated for agricultural and agro-industrial uses and that all land in the area belongs to the Ekiti State Government. As such, any land disputes can and will be easily resolved internally. He added that the objectives of the project are to create a conducive atmosphere for farmers in the area, to provide service and facilities such as a source of fertilizer, tractor services, and agricultural machinery, and to secure the interests of potential investors. He also said that some investors had already expressed interest to secure land parcels from May to September of 2022.

The Honourable Commissioner shed more light on the investors giving examples of an investor who is developing a cassava plant with the capacity to produce 6000 metric tonnes of high-quality cassava flour annually on 5000Ha of land and will, therefore, need a supply of 1 million metric tonnes of cassava. He also stated that another requirement of the SAPZ is the development of roads to link farms and factories and reduce current travel times within the area. He gave security assurances stating that there is a military post within the area. He introduced the State's Surveyor General who is responsible for the detailed mapping of the area to share more information.

The Surveyor General, Surv. S. O. Ibidunmoye, appreciated the need to integrate all facilities within the agricultural zone. He stated that any overlaps in the allocated parcels must be because of misinformation and promised that he would ensure that all mappings are geographically accurate. He said that the entire captured area has been earmarked for the SAPZ and on-ground data is updated regularly.

Engr. Samuel Kayode Ilesanmi stated that the land is over 40,000Ha. He added that conversations were in progress with communities within the project area to allow the government take possession of the land for the provision of infrastructure and to facilitate organised development. He informed the stakeholders that major crops expected to be produced within the area include cassava, maize, and soya beans. He added that historical information is more likely available with the communities and that patience would be required for more information to be sourced.

Tpl. Barnabas Atiyaye thanked all speakers for their contributions in helping the consultants understand the site and the project better. He further inquired if there was any incidence of community or farmer/herder clashes within the area. The Honourable Commissioner assured that there were no such clashes as security is tight and communities are aware of the project and its advantages.

Photo 4.5:SMEC and Stakeholder Representatives at the Stakeholders' Meeting

Photo 4.6 Honourable Commissioner of Ekiti State Ministry of Agricultural and Food Security presiding over the Meeting

Photo 4.7: SMEC Representatives at the Stakeholders' Meeting

Photo 4.8: Attendees at the Conclusion of the Stakeholders' Meeting

4.2 Environmental Assessment

The environmental assessment involves the collection and analysis of various samples within and around the project site. Samples of soil, air, noise, and water were collected at various points of the project site to establish the baseline quality of environmental features before the impact of the project, and to test different parameters in line with acceptable environmental standards. The samples were collected randomly to achieve an even spread from the project site as presented in Figure 4.1.

The samples were collected in November 2021, just at the end of the wet season in southwest Nigeria. To meet the two-season environmental assessment requirement, secondary data from an FMEnv approved EIA for a 7km New Ado-Iyin Ekiti Road with samples collected between December 2019 and February 2020 (dry season) by Envikare Associates in association with Rejov Resources Ltd and MOA Planners Ltd. was relied upon. The selection of this EIA was done carefully as it provides baseline data for a geographical area within the broad Ekiti SAPZ region. This is considered to provide reliable indication of the environmental condition of the SAPZ.

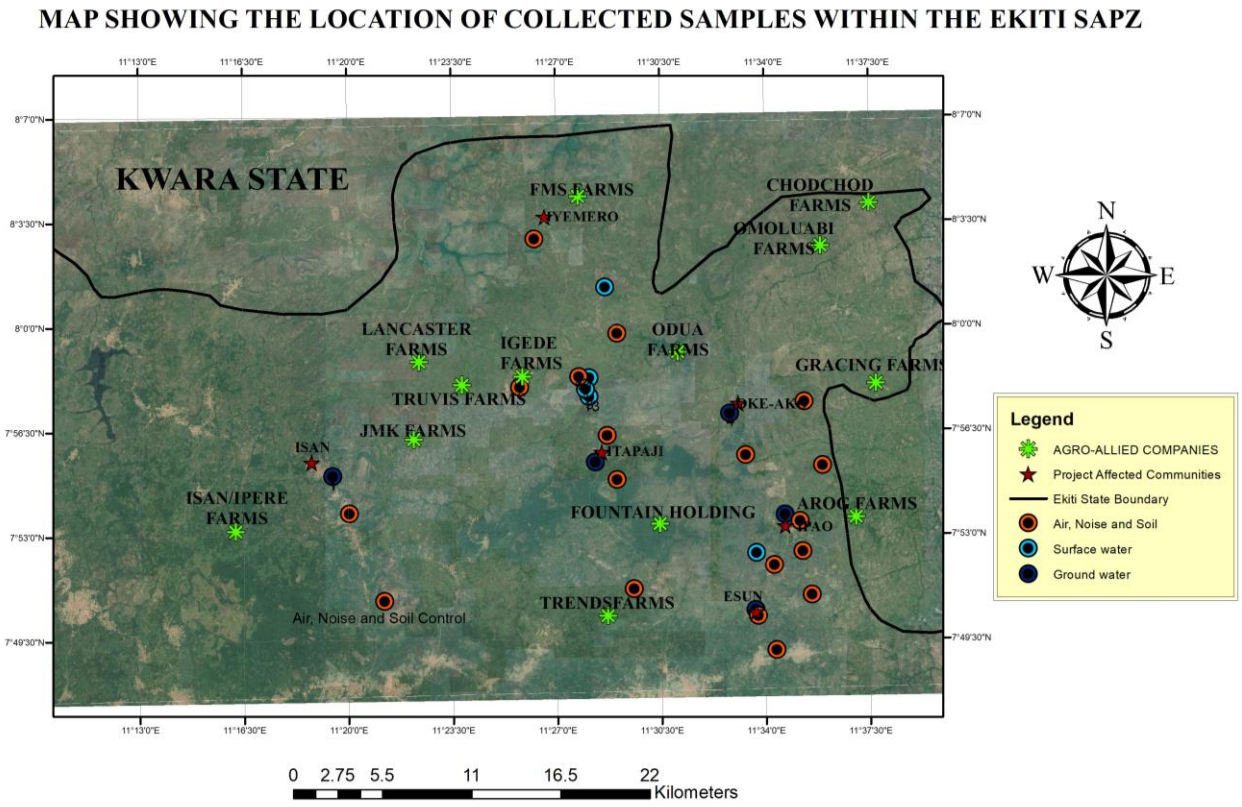

Figure 4.1:Map Showing Locations of Collected Samples
Source: (Field Survey, November 2021)

4.2.1 Air Quality

Indoor and outdoor air pollution causes major environmental and health problems; it has contributed majorly to the current climate crisis and is a significant contributor to Nigerian morbidity (Chasant, 2018; Croitoru, Chang, & Kelly, 2020). The quality of ambient air is of paramount importance to environmental chemistry and air quality. Ambient air constitutes a wide range of air pollutants ranging from particulate matter of different sizes and compositions from critical air pollutants such as Oxides of Sulphur (SO_x), Carbon Monoxide (CO), Oxides of Nitrogen (NO_x), and methane (CH_x). The effects of some air pollutants are presented in Table 4.2. Abnormal concentrations of these pollutions in the ambient air are a consequence of anthropogenic activities within an environment.

Table 4.2:Primary pollutants and their adverse effects

Pollutant	Effect above limit
Carbon monoxide (CO)	Reduces oxygen carrier leading to damage of the central nervous system
Carbon dioxide (CO_2)	Causes asphyxiation, blood acidosis
Sulphur IV oxide (SO_2)	Causes irritation of the respiratory tract
Nitrogen II oxide (NO_2)	Causes inflammation of the lungs but less toxic
Ammonia (NH_3)	Causes throat and upper respiratory tract damage and may affect heart action.
Hydrogen Cyanide (HCN)	Causes enlarged thyroid glands, dermatitis scarlets rash and nose irritation.
Chlorine (Cl_2)	Causes fatigue inflammation of mucus membrane of the nose, susceptibility to tuberculosis and corrosion of teeth.
Methane (CH_4)	Simple asphyxiation
Particular matter (PM)	Causes lung cancer, silicosis, heart diseases, exacerbate asthmatic symptoms, chronic bronchitis, and death.

4.2.1.1 Air Quality Assessment Method.

The ambient air quality was measured accordingly at a height of three feet above ground level. Methods of analysis employed in this study are those selected by World Health Organization (WHO) as well as those adapted from the United States Environmental Protection Agency (USEPA). The Federal Ministry of Environment in Nigeria has adopted the methods for the purpose of surveillance and monitoring of air pollutants. The theoretical methods are unique to each pollutant and are therefore shown in Table 4.3.

Table 4.3: Air Quality Analytical and Test Methods

S/N	Components	Measurement	Type/Method
1.	Carbon Monoxide (CO)	Field	Crowcon GASMAN (Handheld detection instrument) In Situ
2.	Ammonia (NH_3)	Field	Crowcon GASMAN (Handheld detection instrument) In Situ
3.	Sulphur Oxides (SO_X)	Field	Crowcon GASMAN (Handheld detection instrument) In Situ
4.	Hydrogen Sulphide (H_2S)	Field	Crowcon GASMAN (Handheld detection instrument) In Situ
5	Nitrogen oxides (NOX)	Field	Crowcon GASMAN (Handheld detection instrument) In Situ
6	Oxygen/Methane/Hydrogen (O_2, CH_4, H_2S, CO)	Field	MSA ALTAIR (Multi Gas Monitor) (Handheld detection instrument) In Situ
7	Suspended Particulate matter	Field	Haz- Dust particulate matter In situ
8	Noise Meter/Relative Humidity/ Temperature	Field	Environmental Meter in situ

Source: (Field survey November 2021).

4.2.1.2 Quality Assurance and Quality Control Measures

A quality control programme was established at the beginning of the fieldwork in order to ensure the validity of results and comparability of acquired environmental and biological data. This involved detailed procedural guidelines for sampling, preservation, labelling, storage and laboratory analysis. To ensure the accuracy and reliability of in-situ field measurements, field instruments were calibrated prior to use and cross checked from time to time.

Field data sheets were carefully kept and inspected at the end of the day's field work to make sure that no sample is missed. Other quality control measures adopted in the field included:

a. Representation of samples and repeatability of data
b. Samples collection, preservation and storage
c. Adequate labelling
d. Minimizing laboratory sampling error or bias and
e. Data verification.

Data sheet for relevant environmental and ecological observations as well as laboratory logbook for laboratory-based aspects of the study were kept through-out the duration of the field work (Appendix C). To ensure that results obtained during analysis compare favourably with the in-situ environment, all samples were analysed soon after collection. Standard laboratory quality control procedures were adhered to.

4.2.1.3 Sampling Points

The sampling points were selected randomly within the study area and those around the immediate vicinity covering the recommended 500m-1000m radius. The sampling points were adequately captured by the use of a GPS and photo identifiable features on satellite imagery of the location. The overriding considerations in the selection of sampling points included accessibility, ecological features and geographical location of settlement and sitting of control points in apparently undisturbed areas (See Figure 4.2).

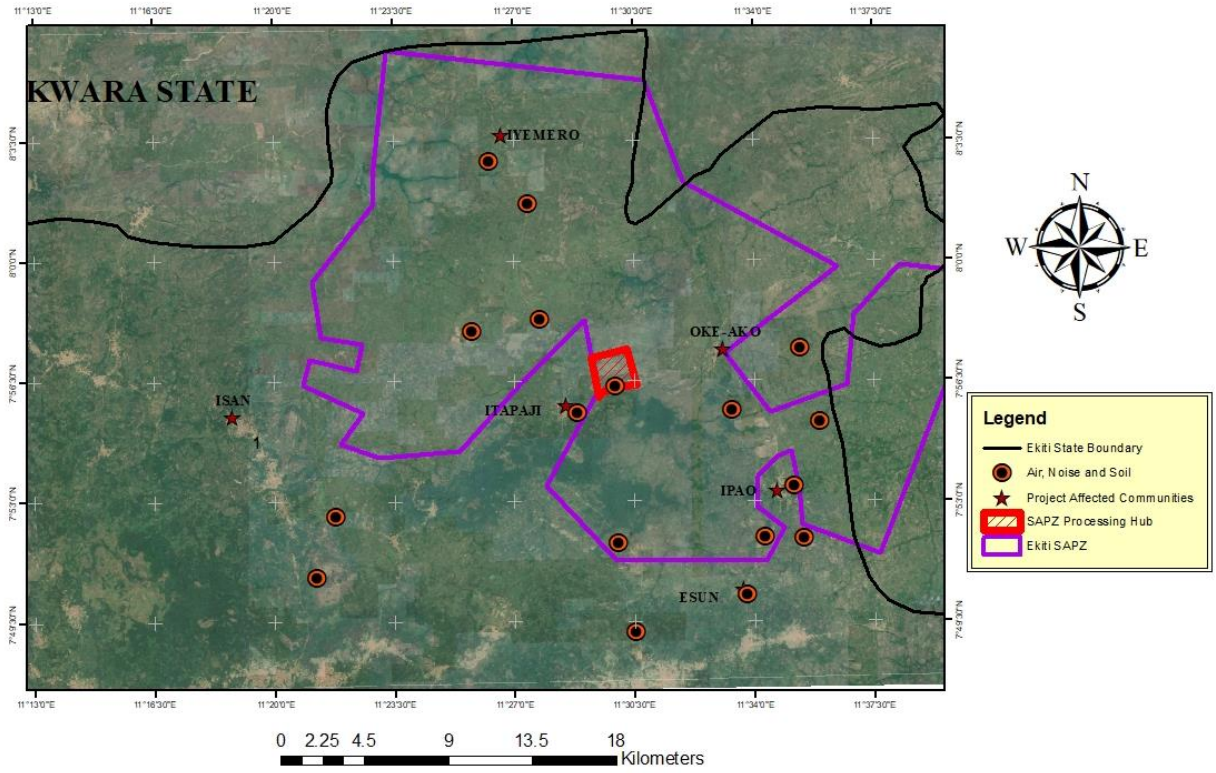

Figure 4.2: Map Showing Location of Air Samples Collected

Source: (Field Survey, 2021)

4.2.1.4 Noise and Vibration

Noise is the periodic fluctuations of air pressure due to a collection of typically unpleasant sounds in our environment in relation to its psychological effect on the receptors. In residential, office, or commercial environment, some level of noise produced by almost every component that makes the environment workable and suitable for living organisms are necessary. Meanwhile, in small and large industries, higher noise levels are expected because of the operation of heavy machinery and equipment. The values gotten from all 19 points of the study area reads 39.9dB (A) to 77.4dB (A). This is within the Federal Ministry of Environment recommended standard of 90dB (A). This is attributed to rural nature of the settlements around the study area with farming being the major non-household activity. Other sources of noise include animal sounds like birds and from vehicular movement because some points are a bit close to the road. The probability of the noise increasing when the

project commences is possible from all indication, but standard guideline and procedures will be adhered to so as to ensure that it is not above the recommended standard set by Federal Ministry of Environment.

The recorded air quality and noise levels from the sample points are presented in Table 4.4. Photo 4.9 to Photo 4.12 show air and noise levels data being collected and recorded on site.

Photo 4.9: Showing Recording of Noise Level on Site
Source: (Field Survey, November 2021).

Photo 4.10: Showing Recording of Noise Level on Site
Source: (Field Survey, November 2021).

Photo 4.11: Showing Recording of Air Quality on Site
Source: (Field Survey, November 2021).

Photo 4.12: Showing Recording of Air Quality on Site
Source: (Field Survey, November 2021).

Table 4.4: Result of Gaseous Pollutants Concentration in the Study Area

Sample Point / Time		Geographical Location	Particle (Mg/M³)	Noise (Db)	Relative Humidity (%)	Wind Speed	Temp (°c)	Ch_4 (Ppm)	Co (Ppm)	So_2 (Ppm)	Nh_3 (Ppm)	H_2s (Ppm)	O_2 (Ppm)	No_2 (Ppm)
1	02:37pm	N 07° 49'7.37" E 11°34'21.5"	0.10	77.4	54.4	5.2	34.1	0	04	0.01	0.00	0.00	20.8	0.04
2	02:49pm	N 07° 50'15.7" E 11°33'44.8"	0.11	70.1	54.1	3.7	35.4	0	03	0.00	0.00	0.00	20.8	0.02
3	11:34am	N 07⁰ 82′ 47.8″ E 08⁰ 67′ 65.6″	0.08	54.7	72.0	4.8	29.6	0	01	0.00	0.00	0.00	20.8	0.02
4	11:49am	N 07⁰ 82′ 54.4″ E 08⁰ 67′ 65.9″	0.07	47.8	59.1	7.8	31.7	0	01	0.00	0.00	0.00	20.8	0.01
5	12:18pm	N 07⁰ 83′ 55.1″ E 08⁰ 70′ 68.0″	0.06	39.8	54.3	4.8	35.6	0	01	0.00	0.00	0.00	20.8	0.01
6	12:30pm	N 07⁰ 82′ 44.4″ E 08⁰ 71′ 10.7″	0.06	36.1	52.7	6..9	35.4	0	01	0.00	0.00	0.00	20.8	0.01
7	12:48pm	N 07⁰ 83′ 93.6″ E 08⁰ 70′ 86.6″	0.06	61.1	50.4	4.3	35.2	0	01	0.00	0.00	0.00	20.8	0.02
8	12:59pm	N 07⁰ 84′ 28.3″ E 08⁰ 73′ 50.7″	0.06	48.9	51.1	3.7	35.6	0	01	0.00	0.00	0.00	20.8	0.01
9	01:20pm	N 07⁰ 84′ 10.8″ E 08⁰ 75′ 38.2″	0.08	40.9	47.0	3.9	36.0	0	01	0.00	0.00	0.00	20.8	0.01
10	01:47pm	N 07⁰ 84′ 17.0″ E 08⁰ 75′ 36.4″	0.06	44.5	43.5	5.6	36.7	0	01	0.00	0.00	0.00	20.8	0.01
11	02:21pm	N 07⁰ 80′ 75.3″ E 08⁰ 79′ 44.0″	0.06	39.9	36.5	7.9	36.0	0	00	0.00	0.00	0.00	20.8	0.01
12	02:52pm	N 07⁰ 80′ 94.4″ E 08⁰ 80′ 80.3″	0.07	41.3	36.3	5.7	36.3	0	00	0.00	0.00	0.00	20.8	0.01
13	03:11pm	N 07⁰ 72′ 80.5″ E 08⁰ 77′ 90.8″	0.05	43.7	36.7	8.9	36.5	0	00	0.00	0.00	0.00	20.8	0.01
14	03:43pm	N 07⁰ 72′ 20.4″ E 08⁰ 80′ 62.8″	0.06	50.1	36.9	7.4	36.7	0	01	0.00	0.00	0.00	20.8	0.02
15	04:02pm	N 07⁰ 72′ 12.1″ E 08⁰ 80′ 73.9″	0.07	52.7	37.0	4.4	37.0	0	01	0.00	0.00	0.00	20.8	0.01
16	04:23pm	N 07⁰ 71′ 91.0″ E 08⁰ 88′ 55.1″	0.06	52.1	36.4	4.9	36.4	0	01	0.00	0.00	0.00	20.8	0.01
17	04:46pm	N 07⁰ 56′ 29.3″ E 08⁰ 75′ 76.5″	0.08	58.1	35.5	5.7	35.5	0	01	0.00	0.00	0.00	20.8	0.02
18	05:04pm	N 07⁰ 56′ 30.7″ E 08⁰ 75′ 80.0″	0.08	42.6	35.7	4.5	35.7	0	01	0.00	0.00	0.00	20.8	0.01
19 *	05:27pm	N 07⁰ 58′ 48.2″ E 08⁰ 70′ 37.7″	0.06	51.3	36.2	6.7	36.0	0	01	0.00	0.00	0.00	20.8	0.01
FME/NESREA LIMIT			**0.25**	**70**	-	-	**<40**	-	**10**	**0.01**	**0.05**	**0.05**	**20.9**	**0.06**

- Point 19 served as the control point.

Source: (Field Survey, November 2021)

4.2.1.5 Total Suspended Particulate Matter

Total Suspended particulates at the study area fall between 0.05- 0.11 Mg/m3 which is within the recommended limit of 0.25 Mg/m3 set by Federal Ministry of Environment (FMENV). This shows significant low variation, the level of particulate values could be attributed to the Greening Environment and low human activities within the area, the low dusty area couple with the fact of the agriculture activities within the day and the gradual setting in of dry season currently experience in which shows low particulate matter within the project site.

4.2.1.6 Gaseous Pollutants

NO2 (Nitrogen dioxide)

NO2 was recorded between 0.01ppm - 0.04ppm within the study area. These readings are within the recommended limit of 0.06 set by FMEnv for Nigeria environment. This is attributed to the fact that work has not commenced on site.

Sulphur Dioxide (SO2)

SO2 was detected only at Point 1 while in the other Points (2-19), it wasn't detected during the air quality analysis. The values read 0.00 ppm which shows that it is in conformity with the Federal Ministry of Environment's standard. These gaseous components of the air are expected to be released from fuel combustion engines during the operational phases of the project.

Carbon Monoxide (CO)

Carbon monoxide was detected within the study area at difference point reading from 1ppm-4ppm in the samples except Points 11-13 (reading 0.00) which is far below the maximum limit of 10ppm set by FMEnv. This has to do with the fact that no major activities have commenced on the project site presently. It is likely to increase when industrial and mechanised farming activities commence.

Oxygen (O2)

Oxygen level at the project area of the environment was 20.8% throughout the air quality readings which is within the recommended standard set by Federal Ministry of Environment.

Hydrogen Sulphide (H2S)

Hydrogen sulphide was not detected at any point within the study area. That's mean its reads 0.00 ppm at the eighteen points where the air quality was taken including the control point.

Ammonia (NH3)

Ammonia was not detected at any Point during the air quality analysis during at the project site.

4.2.1.7 Dry Season Results

During the dry season, only VOCs are detectable around the site regional location (see Table 4.5) while the presence of SO2, NO, NO2, CO, NH3, and H2S are below measuring instruments' detection limit, implying that they are within the recommended limits of the Federal Ministry of Environment. VOCs (combustion products of fuel in both internal and external combustion engines) were detected in all the sampling locations during this season as presented in Table 4.6.

Table 4.5: Location of Air Samples (Dry Season)

No	Station	Coordinates		Elevation (Meter)
1.	AQ1	73936,79 N	51036.26 E	323
2.	AQ2	73925.93 N	5113.05 E	323
3.	AQ3	73918.38 N	51110.91 E	323
4.	AQ4	73916.38N	51113.70 E	327
5.	AQ5	73915.44N	51125.20 E	328
6.	AQ6	73830.22 N	51152.65 E	328

Source: (Envikare Associates, 2020)

Table 4.6: Gaseous and Particulate Concentrations in Air (Dry Season)

Sampling Locations		**Concentrations**						**PM10 (µg/m3)**
		SO2	NO2	CO	NH3	H2S	VOCs	
1 hour Measured	AQ1	<0.1	<0.1	<1.0	<1.0	<0.1	3.1	46.7
	AQ2	<0.1	<0.1	<1.0	<1.0	<0.1	1.3	43.6
	AQ3	<0.1	<0.1	<1.0	<1.0	<0.1	0.7	42.8
	AQ4	<0.1	<0.1	<1.0	<1.0	<0.1	0.5	43.2
	AQ5	<0.1	<0.1	<1.0	<1.0	<0.1	0.9	39.3
	AQ6	<0.1	<0.1	<1.0	<1.0	<0.1	0.3	44.5
24 hours Calculated	AQ1	ND	ND	ND	ND	ND	1.6	24.0
	AQ2	ND	ND	ND	ND	ND	0.7	22.4
	AQ3	ND	ND	ND	ND	ND	0.4	22.0

	AQ4	ND	ND	ND	ND	ND	0.3	22.2
	AQ5	ND	ND	ND	ND	ND	0.5	20.2
	AQ6	ND	ND	ND	ND	ND	0.2	22.8
FMEnv Limit		0.01	0.04-0.06	10.0	-	-	-	250

Source: (Envikare Associates, 2020)

4.2.2 Hydrogeology

Samples of Ground water (GW) and Surface water (SW) were collected from the project site and transported to Zabson Laboratory located at Masaka, Nasarawa State for analysis following the standard operational procedures. Eight (8) ground water samples and four (4) surface water samples were collected within the project site as shown in Figure 4.3 and Figure 4.4. In-situ measurement for pH, temperature, conductivity and dissolved oxygen were conducted with hand-held meters on site. For other physio-chemical analysis, duplicate water samples were collected in to one-litre plastic bottled, duly labelled, stored in an insulated refrigerated container, and later analysed at the laboratory (see Photo 4.13 to Photo 4.16). The result of the physical, chemical and microbiological characteristics of the collected water samples is presented in . Table 4.7 to Table 5.6.

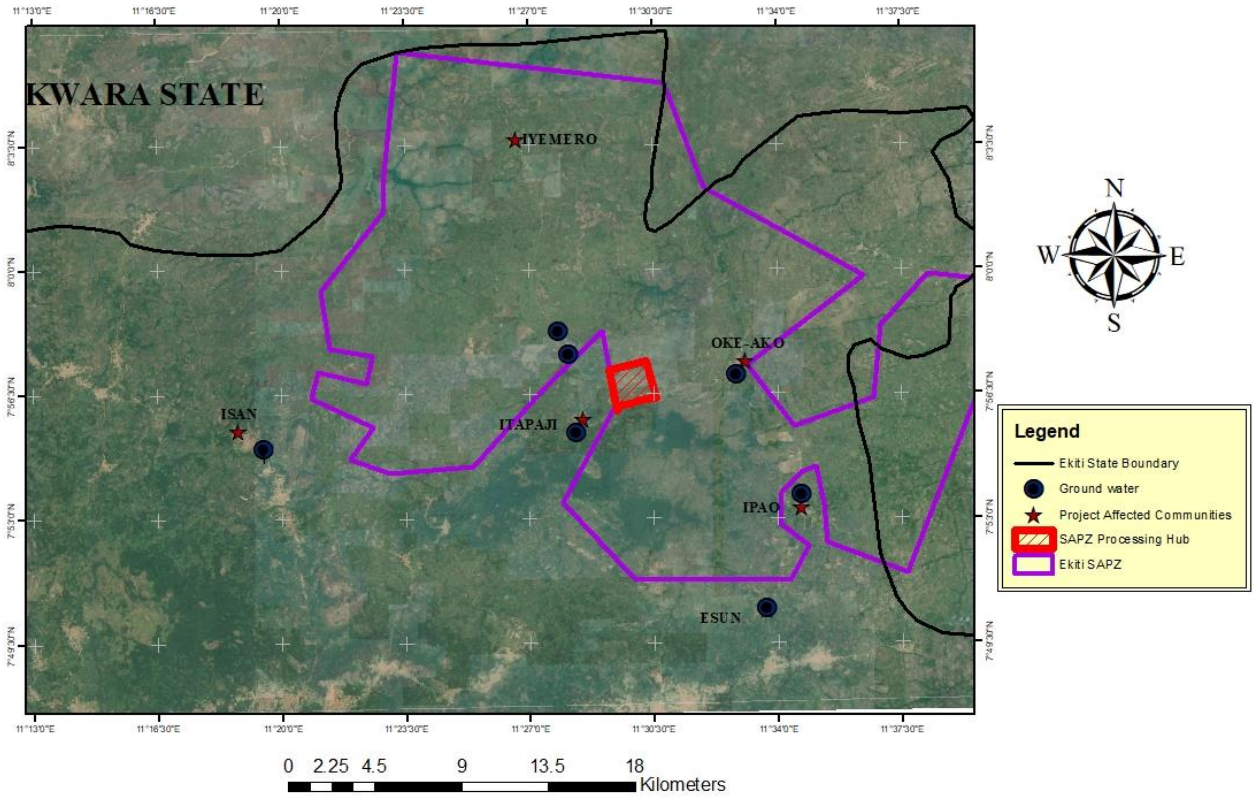

Figure 4.3: Map Showing Location of Collected Ground Water Samples

Source: (Field Survey, November 2021)

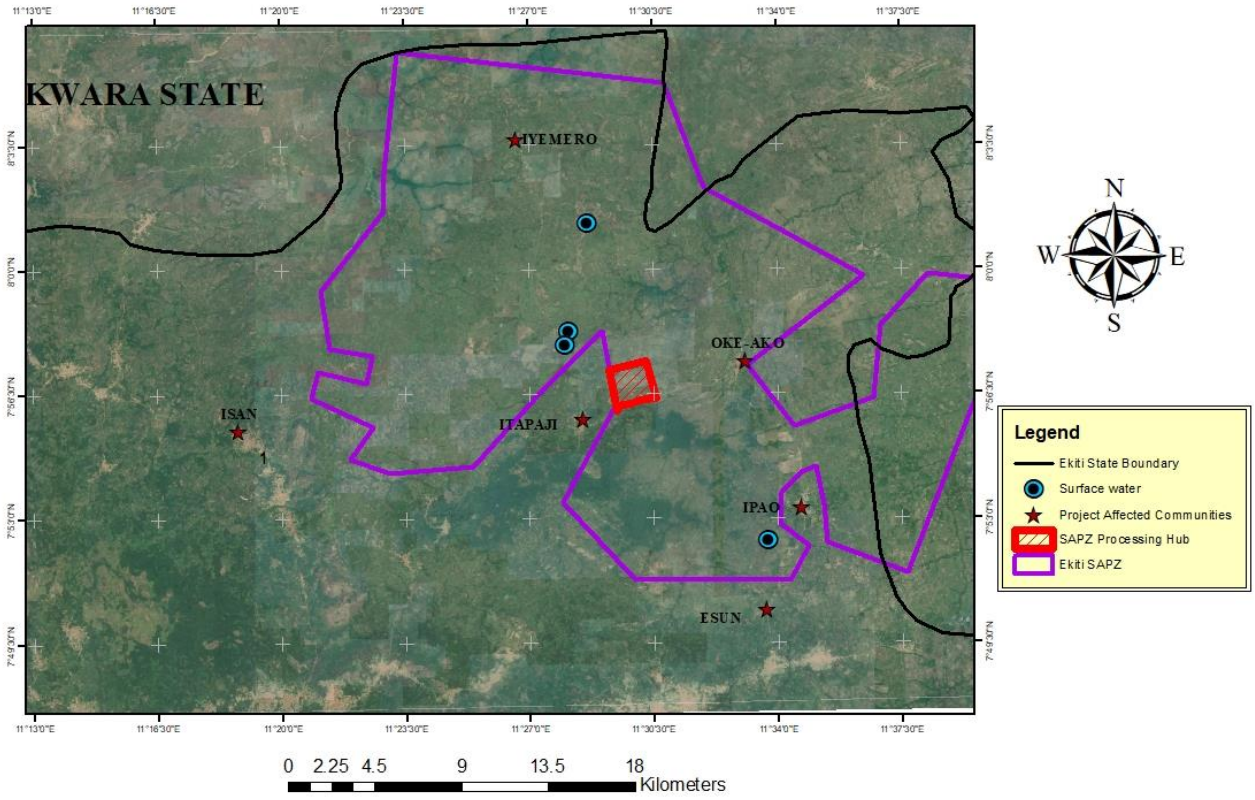

Figure 4.4: Map Showing Location of Collected Surface Water Samples

Source: (Field Survey, November 2021)

Photo 4.13: Collection and Testing of Surface Water

Source: (Field Survey, November 2021)

Photo 4.14: Collection of Ground Water Sample

Source: (Field Survey, November 2021)

Photo 4.15: In-Situ Testing of Ground Water Sample

Source: (Field Survey, November 2021)

Photo 4.16: Collection and Labelling of Ground Water Sample
Source: (Field Survey, November 2021)

4.2.2.1 Physio-Chemical Properties

The following parameters were investigated for the ground water and surface water at the Project site; levels of heavy metals including **Pb**, **Cu**, **Zn**, **Cd**, **Ni**, **Mn**, **Fe**. Other parameters include pH, Electrical Conductivity, Total Suspended Solids (TSS), Total Hardness, Total Dissolved Solids (TDS), **Ca**, **Mg** where relevant. **BOD** and **COD** were also analysed. Microbiology analysis of water samples was also carried out.

The analytical results for ground water analysis are shown in . Table 4.7 and Table 4.8. The FMEnv limits have also been included for ease of references. The physical and chemical properties of closest surface water within the project site was assessed. Samples were collected from stream source within the project site as shown in Photo 4.13. Summary of assessed physical and chemical characteristics of the surface water samples measured in-situ are presented in Table 4.9.

. Table 4.7: Physiochemical Characteristics of Ground Water in the Study Area

S/N	PARAMETERS	GW1 (Well) Promise Farm	GW2 (Well) Esun-Ekiti	GW 3 (Well) Ipao-Ekiti	GW 4 (Well) Oke Ako	FMEnv STD
A.	**PHYSICAL TEST**	N 07°58'16.65" E 05°27'47.78"	N 07^0 82″ 41.9″ E 08^0 67′ 60.6″	N 07^0 84″ 21.0″ E 08^0 73′ 49.3″	N 78^0 80″ 80.4″ E 08^0 79′ 73.4″	
1.	Odour	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	-
2	COLOUR	Colorless	Colorless	Colorless	Colorless	-
3	TEMPERATURE (^{o}C)	29.7	29.5	29.9	30.0	**<40**
4.	$_p$H	5.9	6.2	5.8	6.0	**6-9**
5.	DISSOLVED OXYGEN (mg/l)	5.55	6.0	6.50	6.1	**7.5**
6.	ELECTRICAL CONDUCTIVITY (µS/cm)	302	198	302	286	**1000**
7.	TOTAL DISSOLVED SOLIDS (mg/l)	153	101	153	145	**500**
8.	TURBIDITY (NTU)	1.0	0.895	1.1	1.0	**5**
9.	TOTAL SUSPENDED SOLIDS (mg/l)	0.223	0.063	0.215	0.249	**10**
B.	**CHEMICAL TEST**					
10.	TOTAL HARDNESS (mg/l)	68.48	239.68	85.60	256.8	**200**
11.	MAGNESIUM (mg/l)	17.12	51.36	17.12	51.36	**50**
12.	CALCIUM (mg/l)	51.36	188.32	51.36	205.44	**150**
13.	TOTAL CHLORINE (mg/l)	11.15	17.04	12.783	6.99	**250**
14.	SULPHATE (mg/l)	14.48	12.31	19.10	15.79	**500**
15.	PHOSPHATE (mg/l)	1.467	1.139	0.602	0.853	**5**
16.	NITRATE AS NITROGEN (mg/l)	8.543	10.02	5.82	7.99	**20**
17.	NITRITE AS NITROGEN (mg/l)	0.050	0.162	0.041	0.335	**<1**
18.	BIOCHEMICAL OXYGEN DEMAND (mg/l)	3.7	2.9	3.4	3.9	**7.5**
19.	CHEMICAL OXYGEN DEMAND (mg/l)	14.8	11.6	13.6	15.6	**30**
C	**HEAVY METALS**					
20.	LEAD (mg/l)	ND	ND	ND	ND	**0.05**
21	NICKEL (mg/l)	ND	ND	ND	ND	**0.05**
22.	CADMIUM (mg/l)	ND	ND	0.001	ND	**<1**
23.	MANGANESE (mg/l)	0.19	0.20	0.18	0.19	**0.2**
24.	COPPER (mg/l)	0.038	0.081	0.061	0.053	**0.1**
25.	IRON TOTAL (mg/l)	0.414	0.285	0.281	0.362	**1.5**
26.	ZINC (mg/l)	0.613	0.532	0.482	0.302	**1**
D	**BACTERIOLOGICAL ANALYSIS**					
27.	*total coliform (mpn/100ml)*	3.1 x 10^2	3.2 x 10^2	2.9 x 10^2	3.0 x 10^2	**1.8**
28	*e-coli (cfu/100ml)*	ND	1.2 x 10^2	ND	1.2 x 10^2	**0.0**
29.	*salmonella (cfu/100ml)*	1.2 x 10^2	1.0 x 10^2	1.0 x 10^2	1.1 x 10^2	**0.0**
30.	*shigella (cfu/100ml)*	ND	ND	ND	ND	**0.0**
31.	*staphylococcus (cfu/100ml)*	1.4 x 10^2	1.5 x 10^2	1.4 x 10^2	1.3 x 10^2	**0.0**
33.	*klebsellia (cfu/100 ml)*	1.4 x 10^2	1.3 x 10^2	1.3 x 10^2	1.5 x 10^2	**0.0**

ND = Not Dictate, NS = Not state, GW = Ground Water
Source: (Field Survey, November 2021).

.Table 4.8: Physicochemical Analysis of Ground Water Sample

S/N	PARAMETERS	GW5 (B-hole) Oke-Ako	GW6 (well) Ita-Paji	GW 7 (well) Isan-Ekiti	GW 8 (Well) Control	FMEnv. STD
A.	**PHYSICAL TEST**	N 07^0 80′ 88.3″ E 08^0 80′ 01.6″	N 07^0 72″ 50.9″ E 08^0 76′ 68.7″	N 07^0 56″ 30.7″ E 08^0 75′ 80.0″	N 07^0 58″ 48.2″ E 08^0 70′ 37.7″	
1.	Odour	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	-
2	COLOUR	Colorless	Colorless	Colorless	Colorless	-
3	TEMPERATURE (^{o}C)	29.9	29.9	29.6	30.1	**<40**
4.	$_P$H	6.2	5.9	6.3	5.9	**6-9**
5.	DISSOLVED OXYGEN (mg/l)	5.90	4.85	5.64	6.0	**7.5**
6.	ELECTRICAL CONDUCTIVITY (µS/cm)	276	199	211	206	**1000**
7.	TOTAL DISSOLVED SOLIDS (mg/l)	140	102	107	105	**500**
8.	TURBIDITY (NTU)	0.783	1.1	1.0	1.0	**5**
9.	TOTAL SUSPENDED SOLIDS (mg/l)	0.032	0.088	0.063	0.076	**10**
B.	**CHEMICAL TEST**					
10.	TOTAL HARDNESS (mg/l)	154.08	171.2	222.56	171.2	**200**
11.	MAGNESIUM (mg/l)	34.24	51.36	34.24	34.24	**50**
12.	CALCIUM (mg/l)	119.84	119.84	188.32	136.96	**150**
13.	TOTAL CHLORINE (mg/l)	3.193	2.856	11.946	6.783	**250**
14.	SULPHATE (mg/l)	13.29	18.18	22.36	19.80	**500**
15.	PHOSPHATE (mg/l)	1.203	0.864	1.139	0.712	**5**
16.	NITRATE AS NITROGEN (mg/l)	10.00	6.83	9.22	10.00	**20**
17.	NITRITE AS NITROGEN (mg/l)	0.130	0.113	0.099	0.053	**<1**
18.	BIOCHEMICAL OXYGEN DEMAND (mg/l)	3.0	3.3	4.1	3.6	**7.5**
19.	CHEMICAL OXYGEN DEMAND (mg/l)	12.0	13.2	16.4	14.3	**30**
C	**HEAVY METALS**					
20.	LEAD (mg/l)	ND	ND	ND	0.001	**0.05**
21	NICKEL (mg/l)	ND	ND	ND	ND	**0.05**
22.	CADMIUM (mg/l)	0.001	ND	ND	ND	**<1**
23.	MANGANESE (mg/l)	0.18	0.20	0.19	0.20	**0.2**
24.	COPPER (mg/l)	0.093	0.011	0.064	0.081	**0.1**
25.	IRON TOTAL (mg/l)	0.102	0.544	0.710	0.311	**1.5**
26.	ZINC (mg/l)	0.286	0.401	0.512	0.484	**1**
D	**BACTERIOLOGICAL ANALYSIS**					
27.	*total coliform (mpn/100ml)*	3.4 x 10^2	3.2 x 10^2	3.3 x 10^2	3.0 x 10^2	**1.8**
28	*e-coli (cfu/100ml)*	ND	1.1 x 10^2	ND	ND	**0.0**
29.	*salmonella (cfu/100ml)*	1.1 x 10^2	1.2 x 10^2	1.0 x 10^2	1. 1 x 10^2	**0.0**
30.	*shigella (cfu/100ml)*	ND	ND	1.0 x 10^2	ND	**0.0**
31.	*staphylococcus (cfu/100ml)*	1.5 x 10^2	1.2 x 10^2	1.3 x 10^2	1.3 x 10^2	**0.0**
32.	*klebsellia (cfu/100 ml)*	1.3 x 10^2	1.2 x 10^2	1.4 x 10^2	1.2 x 10^2	**0.0**

ND = Not Dictate, NS = Not state, GW = Ground Water
Source: (Field Survey, November 2021).

.Table 4.9: Physicochemical Analysis of Surface Water Sample

S/N	PARAMETERS	SW1 Promise Farm	SW2 Esun-Ekiti	SW 3 Itapaji Dam	SW 4 Egede farm	FMEnv. STD
A.	**PHYSICAL TEST**	N 07°58'15.53", E 05°28'6.42"	N 07^0 82″46.6″ E 08^0 71′11.2″	N 07^0 72″12.1″ E 08^0 80′73.9″	N 07^0 71″91.0″ E 08^0 88′55.1″	
1.	Odour	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	-
2	COLOUR	Colorless	Colorless	Colorless	Colorless	Colorless
3	TEMPERATURE (°C)	29.9	29.4	30.2	26.9	**25-35**
4.	pH	6.6	5.9	6.6	6.3	**6-9**
5.	DISSOLVED OXYGEN (mg/l)	6.88	6.10	6.80	6.38	**7.0**
6.	ELECTRICAL CONDUCTIVITY (µS/cm)	110	89	78	210	**1000**
7.	TOTAL DISSOLVED SOLIDS (mg/l)	56.5	47.3	40.2	108.3	**1000**
8.	TURBIDITY (NTU)	1.9	2.1	2.0	2.2	**5**
9.	TOTAL SUSPENDED SOLIDS (mg/l)	0.408	0.399	0.169	0.222	**<10**
B.	**CHEMICAL TEST**					
10.	TOTAL HARDNESS (mg/l)	68.48	85.6	171.2	85.6	**NS**
11.	MAGNESIUM (mg/l)	17.12	34.24	68.48	34.24	**NS**
12.	CALCIUM (mg/l)	51.36	51.36	102.72	51.36	**NS**
13.	TOTAL CHLORINE (mg/l)	0.032	0.048	0.043	0.036	**0.2**
14.	SULPHATE (mg/l)	87.0	77.0	65.0	79.0	**500**
15.	PHOSPHATE (mg/l)	2.522	3.118	1.995	2.132	**5**
16.	NITRATE AS NITROGEN (mg/l)	6.62	7.19	4.90	6.70	**10**
17.	NITRITE AS NITROGEN (mg/l)	0.063	0.059	0.082	0.046	**1**
18.	BIOCHEMICAL OXYGEN DEMAND (mg/l)	12.0	11.4	14.2	10.8	**30**
19.	CHEMICAL OXYGEN DEMAND (mg/l)	48.0	45.6	56.8	43.2	**100**
C	**HEAVY METALS**					
20.	LEAD (mg/l)	0.001	ND	ND	0.001	**0.05**
21	NICKEL (mg/l)	ND	ND	0.001	0.002	**0.05**
22.	CADMIUM (mg/l)	0.003	0.002	0.003	0.002	**0.02**
23.	MANGANESE (mg/l)	0.026	0.030	0.025	0.027	**NS**
24.	COPPER (mg/l)	0.011	0.008	0.014	0.012	**0.1**
25.	IRON TOTAL (mg/l)	0.353	0.175	0.442	0.293	**0.2**
26.	ZINC (mg/l)	0.224	0.163	0.215	0.132	**1**
D	**BACTERIOLOGICAL ANALYSIS**					
27.	*total coliform (mpn/100ml)*	5.0 x 10^3	4.7 x 10^3	5.3 x 10^3	4.9 x 10^3	**400**
28	*e-coli (cfu/100ml)*	3.2 x 10^3	2.8 x 10^3	3.0 x 10^3	3.3 x 10^3	**0.0**
29.	*salmonella (cfu/100ml)*	2.8 x 10^3	2.5 x 10^3	2.7 x 10^3	2.3 x 10^3	**0.0**
30.	*shigella (cfu/100ml)*	2.2 x 10^3	1.9 x 10^3	3.0 x 10^3	2.4x 10^3	**0.0**
31.	*staphylococcus (cfu/100ml)*	2.9 x 10^3	2.6 x 10^3	2.8 x 10^3	3.0 x 10^3	**0.0**
32.	*klebsellia (cfu/100 ml)*	2.2 x 10^3	1.7 x 10^3	2.0 x 10^3	1.9 x 10^3	**0.0**

Source: (Field Survey, November 2021).

4.2.2.2 Water Quality Test Results

pH

The pH value of the Ground Water (GW) from the study area ranges from 5.8-6.3 while the Surface Water (SW) ranges from 6.1-6.88 during the sampling period. Abnormal values of pH cause bitter taste to water, affect mucous membranes and causes corrosion. These values fall within the recommended value compared to the Federal Ministry of Environment (FMEnv) limits of 6-9, during the sampling periods.

Total Dissolved Solids/Conductivity

The conductivity of the ground water was found to be between the ranges of 198.0 -302.0 (µS/cm) while the surface water falls between the ranges of 78.0 -210.0 (µS/cm). This value is within the 1000(µS/cm) thresholds for ground and surface water and it can be said to be within the standard when compare to the acceptable limit of 1000(µS/cm) set by FMENV.

Dissolved Oxygen (DO)

The Dissolved Oxygen of the ground water value gotten falls within 4.85mg/l - 6.50mg/l while the surface water falls between 6.20mg/l - 6.88mg/l which is within the acceptable limit of 7.5mg/l and 7.0mg/l respectively.

Total Suspended Solids (TSS)

The measured TSS is 0.032- 0.249 mg/l for the ground water and the surface water ranges from 0.169- 0.408 mg/l for surface water.

Total Dissolved Solids (TDS)

The TDS of the ground water within the study area was found to be 101.0 -153.0 mg/l while the surface water is between 40.2 – 108.3 mg/l this is within the FMEnv recommended standard of 500 -1000 mg/l for ground and surface water.

Total Hardness

The total hardness of the Ground water found within the study area reads between 68.48 – 256.8 mg/l while the surface water falls at 68.48 – 171.2 mg/l during the time of analysis at the study area which is within the Federal Ministry Environment Standard of 200mg/l for Ground but ground water at Isan-Ekiti, Esun-Ekiti and Oke-Ado was above the acceptable standard of 200 mg/l while for surface water is not stated.

Magnesium

Magnesium levels in the ground water analysed within the study area was found to fall at the range of 17.12mg/l - 51.36 mg/l for the ground water analysed while the surface water ranges from 17.12mg/l - 68.48 mg/l which are within the recommended standard set by FMEnv of 50mg/l for ground water except Itapaji, Esun-Ekiti and Oke-Ado were found to be a bit above the recommended standard while surface limit is not stated.

Calcium

The ground water values were found to be within the ranges of 51.36 -205.44 mg/l analysed which is within the recommended standard except Esun-Ekiti and Oke-Ado found to be above the Federal Ministry of Environment recommended standard while the surface water ranges from 51.36 - 102.72 mg/l which fall within the threshold set by Federal Ministry of Environment.

Nitrate and Nitrite

The nitrate value of the study area ground water sample analysed within the study area was found to be within 5.82 -10.02 mg/l in the study area for ground water while surface water falls between 4.90 -7.19 mg/l This is within the FMEnv acceptable limit of 20mg/l for ground water and 10mg/l for surface water. Nitrite ranges between 0.041mg/l -0.355mg/l for both ground and surface water which fall within recommended threshold of FMENV at the time of the analysis.

Phosphate and Sulphate

Phosphate and Sulphate level of the water analysed within the study area fall at the values of 0.602-3.118 1mg/l for Phosphate for both ground and surface water within the study area including the control point and the ranges of 12.31 mg/l -87.0mg/l for Sulphate both surface and ground water analysed within the study area. Which is within The Federal Ministry of Environment recommended level of 5mg/l and 500mg/l respectively.

Metals and Heavy Metals

Metal tested for the ground water and surface water within the study area at Ekiti Special Agro-processing Zone during sampling is discussed below.

Manganese

Manganese levels at the study area, for the ground water fall at the values of 0.018 -0.020mg/l while for surface water is fall at the value of 0.025- 0.030mg/l the value gotten for ground water is within the recommended limit of 0.20mg/l and Surface shows that the recommended thresholds are not stated by Federal Ministry of Environment.

Copper

The concentration of copper in the ground water samples analysed was found to be between the ranges of 0.011 – 0.093 mg/l this reads shows is within the permissible limit of 0.1mg/l while the surface water reads between 0.008-0.014 which is within the recommended standard approved by Federal Ministry of Environment.

Lead

The groundwater and surface water analysed at the study area, shows that lead was not detected in most of the area the water samples was taken only at the control point for ground water which reads 0.001mg/l and also 0.001mg/l for surface water at Egede at the time of the analysis and this conform to the FMEnv recommended Standard of 0.05 mg/l.

Cadmium

Cadmium was dictated in the ground water and surface water analysed. The value gotten falls between the ranges of 0.001 - 0.003mg/l which is within the set limit set by Federal Ministry of Environment for ground and surface water as shown on the table above. Cadmium was only detected only at Oke-Ako and Ipao-Ekiti for the ground water analysis while it wasn't detected in other samples.

Chemical Oxygen Demand (COD) and Biochemical Oxygen Demand (BOD)

The COD of the water analysed was found to be between 11.6-16.4mg/l for ground water while the surface water falls between the ranges of 43.2-56.8mg/l which is within FMEnv standard of 30.0mg/l and 100mg/l respectively indicating moderate organic input and oxygenation. The BOD falls between the rages of 2.9-4.1mg/l for ground water and 10.8-14.2.8mg/l for surface water also indicating moderate organic input and oxygenation.

Microbiological Studies

Water samples for microbiological studies were collected in 100ml plastic containers which were covered with aluminium foil and keep in ice-cool box prior to culturing in the laboratory. The water was then analysed for coliforms using the multiple tube fermentation technique.

The water sample analysed revealed that the *total Coliform Number* of bacteria is above the recommended values of 1.8 and 400 for ground water and surface water. While *Escherichia Coli (*1.2×10^2 -3.2×10^3*), salmonella (*2.2×10^4 -2.8×10^6*), shigella (*2.1×10^4 -2.6×10^4*) yeast/mould (*3.1×10^4 -7.2×10^4*), staphylococcus (*2.9×10^4 -10.9×10^4*)* and *klebsellia (*2.3×10^4 -3.4×10^4*)* were all present in surface water at different load except SW 2 and GW 1-3 where *klebsellia* was not detected. The rest of the bacteriological analysis shows different level of their presence in the surface and ground water analysis.

4.2.3 Soil Quality

Surface soil was investigated through visual observation and sampling. Soil samples were obtained from designated points in seventeen (17) locations including control point within the project site. Topsoil and subsoil samples was taken from each point, generating a total of thirty-four (34) soil samples. The locations of soil sample points are presented in Figure 4.5. Hand Auger of uniform cross section was used to ensure that reproducible soil samples were collected from depths of 0-15cm and 15-30cm. This ensured high quality representative data collection. Surface litter of un-decomposed plant materials were removed to ensure that uncontaminated soil samples were not collected. Soil samples were collected in appropriately labelled and sealed in polythene bags and taken to Zabson laboratory located at Masaka Nasarawa State for further analysis.

Samples for microbiological analysis were collected in sterile McCarthey bottles and kept under 4^0C in a refrigerated box (cooler). Samples for physio-chemical analysis were air-dried in a dust free environment while those for microbiological analysis were stored in ice-packed cooler in the field and transferred to the refrigerator at 4^0C. Physio-Chemical analysis of soil samples were carried out using the analytical methods recommended by FMEnv.

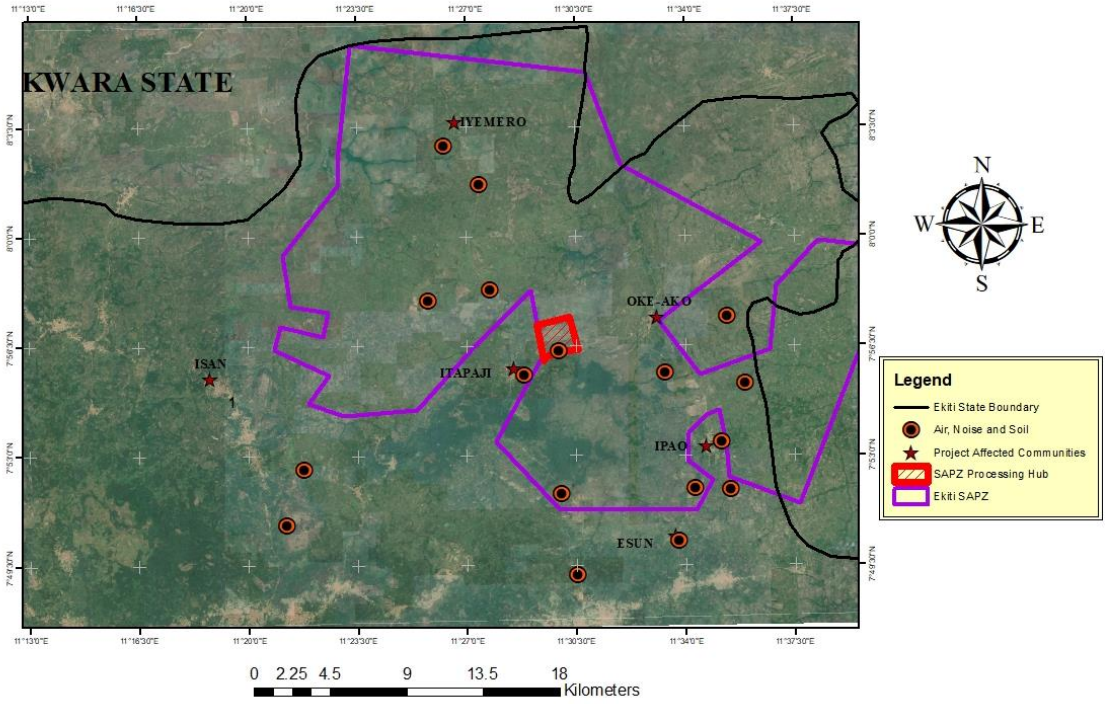

Figure 4.5: Map Showing Location of Collected Soil Samples
(Source: Field Survey, November 2021)

Photo 4.17: Soil Sample Collection on Site
Source: Field Survey, September 2021

Photo 4.18: Soil Sample Collection on Site

Source: Field Survey, September 2021

Photo 4.19: Soil Sample Collection on Site

Source: Field Survey, September 2021

4.2.3.1 Soil Quality Test Results

Textural Composite

The textural composite of the soil is clay-sandy with sand between ranges from 39.83% -60.32%, clay content range of 11.83% -20.43, and silt was range of 20.98% - 37.21% in composition for top soil. Subsoil was assessed to have content sand ranging from 41.33%-65.29%, with clay falling between 11.42%-21.98% and silt is between 19.84%-34.84%.

Exchangeable Cation

Calcium (Ca), Potassium (P) and Magnesium (Mg) are very abundant elements in the earth's crust and are very important nutrients required to ensure plants growth. K facilitates many plant actions and enzyme transformations while Ca is a part of the plant cell walls and is needed for cell division.

Calcium values reads 12.44mg/kg to 33.22mg/kg for the top soil and subsoil analysed within the project site.

Magnesium is a chlorophyll component and is supplied to plants mostly from exchangeable forms. The magnesium, levels in soil ranges between 0.010mg/kg – 0.098mg/kg for both topsoil and subsoil analysed within the project site.

Microbiological Isolate for Soil

The soil sample analysed for top and sub soil revealed the different level of bacteriology present within the project area. *Escherichia Coli* ranges from *(*5.0 x 10^6 -9.4 x 10^7*)* and wasn't detected at some points. *Proteus (*2.2 x 10^4 -3.7 x 10^6*), shigella (*2.4 x 10^4 -3.4 x 10^4*), yeast/mould (*1.1x 10^2 -1.3 x 10^2*)* weren't detected at subsoil point 8., *staphylococcus (*1.0 x 10^1 -1.2 x 10^1*)* was also undetected at a few subsoil points. while *klebsellia* falls between the range of *(*4.9 x 10^4 -6.7 x 10^4*).* While a few organisms weren't detected at the time of the analysis, different loads of bacteria were found in the soil samples analysed. The bacteriological analysis table shows different the level of their presence in the topsoil and subsoil analysis.

Table 4.10 to Table 4.15 show the results of soil tests conducted.

Table 4.10: Physical/Chemical Analysis of Top Soil Samples 1-6

S/N	PARAMETER	SAPZ 1 (TS) (mg/kg) EXCEPT STATED	SAPZ 2 (TS) (mg/kg) EXCEPT STATED	SAPZ 3 (TS) (mg/kg) EXCEPT STATED	SAPZ 4 (T S) (mg/kg) EXCEPT STATED	SAPZ 5 (TS) (mg/kg) EXCEPT STATED	SAPZ 6 (TS) (mg/kg) EXCEPT STATED
A.	**PHYSICAL TEST**	N 07° 49'7.37" E 11°34'21.5"	N 07° 50'15.7" E 11°33'44.8"	N 07^0 82″ 47.8″ E 08^0 67′ 65.6″	N 07^0 82″ 54.4″ E 08^0 67′ 65.9″	N 07^0 83″ 55.1″ E 08^0 70′ 68.0″	N 07^0 82″ 44.4″ E 08^0 71′ 10.7″
1.	pH	5.30	6.09	5.98	6.16	5.44	6.25
2.	TEMPERATURE (^{0}C)	30.2	30.5	30.9	29.9	30.4	30.8
3.	ELECTRICAL CONDUCTIVITY (µS/cm)	199	164	200	139	187	182
4.	PARTICLE SIZES/TEXTURE	SAND/SILT/CLAY 60.32/20.98/13.61	SAND/SILT/CLAY 45.63/37.21/13.04	SAND/SILT/CLAY 39.83/33.56/20.43	SAND/SILT/CLAY 46.43/34.83/13.52	SAND/SILT/CLAY 43.49/30.22/19.47	SAND/SILT/CLAY 42.88/31.54/19.98
5.	POROSITY (%)	27.00	30.00	23.33	33.33	26.66	40.00
6.	MOISTURE CONTENT	16.0	12.3	17.9	12.8	11.8	10.5
7.	BULK DENSITY (g/dm^3)	0.94	0.89	0.85	0.88	0.99	1.2
8.	**ORGANICS**						
9.	TOTAL ORGANIC CARBON	13.0	8.0	11.0	7.2	8.3	13.2
C.	**EXCHANGEABLE IONS**						
12.	NITRATE	21.08	18.12	20.04	17.18	13.98	19.15
13.	NITRITE	0.522	0.835	0.440	0.490	0.108	0.310
14	SULPHATE	85.2	76.12	67.8	59.40	83.10	76.23
15.	MAGNESSIUM	11.10	13.18	10.14	17.12	14.00	12.17
16.	CALCIUM	24.00	34.12	18.18	34.20	25.00	24.54
D.	**HEAVY METALS**						
17.	LEAD	0.001	ND	ND	0.001	ND	ND
18.	IRON	0.343	0.124	0.116	0.099	0.108	0.114
19.	COPPER	0.026	0.021	0.017	0.011	0.022	0.011
20.	MANGANESE	0.027	0.019	0.010	0.012	0.0023	0.016
21.	ZINC	0.860	0.612	0.438	0.642	0.590	1.090
22.	CADMIUM	0.001	ND	ND	ND	ND	ND
23	NICKEL	ND	ND	ND	ND	ND	ND
E.	**BACTERIAL ISOLATE**						
24	*Proteus(cfu/100ml)*	3.5 X 10^3	3.7 X 10^3	4.0 X 10^3	3.0 X 10^3	3.2 X 10^3	3.2 X 10^3
25.	*e-coli (cfu/100ml)*	1.0 X 10^2	1.3 X 10^2	1.0 X 10^2	1.0 X 10^2	1.1 X 10^2	1.0 X 10^2
26.	*yeast/mold(cfu/100ml)*	1.3 X 10^2	1.3 X 10^2	1.2 X 10^2	1.2 X 10^2	1.0 X 10^2	1.1 X 10^2
27	*Shigella(cfu/100ml)*	3.0 X 10^2	3.2 X 10^2	2.7 X 10^2	2.4 X 10^2	1.9 X 10^2	3.0 X 10^2
28.	*Klebsilla(cfu/100ml)*	4.2 X 10^3	3.9 X 10^3	4.0 X 10^3	3.7 X 10^3	3.4 X 10^3	3.5 X 10^3
29.	*Staphilococcus(cfu/100ml)*	1.3 X 10^1	1.5 X 10^1	1.3 X 10^1	1.7 X 10^1	1.3 X 10^1	1.5 X 10^1

ND = Not Dictate, NS = Not state, TS = Top Soil

Source: (Field Survey, November 2021)

Table 4.11: Physical/Chemical Analysis of Top Soil Samples 7-12

S/N	PARAMETER	SAPZ 7 (TS) (mg/kg) EXCEPT STATED	SAPZ 8 (TS) (mg/kg) EXCEPT STATED	SAPZ 9 (TS) (mg/kg) EXCEPT STATED	SAPZ 10 (T S) (mg/kg) EXCEPT STATED	SAPZ 11 (TS) (mg/kg) EXCEPT STATED	SAPZ 12 (TS) (mg/kg) EXCEPT STATED
A.	**PHYSICAL TEST**	N 07^0 83′ 93.6″ E 08^0 70′ 86.6″	N 07^0 84′ 28.3″ E 08^0 73′ 50.7″	N 07^0 84′ 10.8″ E 08^0 75′ 38.2″	N 07^0 84′ 17.0″ E 08^0 75′ 36.4″	N 07^0 80′ 75.3″ E 08^0 79′ 44.0″	N 07^0 80′ 94.4″ E 08^0 80′ 80.3″
1.	pH	6.03	5.94	6.50	6.37	5.75	6.07
2.	TEMPERATURE (^{0}C)	29.9	30.3	31.0	30.5	31.5	31.0
3.	ELECTRICAL CONDUCTIVITY (µS/cm)	127	132	162	120	158	160
4.	PARTICLE SIZES/TEXTURE	SAND/SILT/CLAY 44.49/29.22/19.78	SAND/SILT/CLAY 50.54/25.78/17.05	SAND/SILT/CLAY 40.83/33.56/20.43	SAND/SILT/CLAY 49.28/27.43/16.79	SAND/SILT/CLAY 47.83/29.35/15.66	SAND/SILT/CLAY 53.09/26.17/13.93
5.	POROSITY (%)	30.00	27.00	36.66	43.33	30.00	25.33
6.	MOISTURE CONTENT	14.0	11.8	11.8	10.2	12.8	17.2
7.	BULK DENSITY (g/dm^3)	0.92	0.90	1.0	1.1	0.97	0.96
8.	**ORGANICS**						
9.	TOTAL ORGANIC CARBON	11.5	7.6	8.5	7.3	7.8	11.0
C.	**EXCHANGEABLE IONS**						
12.	NITRATE	15.18	9.11	6.75	12.00	8.16	7.13
13.	NITRITE	0.492	0.123	0.323	0.283	0.214	0.143
14	SULPHATE	88.0	64.41	55.76	64.53	53.40	84.13
15.	MAGNESSIUM	13.43	16.13	9.68	13.80	14.30	10.36
16.	CALCIUM	28.32	36.42	12.54	26.40	28.12	22.12
D.	**HEAVY METALS**						
17.	LEAD	ND	0.001	ND	ND	ND	0.001
18.	IRON	0.292	0.186	0.202	0.132	0.231	0.184
19.	COPPER	0.031	0.028	0.019	0.017	0.020	0.019
20.	MANGANESE	0.023	0.031	0.017	0.019	0.033	0.024
21.	ZINC	0.487	0.537	0.388	0.482	0.507	0.717
22.	CADMIUM	ND	ND	0.001	0.001	ND	0.001
23	NICKEL	ND	ND	ND	0.001	ND	ND
E.	**BACTERIAL ISOLATE**						
24	*Proteus(cfu/100ml)*	3.3 X 10^3	3.6 X 10^3	3.8 X 10^3	4.1 X 10^3	4.0 X 10^3	3.9 X 10^3
25.	*e-coli (cfu/100ml)*	1.2 X 10^2	1.2 X 10^2	1.1 X 10^2	1.3 X 10^2	1.4 X 10^2	1.1 X 10^2
26.	*yeast/mold(cfu/100ml)*	1.2 X 10^2	1.1 X 10^2	1.1 X 10^2	1.2 X 10^2	1.2 X 10^2	1.4 X 10^2
27	*Shigella(cfu/100ml)*	3.3 X 10^2	3.5 X 10^2	3.0 X 10^2	2.8 X 10^2	2.9 X 10^2	3.1 X 10^2
28.	*Klebsilla(cfu/100ml)*	4.0 X 10^3	3.7 X 10^3	3.8 X 10^3	3.5 X 10^3	3.6 X 10^3	3.5 X 10^3
29.	*Staphilococcus(cfu/100ml)*	1.2 X 10^1	1.3 X 10^1	1.2 X 10^1	1.3 X 10^1	1.4 X 10^1	1.2 X 10^1

ND = Not Dictate, NS = Not state, TS = Top Soil
Source: (Field Survey, 2021).

Table 4.12: Physical/Chemical Analysis of Top Soil Samples 13-16

S/N	PARAMETER	SAPZ 13 (TS) (mg/kg) EXCEPT STATED	SAPZ 14 (TS) (mg/kg) EXCEPT STATED	SAPZ 15 (TS) (mg/kg) EXCEPT STATED	SAPZ 16 (TS) (mg/kg) EXCEPT STATED	SAPZ control (TS) (mg/kg) EXCEPT STATED
A.	**PHYSICAL TEST**	N 07^0 72′ 80.5″ E 08^0 77′ 90.8″	N 07^0 72′ 20.4″ E 08^0 80′ 62.8″	N 07^0 71′ 91.0″ E 08^0 88′ 55.1″	N 07^0 56′ 29.3″ E 08^0 75′ 76.5″	N 07^0 58′ 48.2″ E 08^0 70′ 37.7″
1.	pH	6.38	6.15	5.94	6.17	6.18
2.	TEMPERATURE (^{0}C)	31.8	32.0	31.4	31.5	31.9
3.	ELECTRICAL CONDUCTIVITY (µS/cm)	199	170	148	144	152
4.	PARTICLE SIZES/TEXTURE	SAND/SILT/CLAY 51.09/26.89/16.38	SAND/SILT/CLAY 51.46/27.03/16.55	SAND/SILT/CLAY 49.16/32.63/13.51	SAND/SILT/CLAY 50.44/30.12/11.83	SAND/SILT/CLAY 49.37/32.25/12.04
5.	POROSITY (%)	26.00	28.60	43.33	40.00	43.33
6.	MOISTURE CONTENT	16.2	10.6	12.3	11.0	9.4
7.	BULK DENSITY (g/dm^3)	0.96	0.94	1.1	1.0	0.96
8.	**ORGANICS**					
9.	TOTAL ORGANIC CARBON	9.6	7.2	8.0	9.2	6.0
C.	**EXCHANGEABLE IONS**					
12.	NITRATE	18.30	9.28	20.08	16.04	12.63
13.	NITRITE	0.386	0.316	0.402	0.341	0.504
14	SULPHATE	49.6	60.00	59.16	84.13	68.10
15.	MAGNESSIUM	14.13	15.12	10.84	12.24	11.00
16.	CALCIUM	29.22	31.28	21.18	24.49	22.10
D.	**HEAVY METALS**					
17.	LEAD	ND	0.001	ND	ND	ND
18.	IRON	0.263	0.320	0.184	0.175	0.202
19.	COPPER	0.043	0.036	0.026	0.040	0.025
20.	MANGANESE	0.033	0.026	0.021	0.028	0.036
21.	ZINC	0.362	0.414	0.303	0.288	0.421
22.	CADMIUM	0.002	0.001	ND	ND	ND
23	NICKEL	ND	ND	ND	ND	ND
E.	**BACTERIAL ISOLATE**					
24	*Proteus(cfu/100ml)*	4.2 X 10^3	3.3 X 10^3	3.0 X 10^3	3.6 X 10^3	3.4 X 10^3
25.	*e-coli (cfu/100ml)*	1.4 X 10^2	1.6 X 10^2	1.3 X 10^2	1.5 X 10^2	1.3 X 10^2
26.	*yeast/mold(cfu/100ml)*	1.4 X 10^2	1.5 X 10^2	1.4 X 10^2	1.2 X 10^2	1.3 X 10^2
27	*Shigella(cfu/100ml)*	3.5 X 10^2	3.3 X 10^2	3.6 X 10^2	3.4 X 10^2	3.3 X 10^2
28.	*Klebsilla(cfu/100ml)*	3.7 X 10^3	4.0 X 10^3	4.2 X 10^3	3.9 X 10^3	3.5 X 10^3
29.	*Staphilococcus(cfu/100ml)*	1.5 X 10^1	1.4 X 10^1	1.3 X 10^1	1.3 X 10^1	1.2 X 10^1

ND = Not Dictate, NS = Not state, TS = Top Soil
Source: (Field Survey, November 2021)

Table 4.13: Physical/Chemical Analysis of Sub Soil Samples 1-6

S/N	PARAMETER	SAPZ 1 (SS) (mg/kg) EXCEPT STATED	SAPZ 2 (SS) (mg/kg) EXCEPT STATED	SAPZ 3 (SS) (mg/kg) EXCEPT STATED	SAPZ 4 (SS) (mg/kg) EXCEPT STATED	SAPZ 5 (SS) (mg/kg) EXCEPT STATED	SAPZ 6 (SS) (mg/kg) EXCEPT STATED
A.	**PHYSICAL TEST**	N 07° 49'7.3704" E 11°34'21.572"	N 07° 50'15.7" E 11°33'44.8"	N 07^0 82″ 47.8″ E 08^0 67′ 65.6″	N 07^0 82″ 54.4″ E 08^0 67′ 65.9″	N 07^0 83″ 55.1″ E 08^0 70′ 68.0″	N 07^0 82″ 44.4″ E 08^0 71′ 10.7″
1.	pH	5.40	5.88	5.90	6.05	5.90	6.20
2.	TEMPERATURE (^{0}C)	30.0	29.8	30.5	29.9	30.0	30.2
3.	ELECTRICAL CONDUCTIVITY (µS/cm)	174	148	182	130	190	154
4.	PARTICLE SIZES/TEXTURE	SAND/SILT/CLAY 65.29/19.84/11.42	SAND/SILT/CLAY 42.36/33.84/19.24	SAND/SILT/CLAY 51.07/27.61/14.16	SAND/SILT/CLAY 60.32/23.98/12.61	SAND/SILT/CLAY 44.84/34.70/13.80	SAND/SILT/CLAY 47.12/30.83/15.14
5.	POROSITY (%)	23.66	30.33	25.00	24.33	33.66	40.00
6.	MOISTURE CONTENT	11.9	14.0	17.0	16.3	13.6	10.0
7.	BULK DENSITY (g/dm^3)	0.89	0.90	0.88	0.97	0.86	1.2
8.	**ORGANICS**						
9.	TOTAL ORGANIC CARBON	10.0	10.8	11.4	9.2	8.8	7.0
C.	**EXCHANGEABLE IONS**						
12.	NITRATE	13.41	10.45	12.23	15.19	13.02	18.52
13.	NITRITE	0.062	0.165	0.062	0.046	0.038	0.110
14	SULPHATE	63.43	70.80	56.32	57.23	78.93	72.98
15.	MAGNESSIUM	8.40	10.00	4.81	11.07	5.83	7.43
16.	CALCIUM	20.10	32.42	14.20	31.41	19.16	24.40
D.	**HEAVY METALS**						
17.	LEAD	ND	ND	ND	ND	ND	ND
18.	IRON	0.480	0.225	0.331	0.121	0.332	0.153
19.	COPPER	0.036	0.020	0.032	0.048	0.028	0.025
20.	MANGANESE	0.023	0.026	0.018	0.010	0.032	0.013
21.	ZINC	0.430	0.252	0.182	0.312	0.625	0.252
22.	CADMIUM	ND	ND	0.001	0.001	ND	ND
23	NICKEL	ND	ND	ND	ND	ND	ND
E.	**BACTERIAL ISOLATE**						
24	*Proteus(cfu/100ml)*	3.0 X 10^3	3.6 X 10^3	3.8 X 10^3	3.3 X 10^3	2.7 X 10^3	2.9 X 10^3
25.	*e-coli (cfu/100ml)*	0.7 X 10^2	1.0 X 10^2	0.3 X 10^2	0.4 X 10^2	0.6 X 10^2	0.3 X 10^2
26.	*yeast/mold(cfu/100ml)*	1.4 X 10^2	1.1 X 10^2	0.8 X 10^2	0.9 X 10^2	1.0 X 10^2	1.2 X 10^2
27	*Shigella(cfu/100ml)*	2.5 X 10^2	1.9 X 10^2	2.0 X 10^2	2.2 X 10^2	2.0 X 10^2	2.6 X 10^2
28.	*Klebsilla(cfu/100ml)*	3.4 X 10^3	4.0 X 10^3	3.8 X 10^3	3.7 X 10^3	2.9 X 10^3	3.0 X 10^3
29.	*Staphilococcus(cfu/100ml)*	1.0 X 10^1	0.8 X 10^1	0.6 X 10^1	1.0 X 10^1	1.0 X 10^1	1.3 X 10^1

ND = Not Dictate, NS = Not state, SS = Sub Soil
Source: (Field Survey, November 2021).

Table 4.14: Physical/Chemical Analysis of Sub Soil Samples 7-12

S/N	PARAMETER	SAPZ 7 (SS) (mg/kg) EXCEPT STATED	SAPZ 8 (SS) (mg/kg) EXCEPT STATED	SAPZ 9 (SS) (mg/kg) EXCEPT STATED	SAPZ 10 (TSS) (mg/kg) EXCEPT STATED	SAPZ 11 (SS) (mg/kg) EXCEPT STATED	SAPZ 12 (SS) (mg/kg) EXCEPT STATED
A.	**PHYSICAL TEST**	N 07^0 83′ 93.6″ E 08^0 70′ 86.6″	N 07^0 84′ 28.3″ E 08^0 73′ 50.7″	N 07^0 84′ 10.8″ E 08^0 75′ 38.2″	N 07^0 84′ 17.0″ E 08^0 75′ 36.4″	N 07^0 80′ 75.3″ E 08^0 79′ 44.0″	N 07^0 80′ 94.4″ E 08^0 80′ 80.3″
1.	pH	6.00	6.00	6.00	6.41	5.92	6.12
2.	TEMPERATURE (^{0}C)	29.8	30.8	31.0	30.0	31.4	30.0
3.	ELECTRICAL CONDUCTIVITY (µS/cm)	118	138	151	133	154	163
4.	PARTICLE SIZES/TEXTURE	SAND/SILT/CLAY 47.11/26.85/14.48	SAND/SILT/CLAY 50.54/25.78/17.05	SAND/SILT/CLAY 41.33/31.34/21.92	SAND/SILT/CLAY 46.51/30.23/19.00	SAND/SILT/CLAY 51.28/26.64/18.13	SAND/SILT/CLAY 49.84/30.10/14.33
5.	POROSITY (%)	30.33	26.66	36.66	43.00	30.00	26.33
6.	MOISTURE CONTENT	16.0	13.4	11.3	11.0	14.8	18.0
7.	BULK DENSITY (g/dm^3)	0.91	0.94	1.0	0.99	0.95	0.97
8.	**ORGANICS**						
9.	TOTAL ORGANIC CARBON	12.2	10.1	8.5	9.0	10.2	11.6
C.	**EXCHANGEABLE IONS**						
12.	NITRATE	13.04	3.99	6.21	12.60	9.86	8.36
13.	NITRITE	0.490	0.280	0.226	0.270	0.143	0.064
14	SULPHATE	49.9	38.17	50.13	69.12	57.48	77.62
15.	MAGNESSIUM	10.22	12.44	9.90	13.30	15.00	10.30
16.	CALCIUM	24.12	33.22	12.44	26.0	23.63	20.81
D.	**HEAVY METALS**						
17.	LEAD	ND	ND	ND	ND	ND	ND
18.	IRON	0.402	0.191	0.246	0.174	0.301	0.163
19.	COPPER	0.036	0.022	0.013	0.021	0.020	0.018
20.	MANGANESE	0.027	0.028	0.018	0.019	0.030	0.020
21.	ZINC	0.282	0.503	0.343	0.480	0.444	0.631
22.	CADMIUM	ND	0.001	ND	ND	ND	ND
23	NICKEL	ND	ND	ND	ND	ND	ND
E.	**BACTERIAL ISOLATE**						
24	*Proteus(cfu/100ml)*	2.9 X 10^3	3.1 X 10^3	3.0 X 10^3	3.5 X 10^3	3.6 X 10^3	3.4 X 10^3
25.	*e-coli (cfu/100ml)*	1.2 X 10^2	1.0 X 10^2	0.8 X 10^2	1.3 X 10^2	1.2 X 10^2	1.1 X 10^2
26.	*yeast/mold(cfu/100ml)*	0.8 X 10^2	0.6 X 10^2	0.5 X 10^2	0.8 X 10^2	1.0 X 10^2	1.0 X 10^2
27	*Shigella(cfu/100ml)*	3.0 X 10^2	3.1 X 10^2	2.8 X 10^2	2.4 X 10^2	2.4 X 10^2	2.7 X 10^2
28.	*Klebsilla(cfu/100ml)*	3.7 X 10^3	3.0 X 10^3	3.4 X 10^3	3.2 X 10^3	3.5 X 10^3	3.4 X 10^3
29.	*Staphilococcus(cfu/100ml)*	0.8 X 10^1	1.0 X 10^1	0.6 X 10^1	0.7 X 10^1	1.0 X 10^1	0.9 X 10^1

ND = Not Dictate, NS = Not state, SS = Sub Soil
Source: Field Survey (November 2021)

Table 4.15: Physical/Chemical Analysis of Sub Soil Samples 13-16

S/N	PARAMETER	SAPZ 13 (SS) (mg/kg) EXCEPT STATED	SAPZ 14 (SS) (mg/kg) EXCEPT STATED	SAPZ 15 (SS) (mg/kg) EXCEPT STATED	SAPZ 16 (TSS) (mg/kg) EXCEPT STATED	SAPZ control (SS) (mg/kg) EXCEPT STATED
A.	**PHYSICAL TEST**	N 07^0 72′ 80.5″ E 08^0 77 90.8″	N 07^0 72″ 20.4″ E 08^0 80′ 62.8″	N 07^0 71′ 91.0″ E 08^0 88′ 55.1″	N 07^0 56″ 29.3″ E 08^0 75′ 76.5″	N 07^0 58″ 48.2″ E 08^0 70′ 37.7″
1.	pH	6.40	6.10	6.02	6.18	5.94
2.	TEMPERATURE (^{0}C)	30.4	31.6	31.2	30.9	31.2
3.	ELECTRICAL CONDUCTIVITY (µS/cm)	184	161	150	139	160
4.	PARTICLE SIZES/TEXTURE	SAND/SILT/CLAY 48.68/29.46/17.12	SAND/SILT/CLAY 55.27/22.42/15.84	SAND/SILT/CLAY 52.75/24.06/16.27	SAND/SILT/CLAY 43.65/28.92/20.48	SAND/SILT/CLAY 44.29/33.10/16.67
5.	POROSITY (%)	26.33	28.00	43.00	40.00	43.33
6.	MOISTURE CONTENT	15.8	10.2	8.9	11.2	10.0
7.	BULK DENSITY (g/dm^3)	0.96	0.95	1.0	0.98	0.97
8.	**ORGANICS**					
9.	TOTAL ORGANIC CARBON	10.0	7.4	8.4	8.0	7.3
C.	**EXCHANGEABLE IONS**					
12.	NITRATE	19.21	10.43	20.00	14.83	12.11
13.	NITRITE	0.187	0.119	0.295	0.101	0.365
14	SULPHATE	39.9	48.97	58.06	80.21	68.00
15.	MAGNESSIUM	12.24	14.02	10.12	12.24	11.95
16.	CALCIUM	28.42	24.48	24.20	24.40	24.12
D.	**HEAVY METALS**					
17.	LEAD	ND	ND	ND	ND	ND
18.	IRON	0.194	0.300	0.263	0.132	0.192
19.	COPPER	0.027	0.019	0.020	0.032	0.029
20.	MANGANESE	0.030	0.032	0.045	0.062	0.098
21.	ZINC	0.193	0.333	0.264	0.245	0.310
22.	CADMIUM	ND	ND	ND	ND	ND
23	NICKEL	ND	ND	ND	ND	ND
E.	**BACTERIAL ISOLATE**					
24	*Proteus(cfu/100ml)*	3.1 X 10^3	2.7 X 10^3	3.2 X 10^3	2.6 X 10^3	3.0 X 10^3
25.	*e-coli (cfu/100ml)*	0.7 X 10^2	1.2 X 10^2	0.7 X 10^2	1.2 X 10^2	0.9 X 10^2
26.	*yeast/mold(cfu/100ml)*	1.0 X 10^2	1.2 X 10^2	1.1 X 10^2	0.8 X 10^2	0.8 X 10^2
27	*Shigella(cfu/100ml)*	2.9 X 10^2	2.9 X 10^2	3.2 X 10^2	3.0 X 10^2	3.0 X 10^2
28.	*Klebsilla(cfu/100ml)*	3.2 X 10^3	3.6 X 10^3	3.7 X 10^3	3.2 X 10^3	3.0 X 10^3
29.	*Staphilococcus(cfu/100ml)*	1.0 X 10^1	1.1 X 10^1	0.9 X 10^1	0.7 X 10^1	0.5 X 10^1

ND = Not Dictate, NS = Not state, SS = Subsoil Soil
Source: (Field Survey, November 2021).

4.2.4 Dry Season Results

From secondary sources, it was observed that the physical properties of the soil samples collected in the broad region ranged in texture from sand to sandy loam in the topsoil (top 15cm of soil profile) with the sand fraction varying from 69.0% to 85.0% with mean values of 76.4 ± 6.3% and 67.5 ± 13.5% in the top 15cm and the subsoil horizons respectively and the silt fractions from 6.9% to 12.0% (means of 8.6 ± 5.1% and 11.1 ± 6.5% in top and sub soil layers respectively. The soils were moderately aerated, as porosity values (computed from measured bulk density values) ranged from 47.0 to 52.0%, with mean values of 50.0 ± 2.8% in the top soils. The sample points and chemical properties of collected samples are presented in Table 4.16 and Table 4.17.

Table 4.16; Location of Soil Samples Collected During Dry Season

Sample Codes	GPS Coordinates
Soil Sampling 1 (SS 1)	N070.64'17.9" E005019'84.3"
Soil Sampling 2 (SS 2)	N07064'36.3" E005019'63.2"
Soil Sampling 3 (SS 3)	N07064'76.7" E005019'36.0"
Soil Sampling 4 (SS 4)	N07065'19.4" E005019'00.9"
Soil Sampling 5 (SS 5)	N07065'45.8" E005018'83.1"
Soil Sampling 6 (SS 6)	N07065'66.8" E005018'47.3"
Soil Sampling 7 (SS 7)	N070'65'90.8" E005017'86.1"
Soil Sampling 8 (SS 8)	N07065'96.1" E005017'01.7"
Soil Sampling 9 (SS 9)	N07065'95.7" E005017'80.5"
Soil Sampling 10 (SS 10)	N070'66.00.1" E005016'69.3"
Soil Sampling Control (SS 11)	N07066.91.0" E005016'66.8"

Source: (Envikare Associates, 2020).

Table 4.17: Chemical Properties of the Soil around the Project Location

Parameters	SS1	SS2	SS3	SS4	SS5	SS6	SS7	SS8	SS9	SS10	SS11
Sand (%)	67.93	64.95	69.55	74.46	63.88	66.90	67.46	72.17	65.82	67.85	68.68
Clay (%)	18.62	20.82	18.68	13.21	19.65	20.85	18.12	18.01	20.87	19.62	18.24
Silt (%)	13.45	14.23	11.77	12.33	16.47	12.25	14.42	9.82	13.31	12.53	13.08
pH	5.72	5.93	6.12	5.98	5.79	5.81	6.10	5.91	5.86	6.10	6.16
Porosity (%)	54.52	50.60	52.83	53.81	58.73	55.48	53.28	57.84	55.95	57.81	56.91
Permeability (cm/s)	1.29	1.96	1.62	1.87	1.74	2.55	1.70	2.13	1.95	2.36	1.85
Bulk Density (gcm-3)	1.35	1.45	1.23	1.52	1.32	1.28	1.46	1.32	1.25	1.38	1.41
Total N (%)	0.13	0.15	0.13	0.16	0.10	0.19	0.15	0.18	0.14	0.12	0.20
TOM (%)	1.95	2.07	2.25	2.58	1.92	2.75	2.19	1.89	2.43	2.17	2.45
Total Phosphorus (mg/kg)	5.84	8.27	6.57	7.83	5.83	6.74	5.27	8.05	6.30	5.19	7.48
EA (cmol/kg)	2.34	2.27	2.74	2.51	2.25	2.51	2.29	2.44	2.51	2.72	2.58
CEC (cmol/kg)	7.52	8.27	7.83	9.24	6.98	8.37	7.18	9.37	7.27	9.36	7.58
BS (%)	75.50	79.20	67.80	73.60	69.30	81.50	77.90	85.10	70.40	65.60	75.20
Na+ (cmol/kg)	0.76	0.82	0.86	0.73	0.80	0.58	0.87	0.84	0.60	0.66	0.80
K+ (cmol/kg)	1.47	1.68	1.70	1.42	1.65	1.26	1.59	1.74	1.34	1.40	1.57
Ca2+ (cmol/kg)	4.80	5.04	3.95	4.73	4.36	3.94	5.38	5.08	4.58	4.98	5.09
Mg2+ (cmol/kg)	3.40	3.85	4.13	3.26	4.24	2.98	3.28	2.96	3.26	4.03	3.82
Oil & Grease (mg/kg)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
THC (mg/kg)	0.01	0.02	BDL	0.01	BDL	BDL	BDL	0.03	BDL	BDL	0.01
HEAVY METAL CHARACTERISTICS											
As (mg/kg)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cd (mg/kg)	0.02	BDL	BDL	0.01	0.02	BDL	0.01	0.01	BDL	BDL	0.01
Cr (mg/kg)	0.37	0.64	0.29	0.43	0.74	0.46	0.71	0.52	0.54	0.39	0.61
Cu (mg/kg)	1.01	0.84	0.87	0.70	1.08	0.82	0.77	1.05	1.17	1.30	1.13
Co (mg/kg)	0.01	BDL	BDL	0.03	BDL	0.02	BDL	0.01	BDL	BDL	0.02
Fe (mg/kg)	323.00	356.80	347.10	299.70	280.30	371.50	289.30	295.00	413.50	270.90	397.50
Ni (mg/kg)	0.93	1.19	0.88	0.80	0.67	1.12	0.98	1.23	0.87	1.03	1.07
Mn (mg/kg)	0.10	0.09	0.13	0.09	0.15	0.13	0.07	0.08	0.10	0.14	0.12
V (mg/kg)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Pb (mg/kg)	0.15	0.10	0.17	0.16	0.10	0.16	0.15	0.17	0.20	0.10	0.08
Zn (mg/kg)	35.57	29.69	32.90	31.54	26.44	37.14	30.88	34.98	30.07	25.85	31.29
MICROBIOLOGICAL CHARACTERISTICS											
THB (cfu/g) x 103	2.90	2.30	1.60	1.90	3.30	1.20	2.90	1.80	2.70	3.10	3.10
THF (spore/g) x 103	1.80	2.10	1.20	1.30	2.70	1.00	2.20	1.10	1.90	2.60	2.13
HUB (cfu/g) x 102	0.20	0.10	0.10	0.20	0.30	0.10	0.20	0.30	0.20	0.30	0.20
HUF (spore/g) x 102	0.04	0.08	0.06	0.07	0.10	0.07	0.06	0.10	0.05	0.06	0.09

Source: (Envikare Associates, 2020).

4.3 Socio Economic Assessment

A socio-economic assessment was carried out to ascertain the character of stakeholder communities within the Ekiti SAPZ as well as communal needs and challenges which can be considered in the provision of infrastructure and facilities for the project or be considered in the event of taking up a Corporate Social Responsibility (CSR).

4.3.1 Methodology

Data for the socio-economic assessment was collected through the administration of questionnaires (attached as Appendix D) to household heads or representatives across 10 project affected communities within the Ekiti-SAPZ in Oye and Ikole LGAs. Data was collected with the use of an online data kit, Kobo Toolbox (www.kobotoolbox.org). Relevant questions were uploaded onto the online kit and thirteen enumerators were engaged, trained, and given access to the questionnaire forms for administration. Collected data was submitted to a central account for collation. The data was analysed using Microsoft Excel spreadsheets and are presented herein as tables, graphs, or charts.

The survey targeted household heads or representatives (adult member of the household) within the listed communities informed by the projected 2021 population of communities within Oye and Ikole LGAs obtained from the Statistician general of Ekiti State (Appendix E). The total population of each community was divided by the national average household size of 6 to get an estimated number of the households within each community. 10% of the estimated number of households was taken as the sample size as prescribed by Piroska (2022). As such, a total sample size of 931 was obtained. However, 928 questionnaires were successfully administered across the 10 selected communities, resulting in an acceptable cumulative 0.3% shortfall as presented in Table 4.18.

Other communities within the Ekiti SAPZ area where the questionnaire survey was not carried out due to certain limitations were engaged in community consultations during which communal awareness of the proposed project was raised and their expectations and reactions were noted as elaborated upon in Section 4.4.

Table 4.18: Sampled Population for the Questionnaire Survey

Communities	Projected 2021 Population*	Estimated No. of Households (Projected Population / 6)	Sample Size (10% x Estimated No. of Households)
Esun-Ekiti Community	4,732	789	79 (71 administered)
Ipao-Ekiti Community	12,537	2090	209 (197 administered)
Oke-Ako Community	10,695	1783	178 (179 administered)
Itagbangba Community	*No data*	About 100 based on enumerators observation	10 (14 administered)
Itapaji-Ekiti Community	6,616	1103	110 (102 administered)
Iyemero-Ekiti Community	937	156	16 (39 administered)
Isan-Ekiti Community	15,418	2570	257 (249 administered)
Gede Community	*No data*	About 100 based on enumerators observation	12 (12 administered)
Elemesho Community	*No data*	About 300 based on enumerators observation	30 (36 administered)
Oloje-Ekiti Community	*No data*	About 300 based on enumerators observation	30 (29 administered)
		Total	**931 (928 administered)**

Source: (Appendix E; Field Survey, November 2021)

4.3.2 Socio Economic Data

4.3.2.1 Gender Participation

The statistics reveal that more males participated in the survey than the females in 9 out of the 10 communities, Ipao-Ekiti Community being the only exception. This is attributed to the survey targeting household heads which are mostly men, with women participating in the absence of their husbands. Figure 4.6 graphically presents the statistics of this finding.

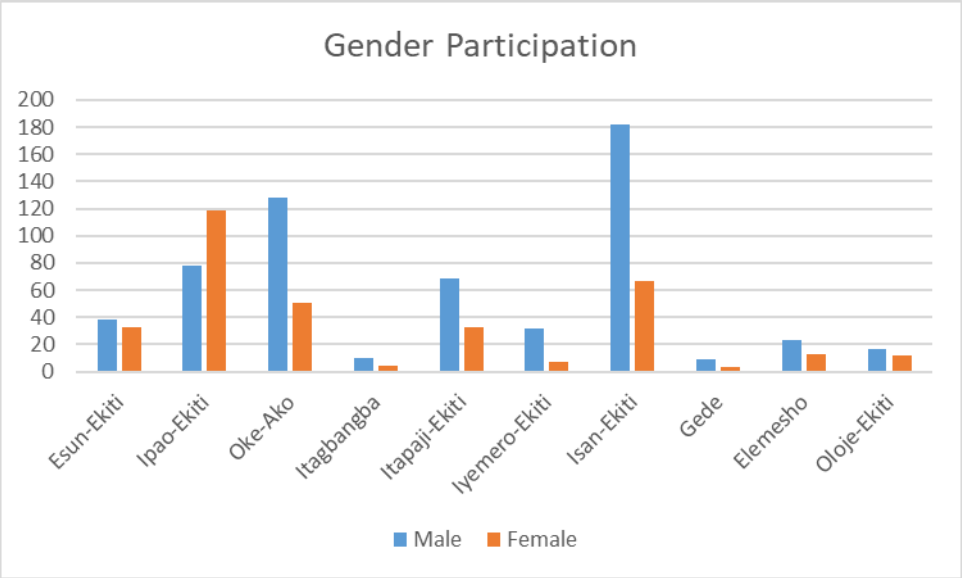

Figure 4.6: Gender Participation in the Questionnaire Survey

Source: (Field survey, November 2021)

4.3.2.2 Age Distribution

The findings from the survey reveals that most of the household heads were between the age of 36 to 50 across the 10 communities as this age group accounts for 42% of the respondents as presented in Figure 4.7. More so, a good proportion of the respondents were above 50 years of age, which is very common in most rural communities. Because the survey targeted household heads, the age distribution with reveals an active youth proportion (18 to 35 years old) of 32% is not considered to represent the correct youth population of the area. The youth population is presumed to be higher than is represented to provide a potential source of industrial professional, semi-professional, and labour workforce for the industries.

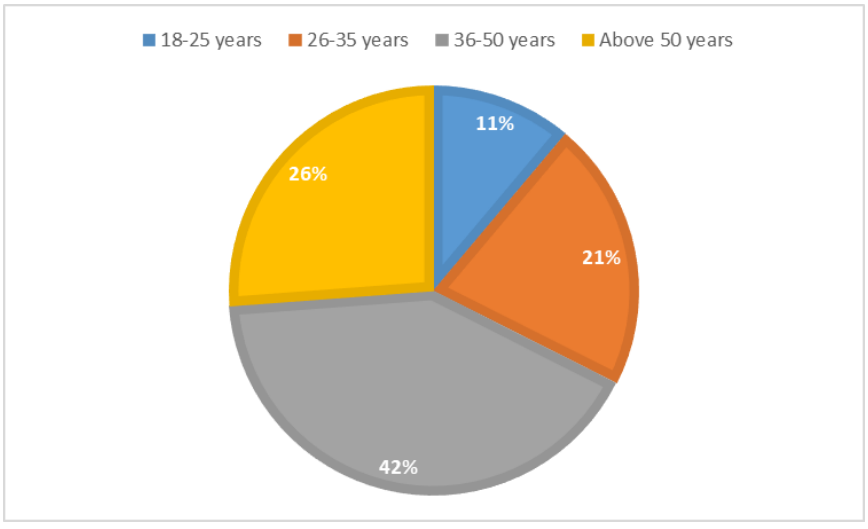

Figure 4.7: Age Class Percentage across the 10 communities

Source: (Field survey, November 2021)

4.3.2.3 Religious Group

The survey revealed that Christianity is the most practiced religion across the 10 communities except for Gede Community where most of the respondents practice Islam. Christianity accounts for 76% of the practiced religion, which is very common in southern Nigeria, this is followed by Islam with 23% and Traditional with 1% as presented in Figure 4.8. This data reflects a massive decline in traditional practice which could be sponsored by civilization and external influence.

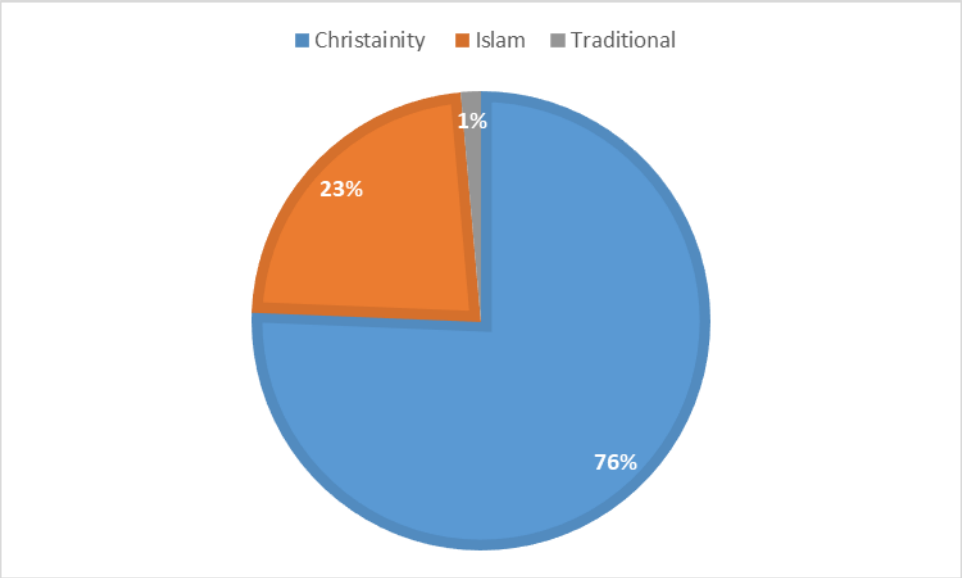

Figure 4.8: Religious Group across the 10 Communities
Source: (Field Survey, November 2021)

4.3.2.4 Marital Status

The survey targeted household heads who were husbands, fathers, wives, or mothers given the circumstances. As a result, most of the respondents within the 10 communities were married. Precisely, 82% of the household heads are married, 11% are single, 7% are widowed and less than 1% are divorced from the accumulated figures as presented in Figure 4.9.

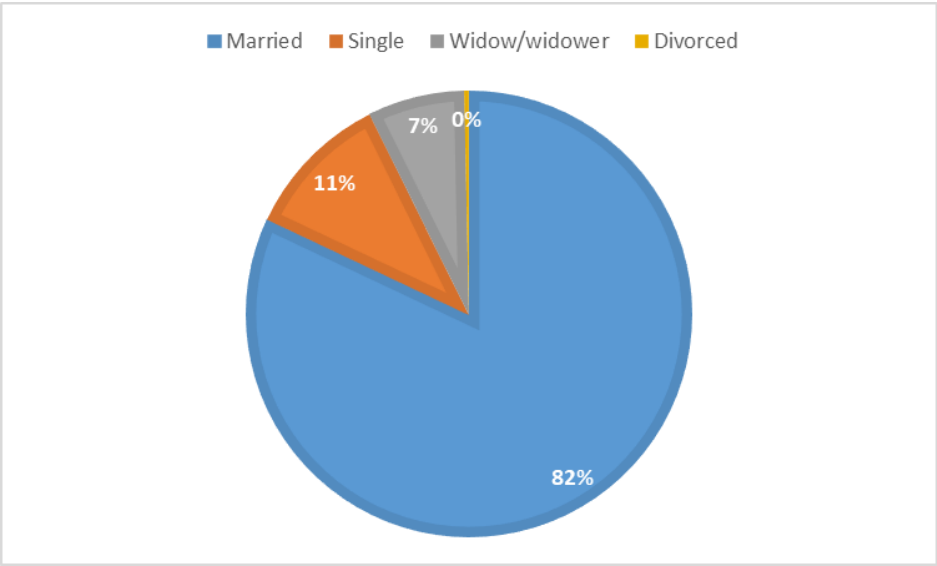

Figure 4.9: Marital Status of Respondents
Source: (Field Survey, November 2021)

4.3.2.5 Number of Wives

The survey unveiled that across the 10 communities, 670 household heads had one wife, 112 had two wives, 17 had three wives, 7 had four wives and 3 had five wives. Most respondents practice monogamy in terms of marriage, which is attributed to both personal and religious beliefs. More so, Christianity which is the predominant religion within these communities (as reflected in 4.3.2.3) encourages monogamy. Figure 4.10 presents these findings in a chart.

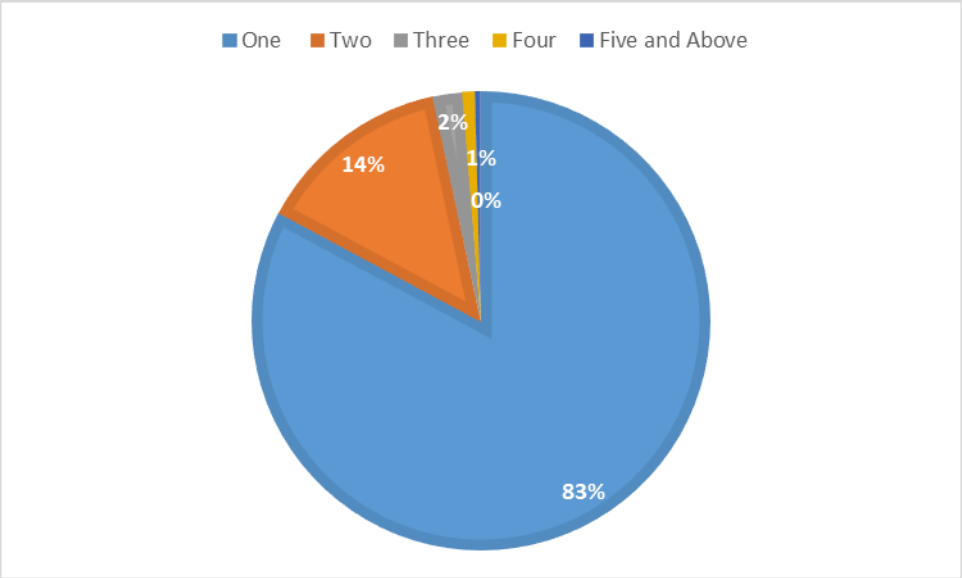

Figure 4.10: Number of Wives in Households
Source: (Field Survey, November 2021)

4.3.2.6 Household Size

The number of persons within households of the ten (10) selected communities reflects that majority of the households are nuclear families given by the size of these families. The findings uncovered that 439 households are comprised 4-6 family members usually the man, his wife and two to four children. This was followed by family size of 7-9 members which accounted for 198 responses; 1-3 persons who accounted for 191 responses; Lastly, family size of 10 persons and above which accounts for 100 responses. The Figure 4.11 below portrays the statistics of the household size.

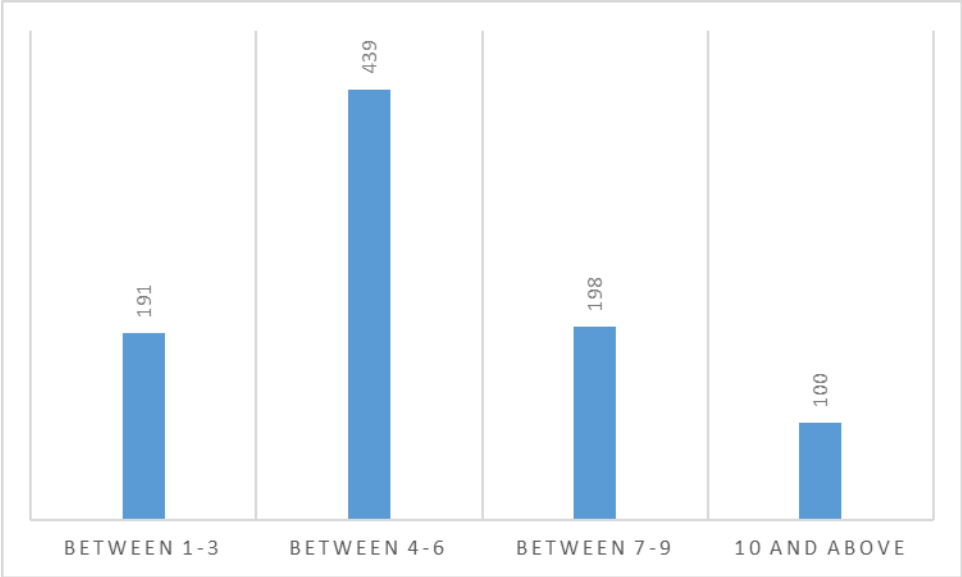

Figure 4.11: Household Size of Respondents
Source: (Field Survey, November 2021)

4.3.2.7 Educational Level

Being rural communities, the respondents do not place a lot of emphasis on education as the major occupation within these communities which is farming (see 0 below) does not require formal educational qualification. The most common educational accolade within the communities is the Senior School Certificate Examination (SSCE) and a Primary School Leaving Certificate.

Besides the listed options, 16 out of the 17 remaining respondents had acquired their NCE (Nigerian Certificate of Education) while the remaining 1 specified he had attained a "standard six "qualification. Table 4.19 elaborates the statistics of these responses for all the communities.

Table 4.19: Educational Level of Respondents within the Communities

	Esun-Ekiti	*Ipao-Ekiti*	*Oke-Ako*	*Itagbangba*	*Itapaji-Ekiti*	*Iyemero-Ekiti*	*Isan-Ekiti*	*Gede*	*Elemesho*	*Oloje-Ekiti*	**Total**
No Formal Education	21	74	96	5	53	13	83	9	13	10	**377**
SSCE and below	35	72	71	5	45	17	132	2	19	15	**413**
OND	7	34	5	4	3	6	15	1	2	4	**81**
HND/Bachelor's Degree	7	10	6	0	1	3	9	0	0	0	**36**
Others	1	7	1	0	0	0	6	0	2	0	**17**
Postgraduate	0	0	0	0	0	0	4	0	0	0	**4**

Source: (Field Survey, November 2021)

4.3.2.8 Employment Status

The findings from the analysed responses revealed that 72% of the household heads are self-employed. This is because the primary occupation within these communities is farming as discussed in Section 0. However, the employment status could be based on the individual perception of these respondents as 18% of the household heads who might be farmers believe they are unemployed because they don't work with the government. The remaining responses which make up 7% of the total responses comprises of employed individuals (4%), retired persons (3%), and students (3%) as presented in Figure 4.12.

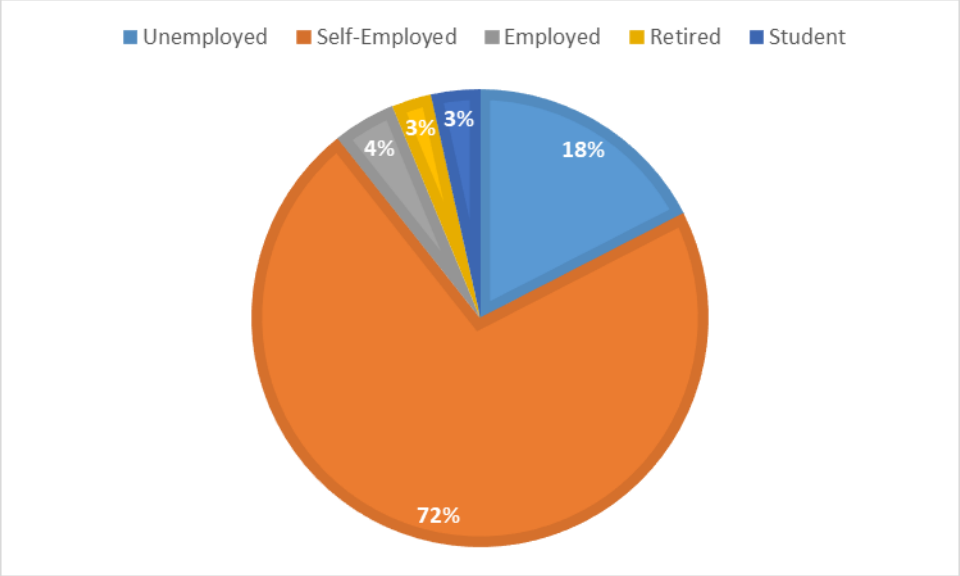

Figure 4.12: Employment Status within the 10 Communities.
Source: (Field Survey, November 2021)

4.3.2.9 Monthly Income

This question was asked to determine the financial strength of residents in these communities to gauge their capacity to pay for services. Data shows that 58% of the respondents (393) earn below ₦18,000 a month which is slightly above half of Nigeria's minimum wage of ₦30,000. This implies that they earn $43.3 a month ($1.4 a day), an indication of poverty. 37% of the respondents earn between N18,000 to ₦50,000 a month, while only 5% earn between ₦51,000 to ₦100,000 a month as presented in Figure 4.13.

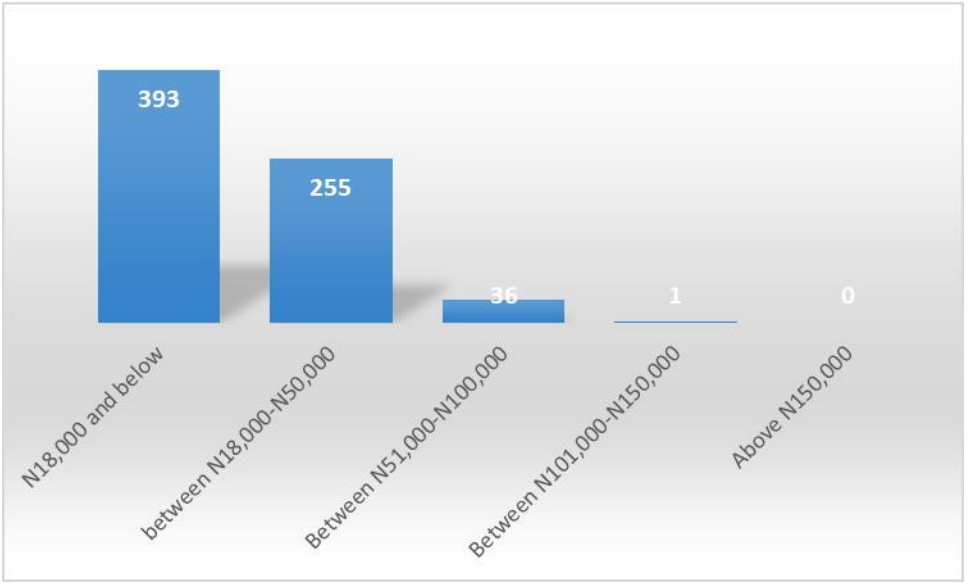

Figure 4.13: Monthly Income of the Respondents within the 10 Communities
Source: (Field Survey, November 2021)

4.3.2.10 Occupation

The survey uncovered that 54% of the household heads are farmers. As farmers must trade to earn profit from their produce, trading is also a major occupation of the household heads making up 25% of the respondents. Artisans makes up 11% of the of the total respondents while civil servant and professionals makes up 4% and 2% respectively. The occupation of the remaining 4% of the household heads was not captured; However, these specified occupations include students (9), and unemployed (6), tailoring (4), retired (3), Pastor (2), training/apprenticeship (2), writer (1), teacher (1), Mechanic (1), and dependent (1), Table 4.20 summarizes the statistics of occupation within these communities.

Table 4.20: Occupation of Household Heads

	Esun-Ekiti	*Ipao-Ekiti*	*Oke-Ako*	*Itagbangba*	*Itapaji-Ekiti*	*Iyemero-Ekiti*	*Isan-Ekiti*	*Gede*	*Elemesho*	*Oloje-Ekiti*	**Total**
Farmer	36	124	117	9	62	23	74	10	24	23	502
Trader	18	35	29	4	22	4	109	0	6	5	232
Artisan	5	14	21	1	13	7	38	2	5	1	107
Civil Servant	4	8	4	0	5	4	8	0	0	0	33
Professional	2	4	0	0	0	0	11	0	0	0	17
Others	6	12	8	0	0	1	9	0	1	0	37

Source: (Field Survey, November 2021)

4.3.2.11 Major Economic Activity within the Respondents' Area

Having confirmed the primary occupation of the household heads, this question aimed at re-affirming or confirming what was earlier stated in terms of occupation be assessing the economic activity beyond the one provided by the respondent. From the findings, the primary economic activity in each of the 10 communities is farming in which 83% of the household heads attested to. This was followed by trading which accounts for 12% of the responses. Other responses were civil service which had 2% of the responses while arts and craft, uncertain and others which had 1% each. This result tallies with the findings from section 0 above and validates the responses. Figure 4.14 presents this detail in a chart.

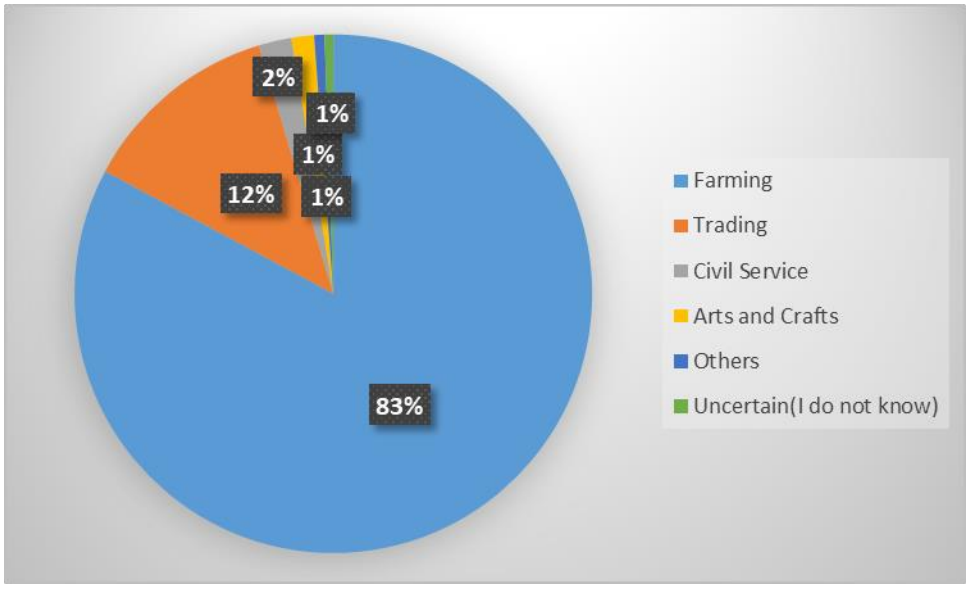

Figure 4.14: Economic Activities within the Area

Source: (Field Survey, November 2021)

4.3.2.12 Primary Mode of Transportation

The study uncovered that commercial motorcycle is the predominant means of transportation for most of the across the 10 communities as 47% of the responses stated that they utilise commercial motorcycle for their daily transport. This could be attributed to short distance trips within communities and narrow roads which are very common in rural communities. The second preferred option is the use of personal or private motorcycles which accounts for 25% of the responses. 17% of the household heads claim they journey around on foot as they mostly do not go too far unless when necessary. 7% of the respondents makes use of commercial vehicles, while private vehicle owners and bicycle owners account for 3% and 1% respectively. Table 4.21 elaborates this finding into communal level.

Table 4.21: Primary Mode of Transportation

	Esun-Ekiti	*Ipao-Ekiti*	*Oke-Ako*	*Itagbangba*	*Itapaji-Ekiti*	*Iyemero-Ekiti*	*Isan-Ekiti*	*Gede*	*Elemesho*	*Oloje-Ekiti*
Commercial Motorcycle or Tricycle	19	92	56	5	44	9	170	6	27	22
Private Motorcycle or Tricycle	16	86	43	2	10	15	53	3	6	5
Foot	19	21	48	6	45	9	7	3	1	2
Commercial Vehicle	13	13	23	0	0	3	7	0	2	0
Private Vehicle	4	5	7	0	0	2	12	0	0	0
Bicycle	0	2	2	1	3	1	0	0	0	0

Source: (Field Survey, November 2021)

4.3.2.13 Years of Residence

The deduction from the survey reveals that most of the household heads were born within their respective communities and have since been living there till date. The results show that 482 of the household heads across the 10 communities have lived in their communities for longer than 20 years. 188 of the household heads have lived within their communities between 16 to 20 years. 115 household heads indicated that they have lived 11 to 15 years within their communities. 82 of the respondents have lived between 6 to 10 years and 61 of the household heads which is the smallest frequency have spent within 0 to 5 years within their neighbourhood. This statistic reveals that most of the household heads must have been indigenes of their respective communities having been domiciled in the communities for a very long time. Table 4.22 presents the elaborate details of these figures at communal level.

Table 4.22: Years of Residence

Years	*Esun-Ekiti*	*Ipao-Ekiti*	*Oke-Ako*	*Itagbangba*	*Itapaji-Ekiti*	*Iyemero-Ekiti*	*Isan-Ekiti*	*Gede*	*Elemesho*	*Oloje-Ekiti*	*Total*
0 - 5	14	12	7	1	7	2	13	3	2	0	**61**
6 - 10	14	15	4	4	2	3	35	3	2	0	**82**
11 - 15	9	28	9	2	21	8	32	1	4	1	**115**
16 - 20	8	39	31	3	15	5	71	4	3	9	**188**
Over 20	26	103	128	4	57	21	98	1	25	19	**482**

Source: (Field Survey, November 2021)

4.3.3 Health, Educational, and Recreational Facilities

4.3.3.1 Availability of Health Facilities

From the analysed responses, it was uncovered that clinics and drug stores were the most common health facilities known to the household heads. Clinics ranks first as being the most common health facility with 410 mentions, followed by chemist and drug store which had 354 mentions and hospital which has 164 mentions. Only 50 of the household heads do not have any idea about the existence of any health facility (Figure 4.15). This reveals that most of the communities are serviced with health facilities. However, hospitals appear to be limited in supply as it was rarely mentioned and even if present, it appears to be very distant.

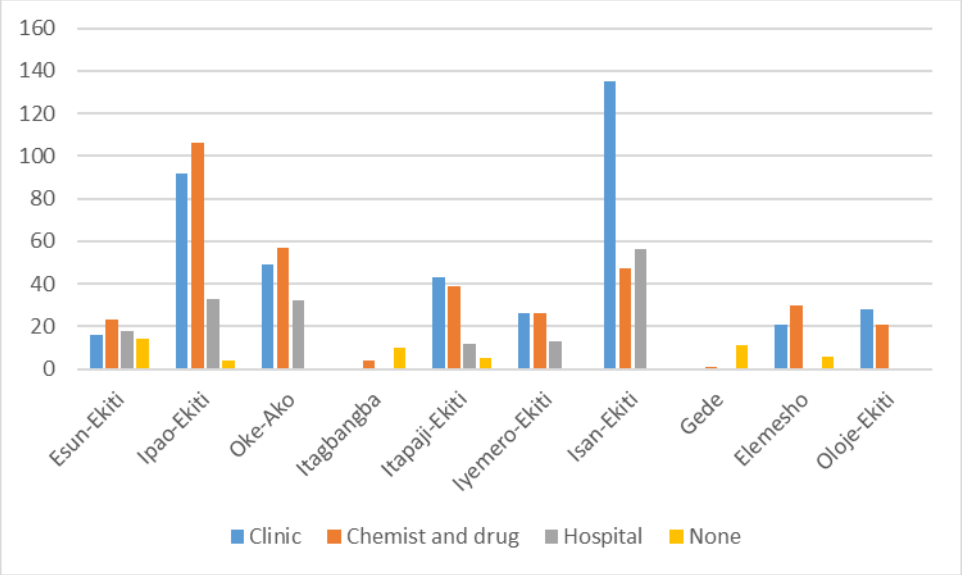

Figure 4.15: Known Health Facilities Present within Communities

Source: (Field Survey, November 2021)

4.3.3.2 Walking Distance to the Nearest Health Facility

Accessibility to health facilities shows that it is present in the given community and the time taken to get to the facility reflects proximity and shows that it is adequately located. From the survey, it was uncovered that, across the 10 communities, 37% of the household heads specified that they access health facilities within 5-10 minutes of walking. 26% of the household heads spend less than 5 minutes to access available health facilities by walking. 24% spend between 10 to 15 minutes to access health facilities. Only 13% of the total household heads spend greater than 15 minutes to access these health facilities. Hence the available health facilities are assumed to be adequately located as 63% of the respondents access them by walking about 10 minutes and for the fact that these communities bare span above 1 kilometer in radius. However, the case is different with Gede Community in which most of the household heads spend longer walking time to access these health facilities.

Table 4.23: Walking Distance to the Nearest Health Facilities within Communities

	Esun-Ekiti	*Ipao-Ekiti*	*Oke-Ako*	*Itagbangba*	*Itapaji-Ekiti*	*Iyemero-Ekiti*	*Isan-Ekiti*	*Gede*	*Elemesho*	*Oloje-Ekiti*
Less than 5 minutes' walk (500m)	26	72	16	6	41	7	57	3	13	5
5-10 minutes (1km)	22	80	62	1	29	11	109	1	9	15
11-15 minutes' walk	8	29	77	1	24	16	53	0	12	3
16-30 minutes' walk	5	11	24	1	5	2	21	1	2	6
more than 30 minutes' walk	10	5	0	5	3	3	9	7	0	0

Source: (Field Survey, November 2021)

4.3.3.3 Prevalent Sickness Within the Communities

This question aimed at understanding the common sickness peculiar to these communities for better understanding, preparation, and prevention for SAPZ workers. The survey revealed that malaria (63%) and typhoid (28%) are the most prevalent sickness across the 10 communities. Other sicknesses which include cholera, diarrhoea, and fever had very rare occurrences and made up only 9% of the total responses. The prevalence of malaria across these communities could be attributed to the vegetal nature of the of the area, which can harbour mosquitoes. Figure 4.16 shows the result of this survey in detail with frequency.

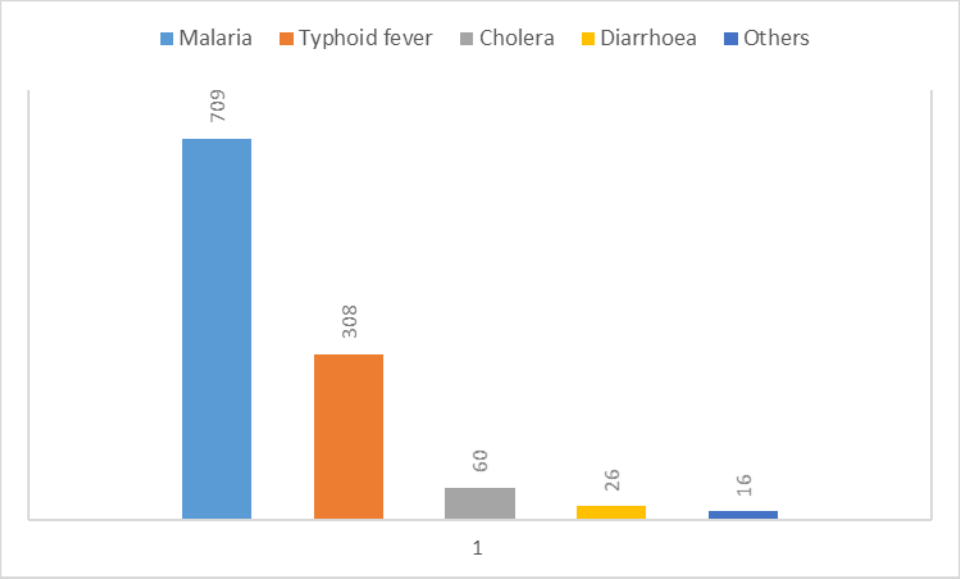

Figure 4.16: Prevalent Sicknesses across the 10 Communities

Source: (Field Survey, November 2021)

4.3.3.4 Educational Facilities Present

From Section 0, it was established that a very good fraction of the household heads had no formal education, likely influenced by the availability of educational facilities (other factors like affordability, culture, etc. are acknowledged). The result confirmed the availability of these educational facilities within most of the communities. It further revealed that primary schools and secondary schools were the most common educational facilities as they are present in almost all the communities except Gede. It was observed that very often the primary and secondary schools are usually accommodated within the same space explaining their similar frequency. The study also revealed that only Isan-Ekiti had the presence of a tertiary institution which is the College of Agriculture and Technology, Isan-Ekiti. The survey findings are presented in detail in Table 4.24.

Table 4.24: Availability of Educational Facilities by Community

	Esun-Ekiti	*Ipao-Ekiti*	*Oke-Ako*	*Itagbangba*	*Itapaji-Ekiti*	*Iyemero-Ekiti*	*Isan-Ekiti*	*Gede*	*Elemesho*	*Oloje-Ekiti*
None	1	0	0	1	0	0	0	0	0	0
Primary School	64	197	179	13	65	39	249	4	36	29
Secondary School	58	197	179	1	59	39	249	0	21	19
Higher Institution	1	0	0	0	0	0	249	0	0	0

Source: (Field Survey, November 2021)

4.3.3.5 Walking Distance to the Nearest Educational Facility

The question aimed to determine how accessible the available educational facilities are. From the findings, both the primary and secondary schools are easily accessible by foot as 83% of the total household heads access these facilities within 15 minutes walking time. This reflects the proximity of educational facilities to place of residence and shows how adequately located these facilities are. However, Gede is the only community where educational facilities are not easily accessible as 8 out of the 11 household heads spend longer than 30 minutes walking to access educational facilities. The details in walking time are presented in the Figure 4.17.

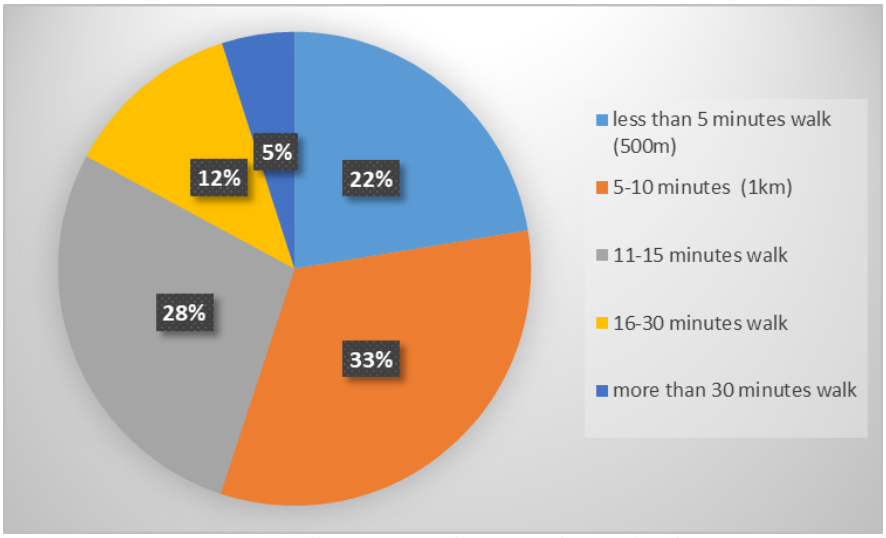

Figure 4.17: Walking Distance to the Nearest Educational Facility
Source: (Field Survey, November 2021)

4.3.3.6 Recreational Facilities Present

Recreational activities are aided by the availability of its facilities. With regards to these, the available and common recreational facilities are football fields with the frequency of 478 which are provided within schools or large open areas. Playgrounds (open areas for recreation not large enough for a football field) are also very common within these communities with a frequency of 433, found within school premises. Parks were notably mentioned by Household heads in Isan-Ekiti with the frequency of 45 out of 54; while other perceived recreational facilities had local names such as “ifetedo” and “Ayo-Opolon”, they had the frequency of 43. The detailed result showing the cumulative frequency of is presented in Table 4.25

Table 4.25: Available Recreational Facilities within Communities

	Esun-Ekiti	*Ipao-Ekiti*	*Oke-Ako*	*Itagbangba*	*Itapaji-Ekiti*	*Iyemero-Ekiti*	*Isan-Ekiti*	*Gede*	*Elemesho*	*Oloje-Ekiti*	*Total*
Park	2	6	0	0	0	1	45	0	0	0	**54**
Playground	29	101	48	4	36	28	131	5	36	15	**433**
Football Ffield	53	58	139	8	57	23	73	2	36	29	**478**
Others	6	13	6	4	9	0	0	5	0	0	**43**

Source: (Field Survey, November 2021)

4.3.3.7 Walking Distance to the Nearest Recreational Facility

For the fact that these recreational facilities are located within or around educational facilities, the walking distances are similar to those of the educational facilities (see Figure 4.17). Figure 4.18 presents the walking distance to these recreational facilities at communal level.

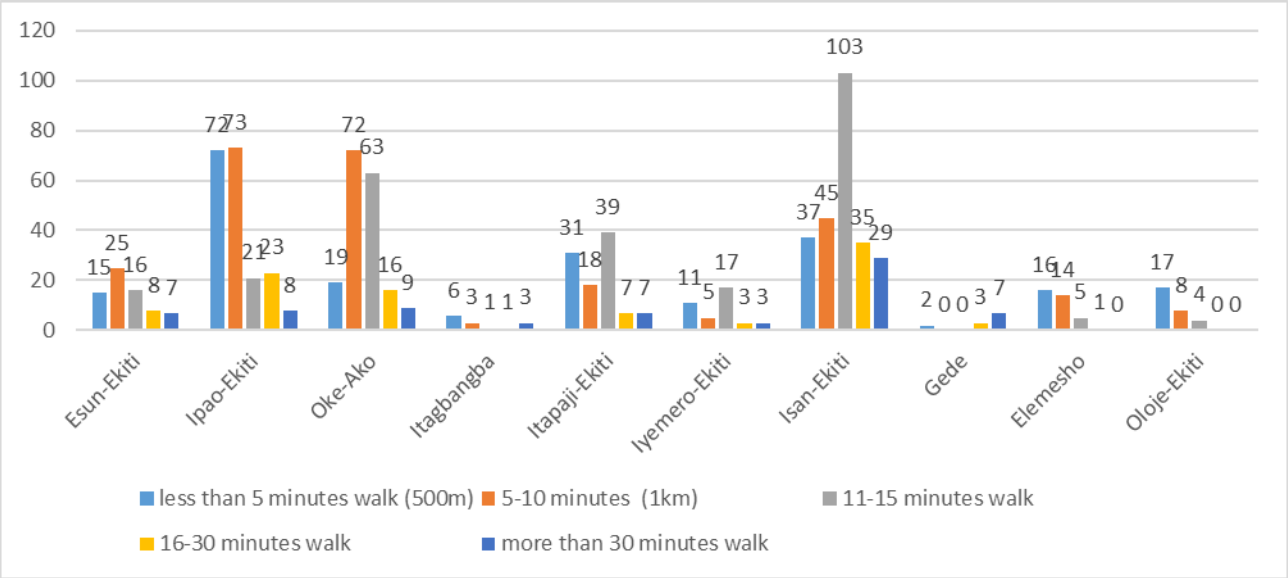

Figure 4.18: Walking Distance to Recreational Facilities within Communities

Source: (Field Survey, November 2021)

4.3.3.8 Participation in Recreational Activities

The survey uncovered a very low participation in recreational activities that on the part of the household heads. This could be attributed to their age group (see Section 4.3.2.2). Hence, low participation in active recreation would be anticipated. Figure 4.19 shows the percentage of the respondents' level of participation in active recreation.

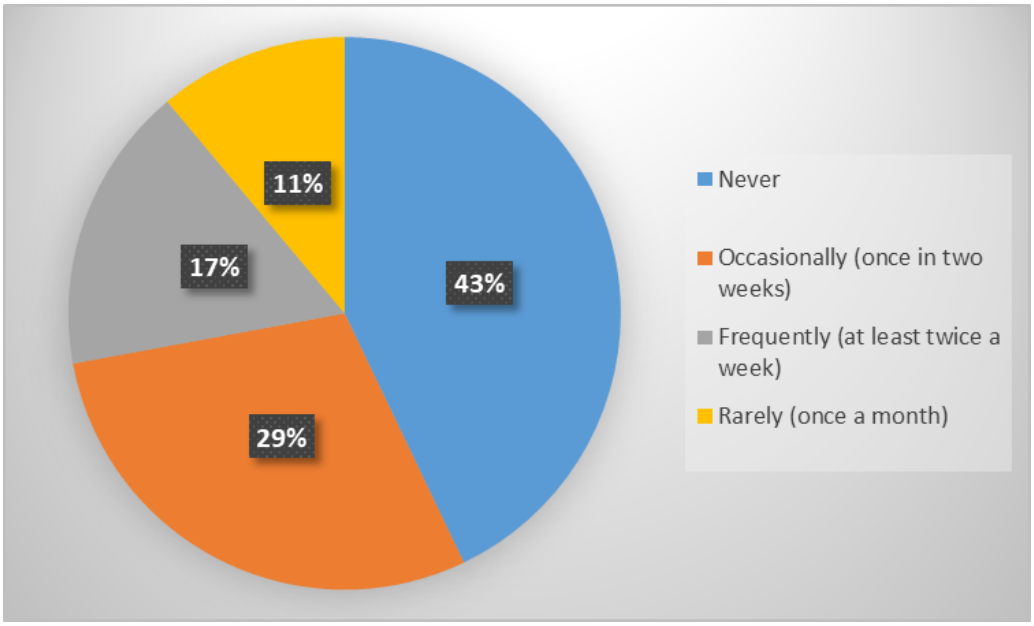

Figure 4.19: Participation in Active Recreation across the 10 Communities

Source: (Field Survey, November 2021)

4.3.4 Sanitation and Waste Management

4.3.4.1 Availability of Waste Bins

The availability of the waste bins could be used as an indicator to measure household sanitation. The survey finding shows that 61% of the household heads do not own waste bins in their houses, implying that waste is not collected and properly disposed or disposed indiscriminately within the immediate environment. Only 39% of the household heads indicated that they have waste bins in their homes as shown in Figure 4.20.

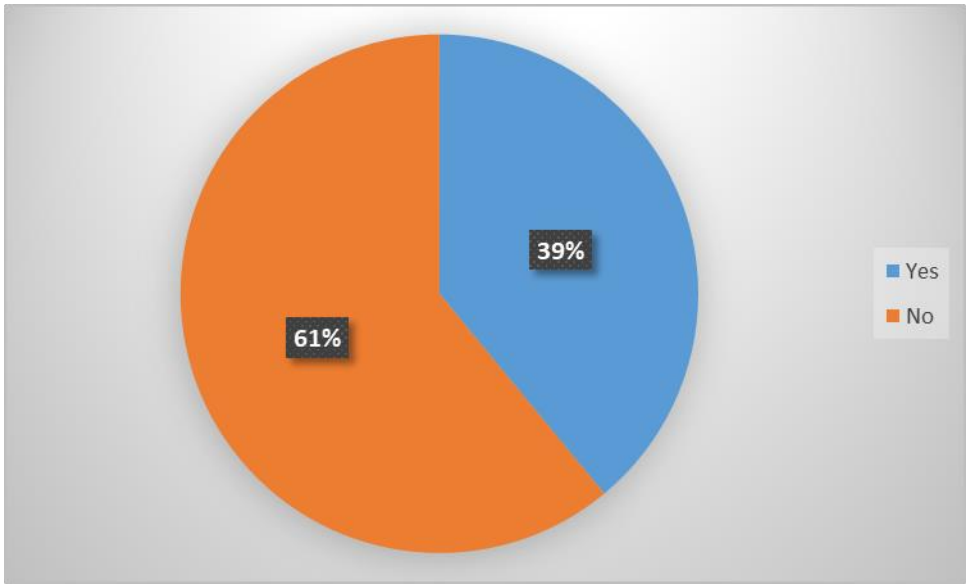

Figure 4.20: Waste Bin Ownership
Source: (Field Survey, November 2021)

4.3.4.2 Major Composition of Household Waste

The survey uncovered that kitchen waste (food waste) are the is the primary composition of waste across the 10 communities, they account for 60% of the responses; packages and wraps makes up 34% of the responses; while papers and plastics accounts for 1% and 2% respectively. Other waste composition which constitutes the remaining 3% comprises of all the aforementioned waste together. Figure 4.21 shows the composition of household waste based on a communal level.

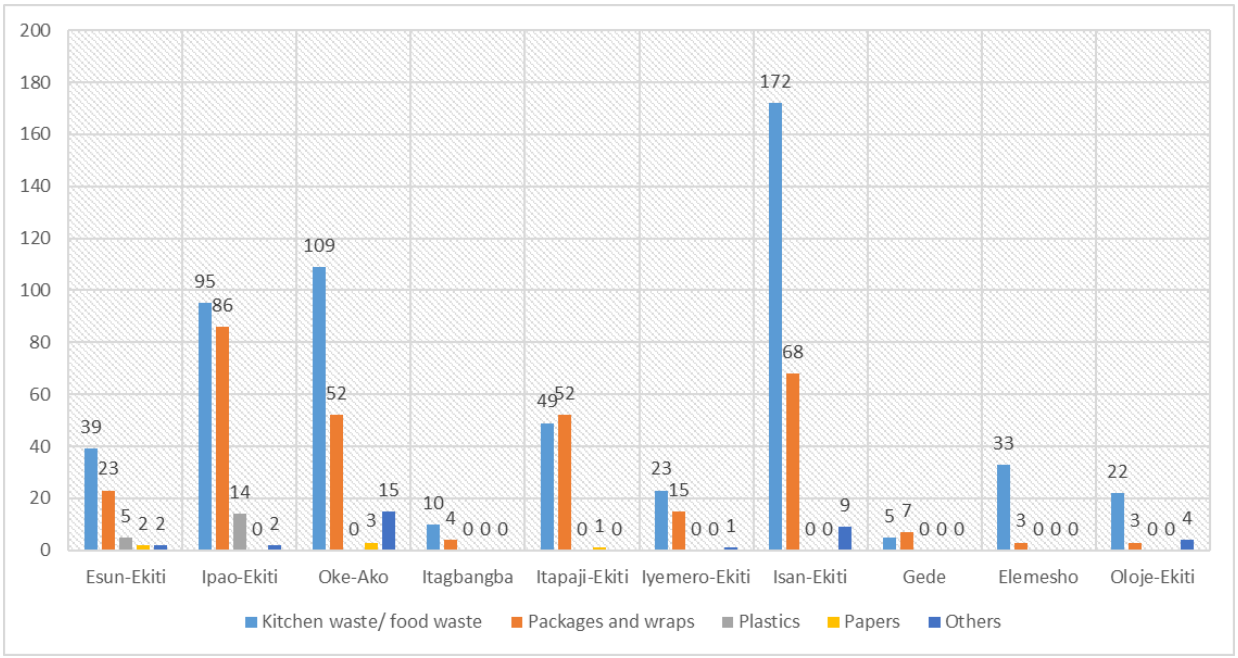

Figure 4.21: Composition of household waste
Source: (Field Survey, November 2021)

4.3.4.3 Waste Separation from Source

The practice of waste separation is recommended for urban settlements where the generated waste is dynamic in composition. Rural communities on the other hand mostly generate organic waste (mostly food waste as shown in 0); therefore, the need for separation might not be too necessary. However, 15% of the household heads (185) admitted to separating their waste before disposal. This is shown in Figure 4.22.

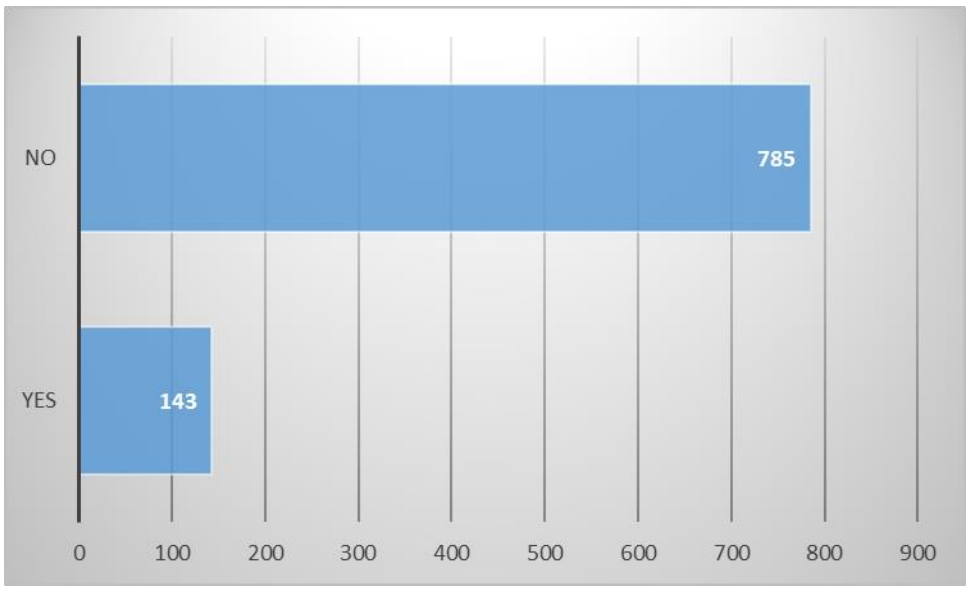

Figure 4.22: Waste Separation from Source
Source: (Field Survey, November 2021)

4.3.4.4 Waste Recycling

The result of this revealed that across the 10 communities, only 16 out of the 928 household heads carry out recycling. Given that most of the household heads indicated that the major composition of their waste to be kitchen waste (as indicated in 0) which can barely be recycled, it was anticipated that recycling across these communities if existent will be very low. Unlike the urban centres where items and foods are processed and come in cans and bottles, these communities are rural and barely deal with processed items reducing need and practice of recycling. In addition to this, the knowledge of the benefit of recycling will be low given the low level of education and exposure reflected in the frequency of heading 0.

4.3.4.5 Method of Waste disposal

From the survey finding, it was uncovered that 69% of the household heads admitted to disposing their waste at dump sites which could be any agreed open space within the community. This disposal practice is very common in all the communities. 18% of the household heads admitted to burning their waste in pits, 8% of the household heads dump their waste besides access roads while 1% of the respondents stated that they bury their waste. The remaining 4% use other method of disposal which includes dumping in the bush or behind the house as presented in in Table 4.26.

Table 4.26: Method of Waste Disposal within Communities

Options	*Esun-Ekiti*	*Ipao-Ekiti*	*Oke-Ako*	*Itagbangba*	*Itapaji-Ekiti*	*Iyemero-Ekiti*	*Isan-Ekiti*	*Gede*	*Elemesho*	*Oloje-Ekiti*
Dumping Site	42	117	121	7	79	30	192	10	33	14
Pit for burning	23	38	29	7	14	7	39	2	2	4
Dumping by roadside	3	25	23	1	0	1	11	0	1	6
Burying	0	0	0	0	0	1	7	0	0	0
Others	3	17	6	3	9	0	0	0	0	5

Source: (Field Survey, November 2021)

4.3.4.6 Waste Disposal Frequency

The frequency of waste disposal can also reflect the frequency of waste generation. It was uncovered from the survey that 67% (618) of the household dispose their waste every day. This could be attributed to the fact that majority of the household heads do not own waste bins (as seen in 4.3.4), therefore waste is not temporally stored. Furthermore, it was discovered that 21% (196) of the household heads indicated that they dispose waste twice a week while 11% (100) dispose once a week. Indiscriminate disposal of such waste could affect the sanitation and might result in the prevalence of sanitation diseases such as cholera which have already been experienced (see 4.3.3.3). The result of this is graphically presented in Figure 4.23.

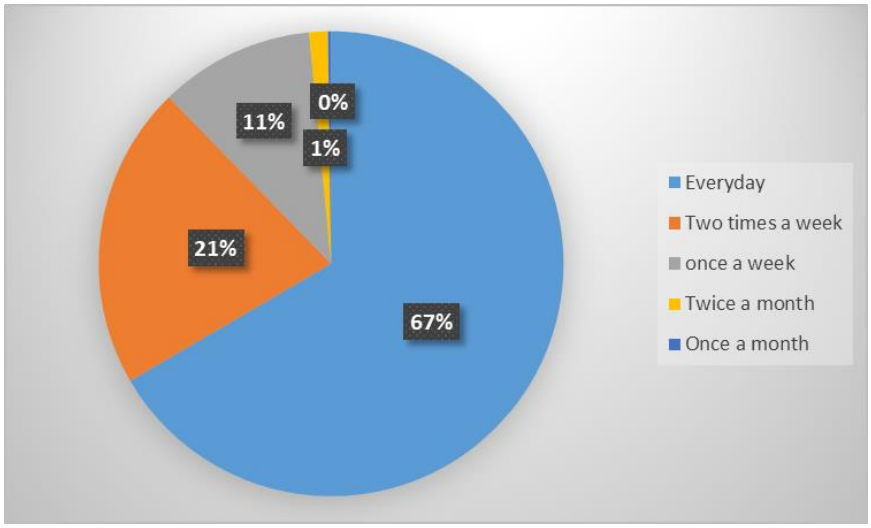

Figure 4.23: Frequency of Waste Disposal within the 10 Communities

Source: (Field Survey, November 2021)

4.3.4.7 Distance to Point of Waste Disposal

The distance to the point of waste disposal helps to analyse how close dumpsites are to the immediate environment and can also inform relevant authorities on how far people are willing to go to dispose their waste. The result of the survey revealed that 36% of the households dispose their waste within 50 meters of their homes, while 33% dispose their waste within 50 to 100 meters from their homes. 11% of households to dispose between 100m to 150m of their homes while 11% dispose at locations over 150 meters (Table 4.27). However, only 9% of the total household heads indicated that they dispose their waste in the front of their residence to burn them later. It could be deduced from this finding that a moderate distance is preferable for waste disposal.

Table 4.27: Distance to Point of Waste Disposal

	Esun-Ekiti	*Ipao-Ekiti*	*Oke-Ako*	*Itagbangba*	*Itapaji-Ekiti*	*Iyemero-Ekiti*	*Isan-Ekiti*	*Gede*	*Elemesho*	*Oloje-Ekiti*
In front of residence	8	12	15	2	12	6	26	4	4	1
0 to 50 metres	32	76	95	6	28	4	63	2	21	13
51 to 100 metres	17	89	35	4	41	9	95	2	8	15
101 to 150 metres	5	11	24	0	16	5	36	2	3	0
151 to 200 metres	5	5	10	2	3	7	29	0	0	0
Above 200 metres	4	4	0	0	2	8	23	2	0	0

Source: (Field Survey, November 2021)

4.3.4.8 Willingness to Pay for Waste Disposal

In order to understand communal perception on waste disposal services and the level of acceptance, this question was asked to all the households across the 10 communities. It was discovered that only about a quarter of the total population were willing to pay for waste disposal services while the majority weren't willing as shown in Figure 4.24.. This is likely due to their income levels in the dace of other pressing household needs.

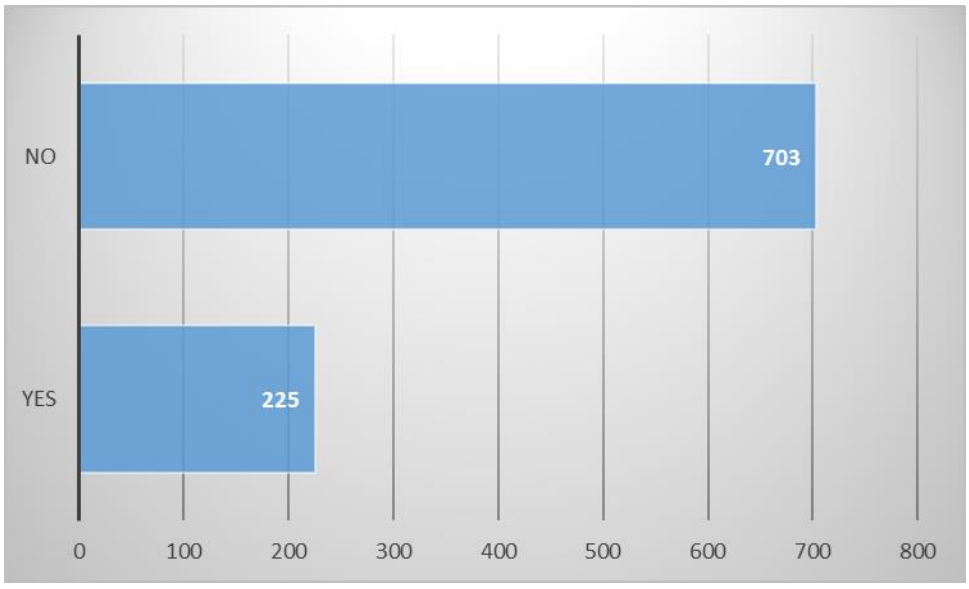

Figure 4.24: Willingness to Pay for Waste Disposal Services

Source: (Field Survey, November 2021)

4.3.4.9 Disposable Amount for Waste Disposal

The 225 respondents who stated their willingness to pay for waste disposal were further asked to specify the amount they will be willing to pay for this service. 50 persons agreed that they can afford to pay N200 weekly while 45 stated that they can afford N50 weekly (see Figure 4.25). Because of the wide margin in suggestion, it may be difficult to peg a widely acceptable price.

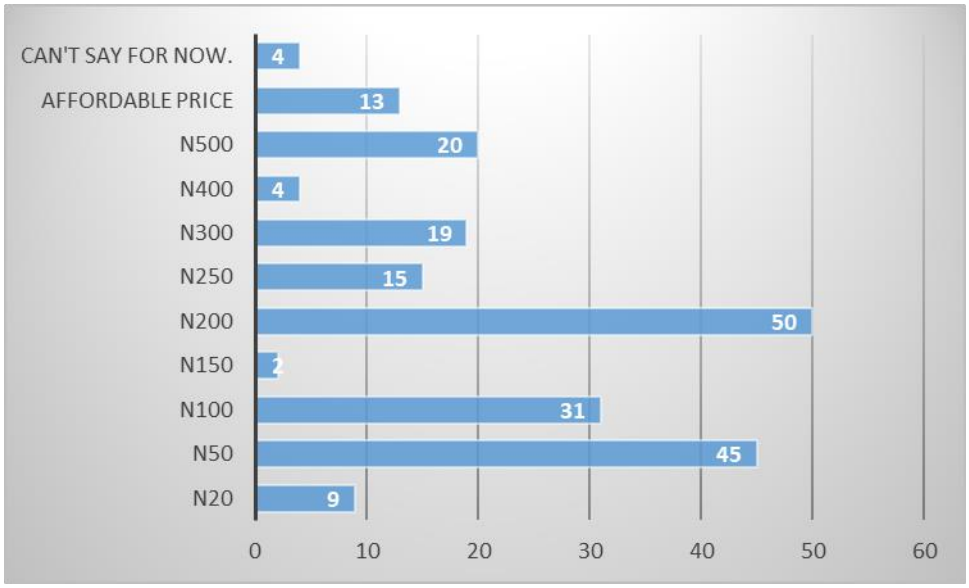

Figure 4.25: Suggested Payment for Waste Disposal
Source: (Field Survey, November 2021)

4.3.4.10 Toilet Type

Toilet type could be linked to personal hygiene or can serve as an indicator to measure personal hygiene. The study uncovered that across the 10 communities, 53% of the total households engage in open defaecation as they do not have toilets. Furthermore, 30% of the total households make use of pit-latrines while the remaining 17% of the households are fitted with water closet toilet systems which is the most hygienic of all the options. Engagement in open defaecation exposes women to gender-based violence (Saleem, Burdett, & Heaslip, 2019), is the leading cause of death among under-five children in Nigeria (Adanikin, 2021), and exposes people to snake or insect bites. The percentage is further displayed in Figure 4.26.

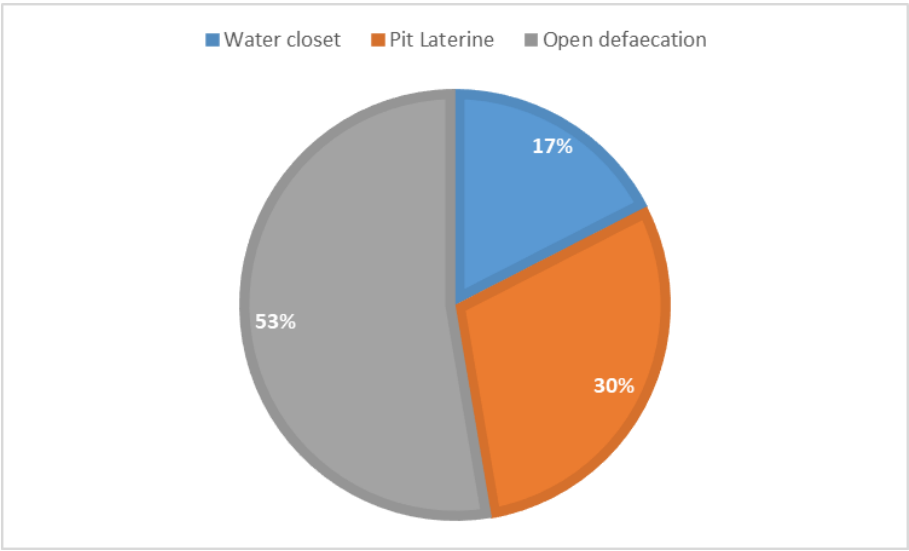

Figure 4.26: Toilet Type in the Community
Source: (Field Survey, November 2021)

4.3.5 Water and Energy Supply

4.3.5.1 Source of Water

Rural communities are known to harvest water for domestic use from natural/primary sources such as well, rainfall, stream/river, creeks, and water runoffs (Obeta, 2018). Based on the collated data, it was uncovered that wells are the primary source of water for 68% of households across the 10 communities. 23% of the households source their water from boreholes and 8% of the households rely on stream/river for their domestic water. Only 1% of the households (all in Ipao-Community) use pipe-borne water. Figure 4.27 shows the statistics of the most utilised source of water by all interviewed households.

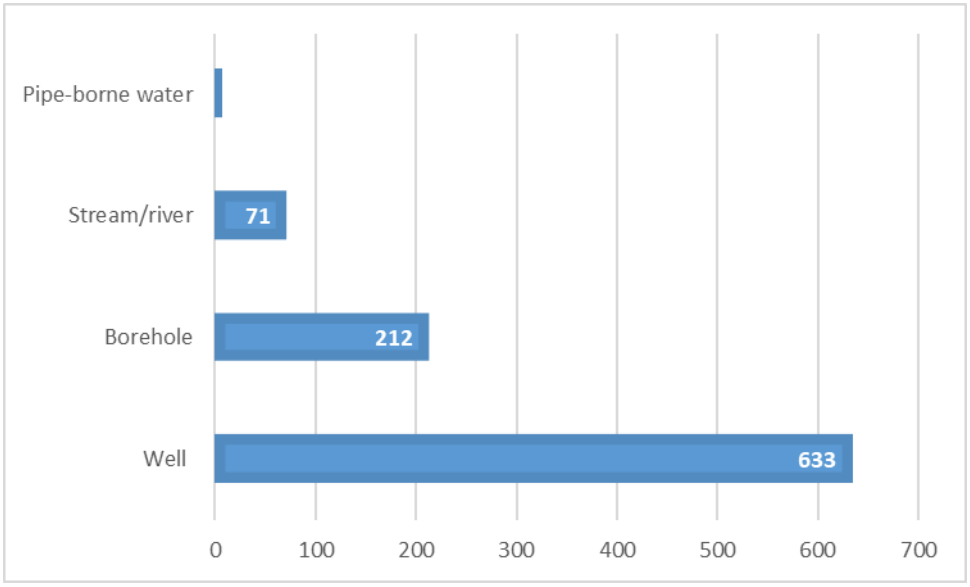

Figure 4.27: Primary Source of Water
Source: (Field Survey, November 2021)

4.3.5.2 Water Treatment

Given that the water for domestic use is being sourced mainly from wells, it is advised that the water is treated as it could be contaminated from direct exposure to unwanted/harmful substances. However, 85% of the households do not purify their water before use, leaving them prone to water borne diseases like typhoid and cholera which is common disease across these communities as shown in Section 0. Figure 4.28 portrays this finding in a graphically in a pie-chart.

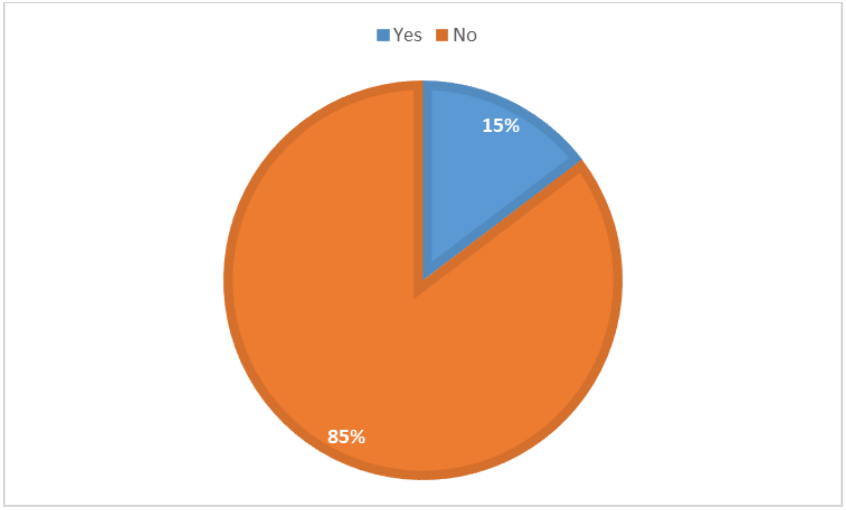

Figure 4.28: Water Treatment Before Use.
Source: (Field Survey, November 2021)

4.3.5.3 Method of Water Treatment

Among the 15% of households who treat their water, 48% of the households purify their water with the use of alum which is the most common method of water purification/treatment across all communities. 29% of the household purify their water by boiling, 5% use the art of sieving, while the remaining 18% of the households use other methods mainly comprised of the use of chlorine, water guide, and borehole treatment. (Figure 4.29).

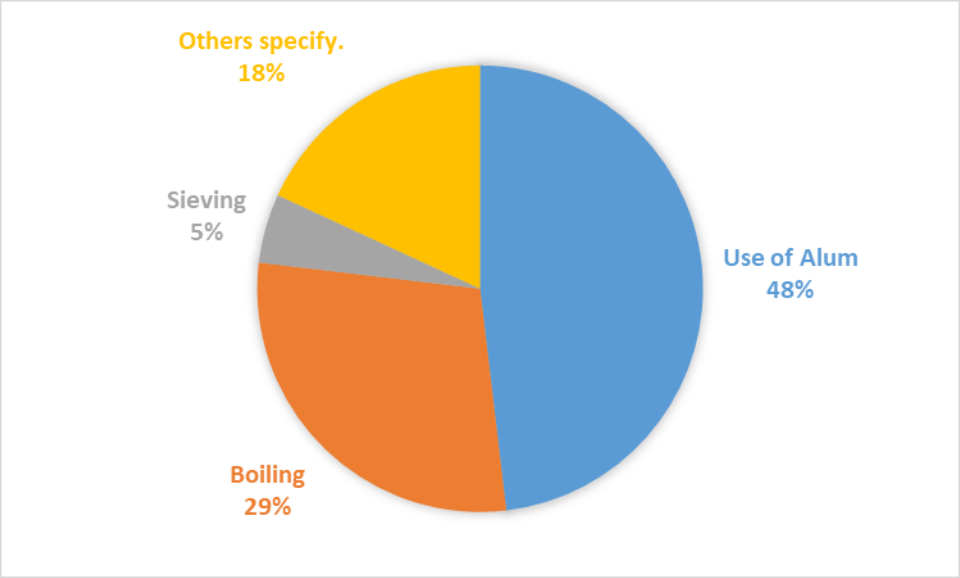

Figure 4.29: Water Purification Methods

Source: (Field Survey, November 2021)

4.3.5.4 Water Borne Diseases Suffered within the Last One Year

While 63% of the households have not experienced any water borne diseases within the past one year, 28% of the household however stated that within the past one year, they have suffered from "typhoid" which has the highest frequency of occurrence across all the communities and was notably mentioned in 0. Additionally, 5% of the households stated that they have suffered from cholera. 2% have suffered from hepatitis while scabies and Amebiasis had 1% respectively. Table 4.28 elaborates the result of the survey as regards to this question.

Table 4.28: Water Borne Diseases Experienced in the Past One Year

	Esun-Ekiti	*Ipao-Ekiti*	*Oke-Ako*	*Itagbangba*	*Itapaji-Ekiti*	*Iyemero-Ekiti*	*Isan-Ekiti*	*Gede*	*Elemesho*	*Oloje-Ekiti*
Typhoid	16	89	42	7	8	12	44	5	11	9
Cholera	8	14	0	3	8	1	11	0	0	0
Hepatitis	4	15	0	0	2	0	0	0	0	0
Scabies	1	9	0	0	0	0	0	0	0	0
Amebiasis	0	6	0	1	0	0	0	0	0	0
None	48	73	137	6	20	27	194	7	25	20

Source: (Field Survey, November 2021)

4.3.5.5 Major Source of Power

Electrical could be used as an indicator to measure satisfaction, comfort and economic development of residents of a given place. With regards to this, it was uncovered in the survey that these communities are barely serviced with the primary source of electricity which comes from the national grid. As a result, 50% of the household have to depend on secondary sources for their electricity, while 41% use non-electrical mediums for lighting, this goes to show that most of these communities are barely served with electrical supply. However only 9% of the households which fall within Esun-Ekiti, Isan-Ekiti and Ipao-Ekiti are serviced from the primary electricity source. Table 4.29 below presents this data.

Table 4.29: Major Source of Power

	Esun-Ekiti	*Ipao-Ekiti*	*Oke-Ako*	*Itagbangba*	*Itapaji-Ekiti*	*Iyemero-Ekiti*	*Isan-Ekiti*	*Gede*	*Elemesho*	*Oloje-Ekiti*
Generator	38	119	82	5	48	27	97	6	13	5
Local*	25	77	78	9	72	27	120	7	18	29
Solar	26	25	19	4	6	5	33	2	5	2
PHCN	37	12	0	0	2	0	49	0	0	0
*Local sources include lanterns and candles.										

Source: (Field Survey, November 2021)

4.3.5.6 Source of Domestic Energy for Cooking

Cooking is a daily activity and thus have high energy demand for its processes. Rural settlements are known to rely on natural sources of energy such as fuel wood and charcoal for cooking (Rahut, Akhter, Khondoker, & Jeetendra, 2019). The survey revealed 79% of communal household depend on firewood for their daily cooking, this is supported with the fact that firewood is an available resource within communities, and it is also the most preferred option for poor households as reflected in 4.3.2.9 of this chapter. The survey also uncovered that 16% of all the households make use of gas for their domestic cooking, while 5% of the total depend on kerosene stoves. For the fact that primary electricity is barely given the option of electric cooker was totally ruled out by the households. Figure 4.30 below summarizes the results in a chart.

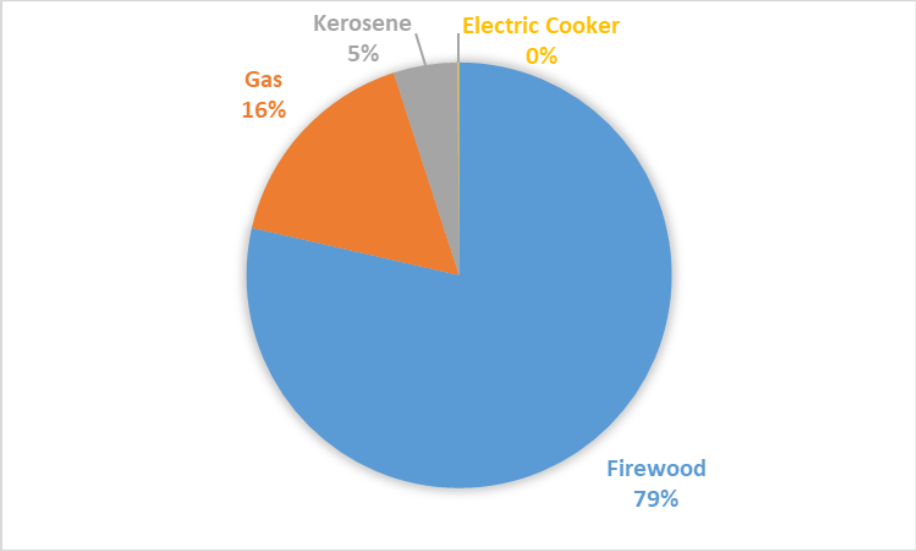

Figure 4.30: Source of Energy for Domestic Cooking

Source: (Field Survey, November 2021)

4.3.6 Environmental Challenges

4.3.6.1 Experience of Environmental Challenges within the Last 5 Years

Every environment is faced with peculiar challenges that emanate from natural or manmade causes. This question was asked to identify environmental challenges experienced by the households in the last five years. 76% of the respondents specified that they have faced no major environmental challenge while 24% of the household had contrary opinion and specified some environmental challenges present as shown in Table 4.30.

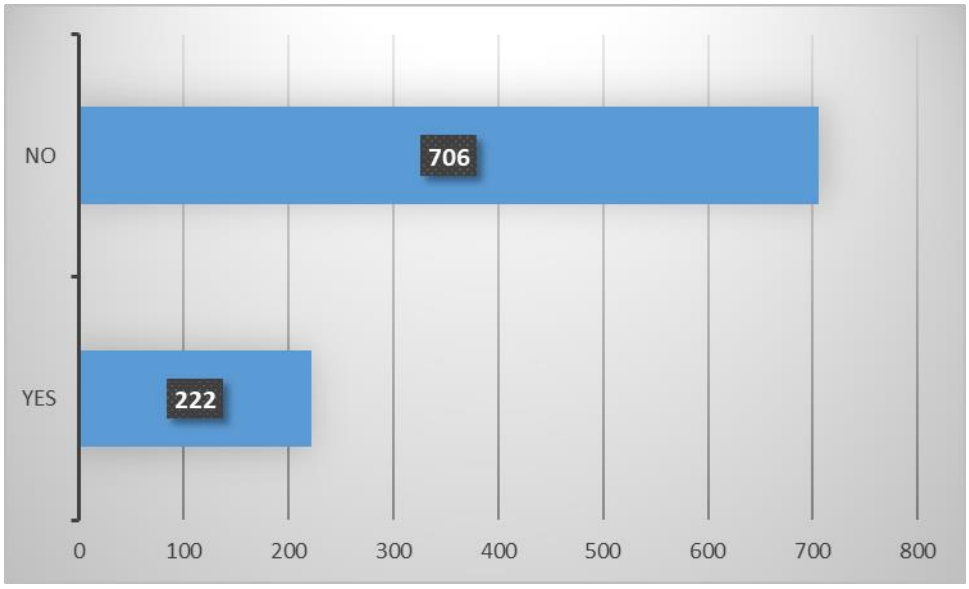

Figure 4.31: Environmental Challenges Experienced in the Past 5 Years

Source: (Field Survey, November 2021)

4.3.6.2 Specific Environmental Challenges Faced

Based on the survey findings, erosion was the most specified environmental challenge across the 10 communities, followed by flooding, and drought. Other respondents further specified that wind hazard was a common threat to their immediate environment. These major environmental challenges (erosion and flood) are factors of heavy rainfall which is very common with Southern-Nigeria.

Table 4.30: Specified Environmental Challenges Faced within the Past Five years

	Esun-Ekiti	*Ipao-Ekiti*	*Oke-Ako*	*Itagbangba*	*Itapaji-Ekiti*	*Iyemero-Ekiti*	*Isan-Ekiti*	*Gede*	*Elemesho*	*Oloje-Ekiti*
Erosion	6	21	15	5	21	0	16	0	4	2
Flooding	3	18	12	2	6	5	5	2	3	0
Drought	5	14	5	1	6	1	0	0	0	0
Others	2	6	4	1	4	0	0	0	3	4

Source: (Field Survey, November 2021)

4.3.7 Level of Awareness and Anticipation

4.3.7.1 Awareness about the SAPZ

At the time of the survey, it was uncovered that majority of the household are unaware of the proposed SAPZ project. Hence the survey was also a medium for creating awareness which was further amplified during the community consultations (see Section 4.4). From the findings, 89% of the surveyed households know nothing about the SAPZ project and were only informed by the presence of the survey enumerators in that regard. Only 11% of the respondents indicated that they knew little about the proposed SAPZ project and 5 persons out of the entire 928 households had sufficient knowledge about the proposed SAPZ project (Figure 4.32).

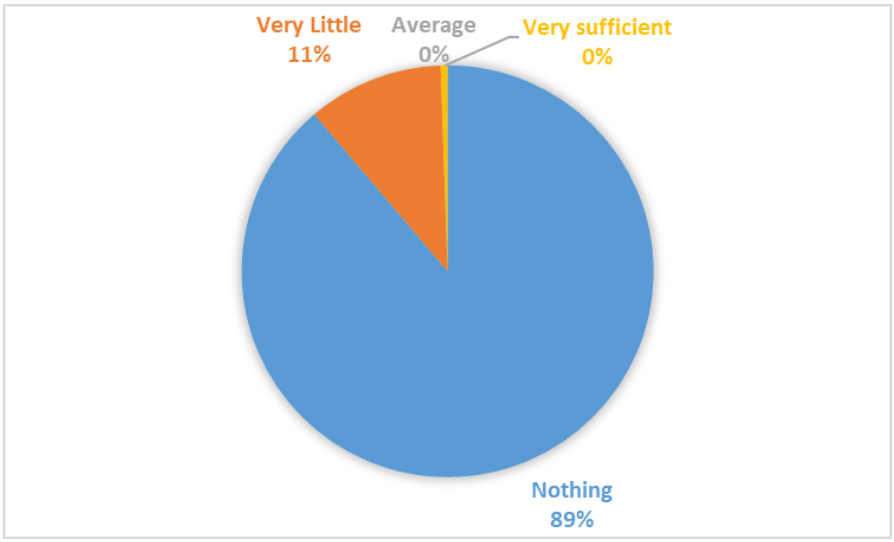

Figure 4.32: Level of SAPZ Awareness
Source: (Field Survey, November 2021)

4.3.7.2 Relationship with Existing Agro-Investors within the Communities

During the reconnaissance survey, some agro-allied industries were discovered such as Promise Point Cassava Factory and FMS Factory. Therefore, the questions were asked to gauge the relationship with existing agro-allied companies and also understand how the communities relate these natures of agro-allied companies. From the survey findings, it was uncovered that most of the communities have a positive relationship with these agro-allied companies as 50% of the respondents indicated that they have a good relationship, 11% percent specified that the relationship was very good, while 39% indicated that the relationship with these agro-allied companies was fair (moderate). Only an insignificant few indicated that they have a hostile relationship within agro-allied companies as presented Figure 4.33.

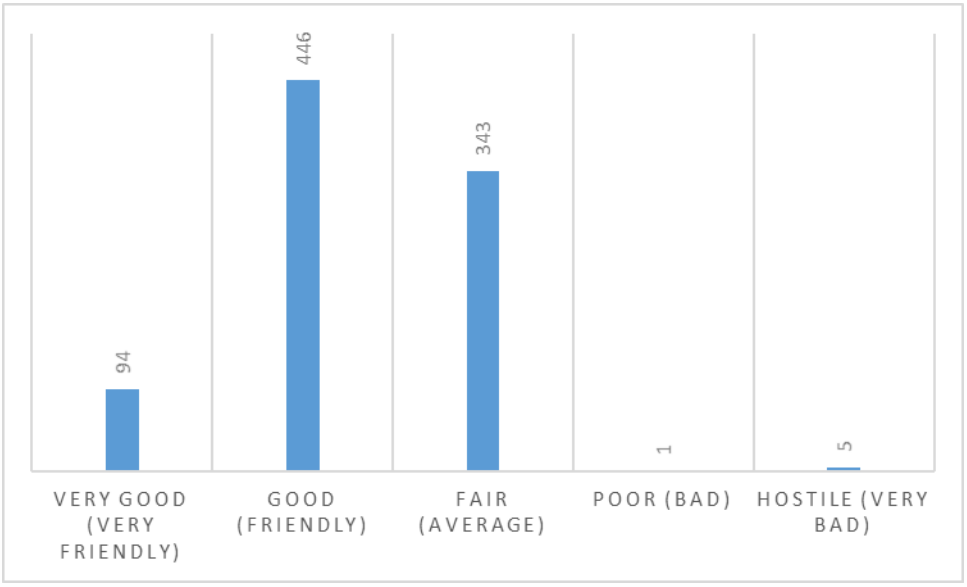

Figure 4.33: Relationship with Existing Agro-Allied Investors
Source: (Field Survey, November 2021)

4.3.7.3 Empowerment Anticipated from the Project

The execution and operation of the SAPZ project is expected to bring about economic development and improved wellbeing of these communities through direct employment, improvement in commercial activities, Corporate Social Responsibility (CSR)

or capacity building programmes. From the survey, 68% of the households anticipate job creation from the execution and operation of the SAPZ project, 16% of the total respondents hope to have allocated lands for agriculture so as to contribute to the supply of crops for processing zone, 4% anticipate the establishment of inter-trade platforms, and 2% of the household specified that they would like to partner with service providers to render services during the SAPZ operation. The remaining 10% had their own expectations from the SAPZ project which they specified as elaborated in Section 4.3.7.4. The detailed frequency of responses at communal level is shown in Table 4.31 below.

Table 4.31: Communal Anticipation from the SAPZ Project

	Esun-Ekiti	***Ipao-Ekiti***	***Oke-Ako***	***Itagbangba***	***Itapaji-Ekiti***	***Iyemero-Ekiti***	***Isan-Ekiti***	***Gede***	***Elemesho***	***Oloje-Ekiti***
Job creation	38	115	118	6	78	22	192	9	25	23
Allocation of land for agriculture	15	34	26	3	12	9	39	3	6	0
Establishment of inter-trade platforms	11	14	6	0	0	4	5	0	2	0
Partnerships with service providers	3	7	3	0	0	0	4	0	0	0
Others	4	27	26	3	12	4	9	0	3	6

Source: (Field Survey, November 2021)

4.3.7.4 Other Anticipated Forms of Empowerment

Based on the findings in 0, 94 respondents specified other expectations from the SAPZ project in terms of empowerment. Most of them expected a combination of all listed benefits while others focused particularly on financial aid to boost their business. Some of the requests included provision of water and electricity, stoppage of herdsmen attack, provision of loans or grants, provision of good roads, provision of boreholes, feeding fee, completion of Itapaji Dam and provision of medical facility. This is presented in Figure 4.34.

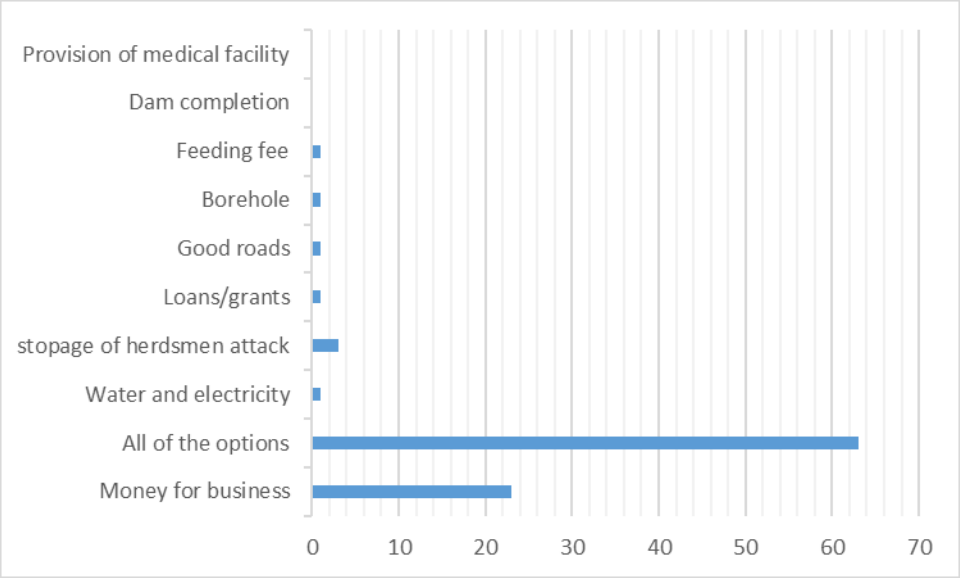

Figure 4.34: Specified communal anticipation from SAPZ

Source: (Field Survey, November 2021)

4.3.7.5 Objections to the SAPZ Project

For the purpose of gauging the level of acceptance of the proposed project by the communities, the survey revealed that 99% (917 responses) of the respondents accept the SAPZ whole heartedly while the remaining 1% (11 responses) had their

objections to the SAPZ project (Figure 4.35). While 9 of them gave no reason for their objections, the remaining 2 specified that similar enumeration and data collection has been done on countless occasions but never followed by action or implementation.

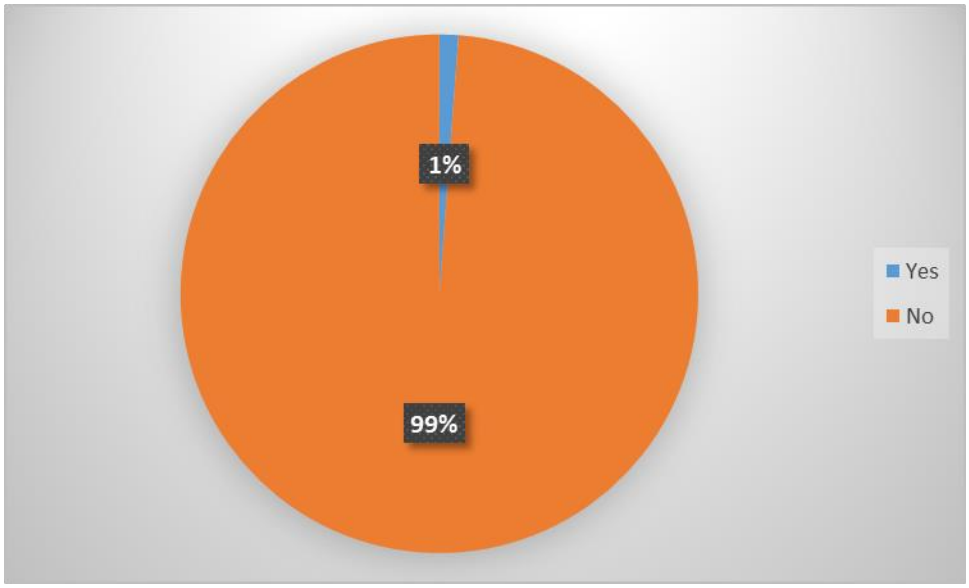

Figure 4.35: Objections to the SAPZ Project
Source: (Field Survey, November 2021)

4.3.8 Communal Norms

4.3.8.1 Tension and Unrest within the Past 5 Years.

From the reactions of the households to this topic, it was obvious that there have been tensions exist or have existed in and between these communities, confirmed by most of the respondent's admittance (Table 4.32). They specifically stated that their communities are plagued with clashes with herders/herdsmen which is currently the primary tension and unrest experienced.

Table 4.32: Tension/Unrest within Stakeholder Communities within the Last Five Years

	Esun-Ekiti	*Ipao-Ekiti*	*Oke-Ako*	*Itagbangba*	*Itapaji-Ekiti*	*Iyemero-Ekiti*	*Isan-Ekiti*	*Gede*	*Elemesho*	*Oloje-Ekiti*	*Total*
Yes	40	164	139	10	77	32	182	11	35	20	**710**
No	31	33	40	4	25	7	67	1	1	9	**218**

Source: (Field Survey, November 2021)

4.3.8.2 Means of Tension Resolution

Having stated the existence of tension and unrest within communities, households were asked to specify how tensions are resolved. 40% of the households stated that the "traditional ruler" is usually the first one consulted for tension resolution while 21% stated that resolution is gotten through police intervention. 19% stated that they have vigilante groups that usually intervene 3% stated that conflicts are resolved through litigation. The remaining 17% specified some conflict resolution which are not included in the suggested options. Notably the reoccurring mentions of resolution are the intervention from the Nigerian Army which had 39 mentions. The vast majority however mentioned that there was no conflict resolution body hence nothing is being done and no intervention given; this had the frequency of 135 mentions. The summary of this finding is presented in Figure 4.36 below.

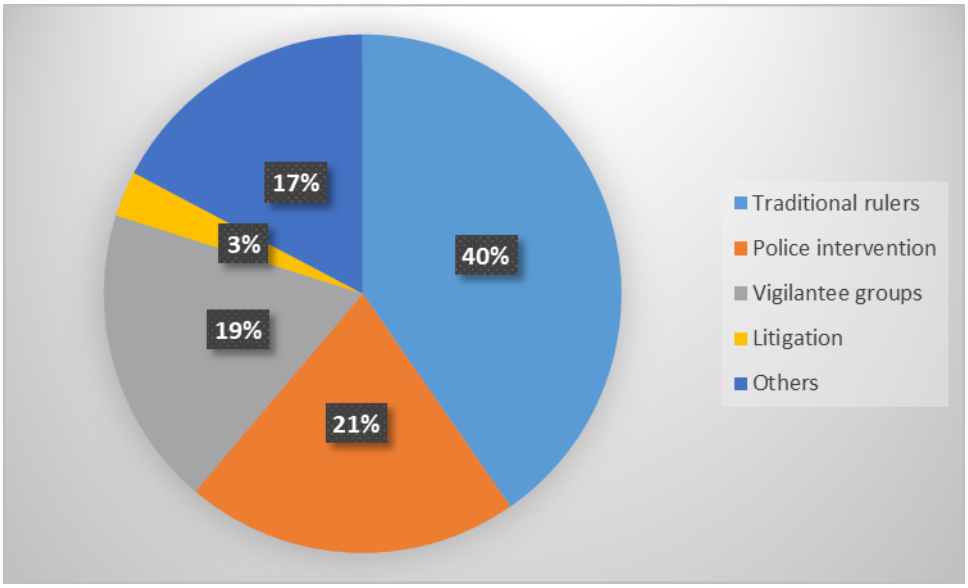

Figure 4.36: Tension resolution

Source: (Field Survey, November 2021)

4.3.8.3 Taboos or deities within the area

To get a deeper understanding of communal cultures and practices, communities were asked the existence of taboos or deities within the area. 734 of the household heads attested that there are taboos the community frown at and there are deities the communities hold sacred. The remaining 194 stated that they do not know about any taboo or deities in their area. The taboo that is most disdained amongst the 10 communities is movement around these communities at midnight, followed by stealing. Taking palm kernel to the markets without separating it from the stalk is also frowned upon as it is believed to bring bad omen to the perpetuator. The details of this finding are presented in Table 4.33.

Table 4.33: Taboo and Deities known to the Respondents

	Esun-Ekiti	*Ipao-Ekiti*	*Oke-Ako*	*Itagbangba*	*Itapaji-Ekiti*	*Iyemero-Ekiti*	*Isan-Ekiti*	*Gede*	*Elemesho*	*Oloje-Ekiti*	*Total*
No movement in the night during Oro festival	20	28	0	0	0	0	61	0	4	1	114
Stealing	1	0	0	0	10	4	0	0	2	9	26
Oro Deity	0	0	7	0	0	0	0	0	0	0	7
Olue Deity	0	0	0	0	0	0	0	0	0	0	0
Taking palm kernel to to town without dismantling it	0	7	0	0	0	0	0	0	5	0	12
Opa festival	1	0	0	0	0	0	0	0	0	0	1
Aje Diety	1	0	0	0	0	0	0	0	0	0	1
Ogun Diety	0	0	0	0	0	0	0	0	0	3	3
Palaake Diety	0	0	6	0	0	0	0	0	0	0	6
Killing	0	0	0	0	2	0	0	0	1	0	3
Bad behaviours	0	0	0	0	0	0	0	0	0	0	0
Akpase	0	0	3	0	0	0	0	0	0	0	3
Going to farms during festivsal period	0	2	0	0	0	0		0	0	0	2
Sweeping market ground with broom	0	2	4	0	0	0	0	0	0	0	6
Beating someone in the night	0	1	0	2	4	0	0	0	0	0	7
Yams can only be eaten after the yam festival	0	2	0	0	0	0	0	0	0	0	2

Women do not open expose their hair during market days	0	0	0	0	0	0	1	0	0	0	1

Source: (Field Survey, November 2021)

4.3.8.4 Organized Festivals within the Community

Deductions from the survey revealed that there are organized festivals within these communities, and they are well known by most of the respondents as 734 (79%) agreed to having organized festivals within their communities while the remaining 194 (21%) have no idea about any organized festivals within their communities. Having told the households to specify the festivals they are aware of in the community, it was discovered that the New Yam Festival is the most common festival as mentioned by 58% of the respondents. This is followed by the Ogun Festival. These two festivals were the most recognized in terms of frequency of mentions. However, there are other festivals within the communities that are not widely celebrated, the details are presented in Table 4.34 below.

Table 4.34: Organized Festivals across the 10 Communities

	Esun-Ekiti	***Ipao-Ekiti***	***Oke-Ako***	***Itagbangba***	***Itapaji-Ekiti***	***Iyemero-Ekiti***	***Isan-Ekiti***	***Gede***	***Elemesho***	***Oloje-Ekiti***	***Total***
New Yam Festival	20	112	72	2	43	21	63	1	21	0	**355**
Ogun Festival	15	37	24	0	14	8	0	2	12	21	**133**
Oro Festival	9	0	0	0	2	0	0	0	0	0	**11**
Oloye Festival	0	12	0	0	0	1	0	0	0	0	**13**
Sango Festival	0	0	0	0	0	10	0	0	0	0	**10**
Ekurin Festival	0	0	0	0	0	0	9	0	0	0	**9**
Aje Festival	4	0	0	0	0	0	0	0	0	0	**4**
Iroko Festival	0	0	0	0	3	0	0	0	0	0	**3**
Esun Day Festival	4	0	0	0	0	0	0	0	0	0	**4**
Imole Festival	0	0	0	0	5	0	0	0	0	0	**5**
Egungun Festival	1	0	0	0	0	0	0	0	0	0	**1**
Epa Festival	0	0	0	0	0	0	9	0	0	0	**9**
Isan Day	0	0	0	0	0	0	20	0	0	0	**20**
Ijesu	0	0	0	0	0	0	0	0	12	0	**12**
Oloje Festival	0	0	0	0	0	0	0	0	0	23	**23**

Source: (Field Survey, November 2021)

4.4 Community Consultations

4.4.1 Adopted Concept/Approach

In order to achieve a robust community stakeholders' engagement, the team adopted the Rapid Rural Approach (RRA). This is because the communities under reference are substantially rural. The Rapid Rural Appraisal is an international best practice, widely accepted for investigating communities with such projects and with rural area characteristics, especially the proposed Special Agro-Industrial Processing Zone. The RRA key principle is the use of Triangulation in the actualization of this stakeholders' engagement by use of multidisciplinary team to investigate the concern of the community dwellers. It also involves working with stakeholders closely by involving the community members in all areas of the stakeholders' engagement and focus group interviews.

Based on the above, the RRA Team for the Agro Industrial Processing Zone Project in the five Local Government Areas of Ekiti State based on the Triangulation principle of diversification of perspectives area are.

- Osunsanmi Gbolabo: Male - Socio Economist and Coordinating Expert.
- Chief Kumapayi Raphael A: Male – Experienced Environmentalist, retired administrator, and titled Chief in Ikole Local Government Area.
- Dr. Olanibi Julius A: Male – Environmentalist, Town Planner and Gender Based Expert.
- Above were assisted by five (5) technical personnel.

4.4.2 Identified Community Stakeholders:

The following were identified as stakeholders to be consulted within the communities affected by the Ekiti SAPZ.

1. The paramount traditional Ruler in the Identified Communities.
2. The Council of Chiefs in the Communities.
3. The Representatives of the Market Women.
4. The Representatives of the Youths.
5. The Representative of Hunters.
6. The Representative of the farmers.
7. All the Family heads whose lands fell within the SAPZ.
8. The Honourable Councillor representing the political wards within the host communities under reference.
9. Officers from the Ekiti State Ministry of Environment.
10. Officers from the Federal Ministry of Environment Abuja (Regulator).
11. Officers from the Ekiti State Ministry of Agriculture and Food Security.
12. Officers from Ekiti State Investment Promotion Agency.

4.4.3 Communities Engaged According to Local Government Areas (LGAs)

While the project is currently located within two LGAs, the community consultations were done across four LGAs in the State and involved seventeen (17) identified communities as presented in Table 4.35 and illustrated in Figure 4.37. The community consultations held successfully from 20th to 23rd December 2021, in the identified communities. The responses of the communities in Oye and Ikole LGAs, as the main PACs are presented herein. The data gathering tools used, attendance sheets, pictures and videos for record purpose are presented in Appendix F.

Table 4.35: PACs involved in Community Consultations

LGA	Oye	Ikole	Ilejemeje	Ido/Osi
Communities Engaged (Community responses from within Oye and Ikole LGAs were more highly considered).	Isan-Ekiti	Esun-Ekiti	Ipere-Ekiti	Ido-Ekiti
	Itaji-Ekiti	Ipao-Ekiti	Iludun-Ekiti	
	Oloje-Ekiti	Oke-Ako Ekiti	Iye-Ekiti	
	Elemeso	Irele-Ekiti	Ewu-Ekiti	
	Ayede-Ekiti	Odo-Ayedun-Ekiti		
		Oke-Ayedun-Ekiti		
		Odo-Oro Ekiti		

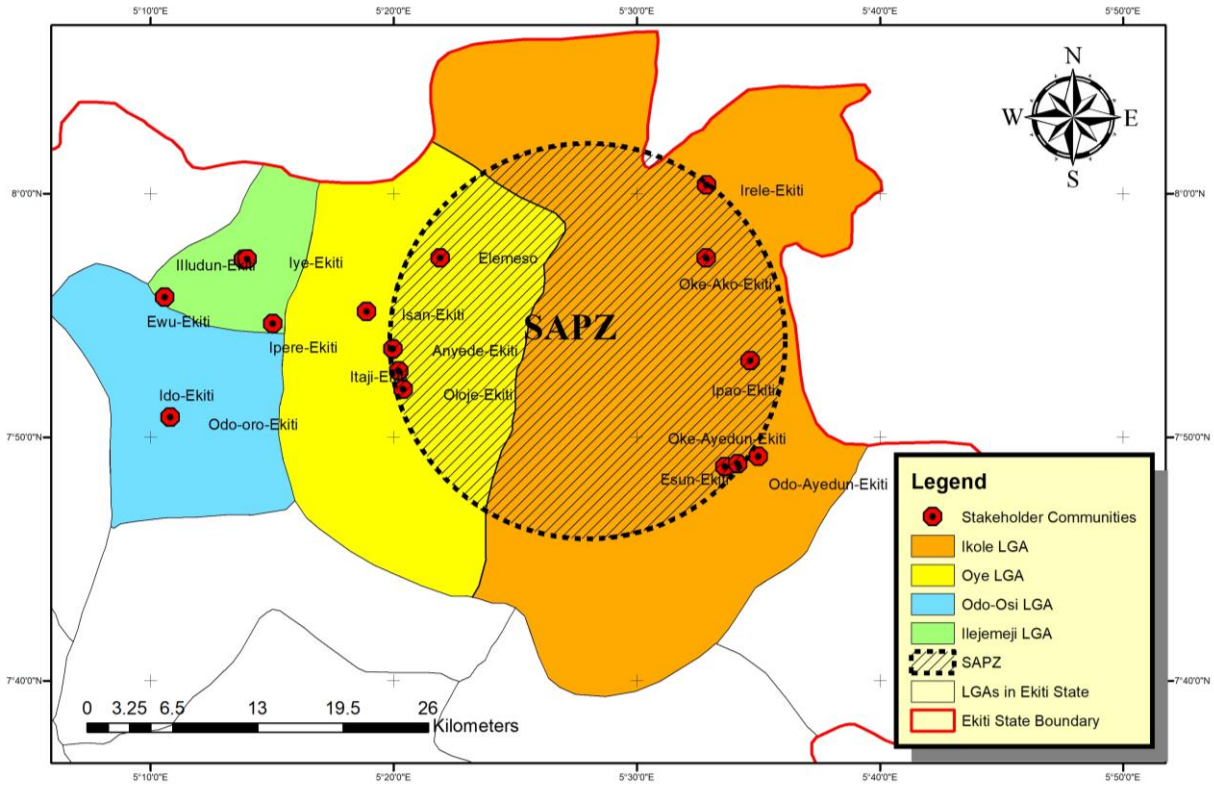

Figure 4.37: Location of Consulted Communities

4.4.4 Community Responses

Detailed responses from all the engaged communities are presented in the Ekiti SAPZ ESIA Scoping Report. The major findings from the community consultations are presented in Table 4.36 and summarised as follows:

- The major language spoken within the communities is Yoruba. Other languages include Tiv, Igbo, Hausa, Fulani, Idoma, Ebira, and Garah. Christianity is the major dominant religion, but some traditional festivities are frequently observed.
- Farming is the major occupation in the communities and is more engaged in manually. Cassava, yam, maize, rice, and guinea corn are the major food crops cultivated in the communities while cocoa, cashew, kolanut, plantain and banana are the major cash crops.
- Inter-communal clashes were common in the past and were driven by land and community border disputes. More recently, however, farmer-herder clashes are the main source of conflict and security concerns in the communities. The communities believe that herders take advantage of the hospitality offered to them and graze over other people's farmlands. Some communities have reacted by expelling herders while others register herdsmen to grant them grazing permission.

- Eight communities confirmed that they were aware of the Ekiti SAPZ project prior to the consultations while four were only made aware ahead of or during the consultations. One community requested to be formally informed by the government despite having prior awareness.
- The communities expressed support for the project as they believe it will create jobs, improve their living standards, and enhance the local economy. With respect to previously abandoned projects and schemes by the government, they pleaded that the project is duly implemented.
- With one exception, the communities expressed support for the proposal with a condition for transparent land acquisition and payment of compensation. They expressed concerns citing examples of previous land acquisitions that only led to unfulfilled promises of compensation. Some communities also requested that they be allowed to continue their farming on acquired land pending when construction begins.
- The community leaders requested for more enlightenment effort to be made to inform the public of the project and its benefits.

Table 4.36:Summary of Community Responses

Community	Period of Project Awareness		Support of Project	Remarks
	Before Consultation	At consultation		
Isan-Ekiti	Yes	Yes	Yes	Support for the project is under the condition that full compensation is paid for all land acquired.
Itaji-Ekiti	Yes	Yes	Yes	
Oloje-Ekiti	Yes	Yes	Yes	
Elemeso	No	Yes	Yes	Support for the project is under the condition that community leaders are involved in decision making and land acquisition process.
Ayede-Ekiti	No	Yes	No	The meeting was suspended by the monarch who ordered his subjects not to say anything further due to the existing unresolved land acquisition issues.
Esun-Ekiti	Yes	Yes	Yes	
Ipao-Ekiti	No	Yes	Yes	Support for the project is under the condition that it brings benefit to the community.
Oke-Ako Ekiti	No	Yes	Yes	Support for the project is under the condition that it brings benefit to the community.
Irele-Ekiti	Yes	Yes	Yes	
Ode-Ayedun-Ekiti	Yes	Yes	Yes	
Oke-Ayedun-Ekiti	Yes	Yes	Yes	
Odo-Oro	Yes	Yes	Yes	Support for the project is under the condition that proper compensation for land acquisition is paid.

5 Potential and Associated Environmental and Social Impacts

To predict the potential impacts of the Ekiti SAPZ, the focus of the ESIA is narrowed to The Processing Hub based on the developed Concept Plan presented in Section 3.3. The impact of activities from other farmlands or industries within the general SAPZ cannot be properly assessed because the specific activities in those land areas (as have been and will be allocated) are not defined. The impacts are also predicted in four stages based on activities to be carried out in every stage. These are the site preparation, site development, operation, and decommissioning stage. For the first three stages, impacts are predicted for Phase 1 of the Hub (refer to Section 3.4.1) because the environmental and social conditions of the site are expected to have changed when future phases are ready to be constructed for operation. The impacts predicted are based on the cumulation of all studies done with regards to the project's site characteristics, baseline information (comprising of macro site assessment, environmental assessment, and socio-economic assessments carried out), and community consultations. The evaluation and significance of every predicted negative impact is assessed using the framework presented in Table 1.10. The summary of all impacts is presented in Section 5.5.

5.1 Site Preparation Stage

The site preparation stage refers to the period whereby physical activity is commenced on the project site to set it for development. Such activities include land surveying, site clearing, and site setting. The following impacts are predicted during the site preparation stage.

5.1.1 Positive Impacts

5.1.1.1 Job Creation

The activities involved in setting out the project site are expected to generate employment opportunities for skilled professionals and non-skilled labourers such as surveyors, tree fellers and loggers, and labourers.

5.1.1.2 Improvement of Local Economy

In addition to the jobs created which shall improve the local economy by providing a source income for engaged personnel, this stage of the project shall also improve the economy through market activity for the sourcing of building and construction material, construction expertise, and local service providers for the working population.

5.1.1.3 Capacity Building

The activities shall also improve the experience of involved personnel, building their capacity for engagement in future projects. It shall also provide opportunity for technology transfer through training in some specialized areas for the skilled workers and for acquiring new skills by the local people.

5.1.1.4 Profitable Use of Land Resources

The activities in this stage shall lead to the removal of existing natural land resources such as trees, rock formations, and top soil. This presents an opportunity to make profitable use of such resources to avoid waste. Felled trees and broken rocks can be sold as timber and gravel, generating revenue for the state government which can contribute to financing the project, offsetting land compensation costs, or used as deemed fit.

5.1.1.5 Communal Participation

Site preparation activities presents an opportunity for the nearby communities to be involved in the project by providing services such as labour and welfare (food sale, health maintenance, etc. to workers) which shall improve the acceptability of the project.

5.1.2 Negative Impacts

5.1.2.1 Deforestation

Site clearance is one of the major activities during the site preparation stage. It shall involve the felling of trees which shall lead to significant loss of ground cover and natural vegetation. In the first phase of the project, an estimated 105Ha of land shall be cleared for development resulting in the loss of up to 60 different tree species. The deforestation is estimated to have low legal and frequency impact as it shall involve no legal activity and be a one-off occurrence. The environmental risk and importance are evaluated to be high due to the significant loss of the natural environment. The significant of the impact is also high as it shall be an isolated incident with major environmental consideration. The impact evaluation and significant of deforestation for this project is presented in Table 5.1.

Table 5.1: Deforestation Evaluation and Significance

Predicted Negative Impact				Deforestation					
Consequence Category				Environmental					
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Environmental Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				Major/Extended Duration/Full Scale Response					
Risk				Serious / Significant Resource Commitment					
Frequency				Moderate/Limited Response of Short Duration					
Importance				Minor / Little or No Response Needed					
Average	(1 + 3 + 1 + 3) / 4 = 2			**Summary:** Medium Impact, High Significance					

5.1.2.2 Impacts on Ecosystem

The deforestation and other site preparation activities shall impact the ecosystem through a loss of flora and fauna (aquatic and terrestrial), some of which may be endangered or threatened. This impact is estimated to have low legal and frequency impacts as it constitutes no illegal activity and occurs once. Risk and importance are considered to be medium impact. The impact also occurs as an isolated incident with moderate environmental consideration. In summary, it is therefore evaluated to be a medium impact with medium significance as presented in Table 5.2.

Table 5.2: Impact on Ecosystem Evaluation and Significance

Predicted Negative Impact				Impacts on the Ecosystem					
Consequence Category				Environmental					
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Environmental Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				Major/Extended Duration/Full Scale Response					
Risk				Serious / Significant Resource Commitment					
Frequency				Moderate/Limited Response of Short Duration					
Importance				Minor / Little or No Response Needed					
Average	(1 + 2 + 1 + 2) / 4 = 1.5			**Summary:** Medium Impact, Medium Significance					

5.1.2.3 Pollution

Activities to get the site ready for construction shall result in air pollution of the site and immediate surroundings due to the operation of heavy machinery, dust generation, and removal of trees that serve as air filters. Soil pollution may also be experienced due to new exposure of the top soil and chemical leakages if utilised machineries are not in good condition. Water pollution is not expected at this point as there is no collected water body in the immediate site environment. The risk and importance of this impact are evaluated to be high, with a medium frequency (during site clearance operations) and low legal impact. On average, the impact is therefore evaluated to be medium, also having medium significant (due to its moderate nature/duration) as presented in Table 5.3.

Table 5.3: Pollution Evaluation and Significance

Predicted Negative Impact				Pollution (Air, Soil, and Water)					
Consequence Category				Environmental					
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Environmental Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				Major/Extended Duration/Full Scale Response					
Risk				Serious / Significant Resource Commitment					
Frequency				Moderate/Limited Response of Short Duration					
Importance				Minor / Little or No Response Needed					
Average	(1 + 3 + 2 + 3) / 4 = 2.25			**Summary:** Medium Impact, Medium Significance					

5.1.2.4 Noise Generation

Site preparation activities are expected to generate noise that could disrupt public comfort or activity in the immediate environment. Noise generation activities include the use of equipment/machinery, rock removal processes (if any), and communication among staff on site. The impact is however considered to be minimal as the closest settlement is 1.8km away from the project site and the highest expected noise generation activity at the closest point to site (Table 5.4) falls below the FEPA limit of 150dB for daytime operations and FMEnv recommended 90dB maximum value for 8-hour occupational exposure. The impact of noise generation is therefore considered to be low with medium significance as presented in

Table 5.5.

Table 5.4: Predicted Noise Generation Activities at Site preparation Stage

Source of Noise	Distance and Noise Levels (dB)			Remarks
	0 –20m	21 - 100m	101 - 200m	
Blasting of rock with controlled explosives (if necessary)	89dB	75dB	50dB	Intermittent, Negligible impact during working hours.
Use of machinery and vehicles	70 dB	50 dB	20 dB	Intermittent, Negligible impact.
Communication among site workers	50 dB	30 dB	15 dB	Regular, Negligible impact.

Table 5.5: Noise Generation Evaluation and Significance

Predicted Negative Impact				Noise Generation					
Consequence Category				Public Disruption					
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Public Disruption Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				Large Community					
Risk				Small Community					
Frequency				Minor					
Importance				Minimal to None					
Average	(1 + 1 + 3 + 1) / 4 = 1.25			**Summary:** Low Impact, Medium Significance					

5.1.2.5 Waste Generation

During the site preparation stage, waste is expected to be generated on site due to the following:

- Vegetal waste from site clearance where not otherwise re-utilised.
- Solid waste directly related to the site preparation activities such as material removed from the site.
- Solid waste on site not directly related to the site preparation activities such as daily food consumption by on-site workers.
- Human and effluent waste from site workers.
- Toxic waste from operational machinery and vehicles.

During this stage, waste generation is evaluated to be medium due to low legal impacts, and medium risk, frequency and importance of impact. Relatively minimal activity during this stage compared to other stages of the project also influenced the evaluation. Nonetheless, repeated incidents of waste generation with moderate environmental considerations gives it a high significance as presented in Table 5.6.

Table 5.6: Waste Generation Evaluation and Significance

Predicted Negative Impact				Waste Generation					
Consequence Category				Environmental					
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Environmental Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				Major/Extended Duration/Full Scale Response					
Risk				Serious / Significant Resource Commitment					
Frequency				Moderate/Limited Response of Short Duration					
Importance				Minor / Little or No Response Needed					
Average	(1 + 2 + 2 + 2) / 4 = 1.75			**Summary:** Medium Impact, High Significance					

5.1.2.6 Increase in Storm Water Run-Off

Due to the site clearance activities, the capacity of the project site to retain storm water is minimised as a result of loss of top soil and moisture retaining vegetation. However, the moderate incidence of waste generation during this stage reduces its risk, as run-off water shall not carry significant amounts of toxins and chemicals to surrounding soils or water bodies. The incidence shall also only occur during the wet season with limited response required, giving it a medium significance as presented in Table 5.7.

Table 5.7: Storm Water Run-Off Evaluation and Significance

Predicted Negative Impact				Increase in Storm Water Run-Off					
Consequence Category				Environmental					
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Environmental Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				Major/Extended Duration/Full Scale Response					
Risk				Serious/Significant Resource Commitment					
Frequency				Moderate/Limited Response of Short Duration					
Importance				Minor / Little or No Response Needed					
Average	(1 + 1 + 1 + 2) / 4 = 1.25			**Summary:** Low Impact, Medium Significance					

5.1.2.7 Predisposition of Soil to Erosion

Site preparation activities such as excavation and earth movement shall involve the intentional movement of the top soil and the exposure of the soil to erosion due to increased storm water run-off and removal of protective vegetal cover. These also contribute to other impacts like the displacements of ecosystem (micro-organisms) and the uncontrolled disposal of soil in water bodies. Predisposition of soil to erosion is a low impact as it poses low risk, illegality, and importance despite a medium frequency. Occurring sometimes with little or no response needed, it is also assessed to have a low significance as presented in Table 5.8.

Table 5.8: Soil Erosion Evaluation and Significance

Predicted Negative Impact				Predisposition of Soil to Erosion					
Consequence Category				Environmental					
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Environmental Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				Major/Extended Duration/Full Scale Response					
Risk				Serious/Significant Resource Commitment					
Frequency				Moderate/Limited Response of Short Duration					
Importance				Minor / Little or No Response Needed					
Average	(1 + 1 + 2 + 1) / 4 = 1.25			**Summary:** Low Impact, Low Significance					

5.1.2.8 Traffic Generation

During this stage, traffic is expected to be generated based on the following:

- Transportation of operational machinery and vehicles to the project site.
- Daily transportation of site workers to, from, around, and within the project site.
- Transportation of services and service providers when not available on site.

The expected traffic shall increase pressure in form of heavy to light vehicles, motorcycles, tricycles, and pedestrians on Itapaji/Oke-Ako road which provides access to the site. Traffic generation shall also contribute to other impacts like pollution and noise generation. Expected transportation activities shall have low legal impacts and frequency with high importance, generating an average medium impact. Disruption from traffic shall also occur repeatedly but shall affect a minor community as site population at this stage is still limited. The evaluation and impact of traffic generation during this period is summarised in Table 5.9.

Table 5.9: Traffic Generation Evaluation and Significance

Predicted Negative Impact				Traffic Generation					
Consequence Category				Public Disruption					
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Public Disruption Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				Large Community					
Risk				Small Community					
Frequency				Minor					
Importance				Minimal to None					
Average	(1 + 2 + 3 + 3) / 4 = 2.25			**Summary:** Medium Impact, High Significance					

5.1.2.9 Risk of Accidents

The activities at the stage poses certain risk of accidents to personnel on site such as fire outbreaks, uncontrolled explosion (if rock blasting/removal is carried out), animal/insect attack/sting/bite, and accidents from the use of heavy machinery and

equipment. This impact is evaluated to be high and significant. While it comprises of no illegal activity, the risk is high and constant if activities are being carried out, making it frequent. It is also an important impact which could occur as isolated incidents but cause serious injury to personnel (limited to the public outside of the site) as presented in Table 5.10.

Table 5.10: Risk of Accidents Evaluation and Significance

Predicted Negative Impact				Risk of Accidents					
Consequence Category				Safety/Health					
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Health Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				Fatalities/ Serious Impact on Public					
Risk				Serious Injury to Personnel/ Limited Impact on Public					
Frequency				Medical Treatment for Personnel/ No Impact on Public					
Importance				Minor Impact on Personnel					
Average	(1 + 3 + 3 + 3) / 4 = 2.5			**Summary:** High Impact, High Significance					

5.1.2.10 Increased Pressure on Community Infrastructure and Facilities

The activities at this stage shall require the presence of site workers. However, no additional health and sanitation facilities shall be provided yet, except for first aid and emergency response, or waste disposal measures. As such, the workers shall rely on infrastructure and facilities in nearby communities for their health and sanitation needs, adding pressure to their service delivery. The impact is however low as it poses no illegality, risk, and is of low importance and it shall pose minimal to no disruption to the public at this stage as presented in Table 5.11.

Table 5.11: Pressure on Infrastructure and Facilities Evaluation and Significance

Predicted Negative Impact				Pressure on Community Infrastructure and Facilities					
Consequence Category				Public Disruption					
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Public Disruption Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				Large Community					
Risk				Small Community					
Frequency				Minor					
Importance				Minimal to None					
Average	(1 + 1 + 2 + 1) / 4 = 1.25			**Summary:** Low Impact, Low Significance					

5.2 Site Development Stage

The site development stage refers to the period during which the project site is being developed in accordance to the Processing Hub Master Plan. This ESIA is conducted for construction of Phase 1. The construction activities for buildings shall include foundation laying, development of superstructure, stairs, boundary walls and gates, roofing, plastering, plumbing and wiring, flooring, interior design and other finishes, and landscaping, Construction of infrastructure shall include the laying of utility lines (for electricity, water, and communication), roadside drainages, finishing of driveways, walkways, and road landscaping, and the fitting of street lights and other street furniture. The following impacts are predicted during the site development stage.

5.2.1 Positive Impacts

5.2.1.1 Job Creation

Construction activities shall generate a wide range of employment opportunities for professionals in the construction industry including architects, builders, estate surveyors, land surveyors, quantity surveyors, town planners, civil, electrical, mechanical, and structural engineers. It shall also employ semi- and non- skilled labour such as drivers, security guards, construction

labourers, etc. These opportunities are expected to be available throughout the construction period and extend to other service providers such as food vendors, cleaners, and more.

5.2.1.2 Improvement of Local Economy

This stage of the project shall also improve the economy through market activity for the sourcing of building and construction material, construction expertise, and local service providers for the working population.

5.2.1.3 Capacity Building

The activities shall improve the experience of involved personnel, building their capacity for engagement in future projects. It shall also provide opportunity for technology and knowledge transfer through training in some specialized areas for the skilled workers and for acquiring new skills by the local people.

5.2.1.4 Profitable Use of Land

The construction activities shall result in the transformation of land from its current state into a more profitable state by being the geographic host of an industrial zone with multiple economic and social benefits.

5.2.1.5 Increased Revenue Generation

Construction activities shall contribute to revenue generation for Ekiti State through the payment of necessary approval and development fees, construction licences, improvement in income tax revenue, payment of income tax by involved private sector players, and more.

5.2.1.6 Increased Infrastructure Development

Construction activities shall lead to the development of new infrastructure or improvement of the existing ones. For example, the construction of new industries, roads, water, drainage, and power infrastructure; and the expansion of Itapaji/Oke-Ako road.

5.2.1.7 Communal Participation

Construction activities presents an opportunity for the nearby communities to be involved in the project by providing services such as labour and welfare (food sale, health maintenance, etc. to workers) which shall improve their awareness and reception of the project.

5.2.2 Negative Impacts

5.2.2.1 Noise Generation

This stage of the project involves the operation of building and construction machinery and equipment, the use of different materials such as sand, cement, iron rods, wood, etc., the involvement of various professionals and artisans, and the transportation of personnel and materials to, in, and around the site. The combination of these shall generate a significant amount of noise through communication, transportation, and machinery operation. The impact at this stage is considered to be significant as it shall affect a small community of people (site workers). However, all noise generation activities are expected to fall below the FEPA limit of 150dB for daytime operations and FMEnv recommended 90dB maximum value for 8-hour occupational exposure (Table 5.12). As such, with a high frequency of noise generation, medium risk and importance, and no legal implications, the impact of noise generation shall be medium as presented in Table 5.13.

Table 5.12: Predicted Noise Generation Activities at Site Development Stage

Source of Noise	Distance and Noise Levels (dB)			Remarks
	0 –20m	21 - 100m	101 - 200m	
Use of machinery and vehicles	70 dB	50 dB	20 dB	Intermittent, Negligible impact.
Carpentry, Joinery, and fitting	60 dB	40 dB	15 dB	Intermittent, Negligible impact.
Communication among site workers	50 dB	30 dB	15 dB	Regular, Negligible impact.

Table 5.13: Noise Generation Evaluation and Significance

Predicted Negative Impact				Noise Generation					
Consequence Category				Public Disruption					
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Public Disruption Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				Large Community					
Risk				Small Community					
Frequency				Minor					
Importance				Minimal to None					
Average	(1 + 2 + 3 + 2) / 4 = 2			**Summary:** Medium Impact, High Significance					

5.2.2.2 Increased Water Demand

At this stage, water shall be required for construction work and for site workers consumption, sanitation, and hygiene. According to the United Nations Environmental Program, the building industry consumes a global average of 30% of freshwater with research revealing that 27 kilolitres of water is required per square meter of built-up areas in urban construction (Bardhan, 2011; UNEP, 2006). Relying on those studies, it is estimated that the construction of Phase 1 of the Hub with a total land area of 110Ha (1,100,000sqm) will demand 29,700,000 kilolitres of water. The increase in water demand is considered to be frequent and of high importance and failure to meet the demand poses significant risk to the project. The impact shall also affect a small community of site workers and investors as presented in Table 5.14.

Table 5.14: Increase in Water Demand Evaluation and Impact

Predicted Negative Impact				Increased Water Demand					
Consequence Category				Public Disruption					
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Public Disruption Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				Large Community					
Risk				Small Community					
Frequency				Minor					
Importance				Minimal to None					
Average	(1 + 2 + 3 + 3) / 4 = 2.25			**Summary:** Medium Impact, High Significance					

5.2.2.3 Increased Power Demand

The construction activity shall require electrical power for machinery, equipment, and device operation, for the use of other appliances to maintain the welfare of workers and for lighting of the project site and operational buildings such as site offices, cloakrooms, warehouses, and stores, etc. A significant amount of power will be required for these uses which shall impact a small community of site workers. The impact of power demand is of low legal implications, medium risk, and high frequency and importance (Table 5.15).

Table 5.15: Increase in Power Demand Evaluation and Impact

Predicted Negative Impact				Increased Power Demand					
Consequence Category				Public Disruption					
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Public Disruption Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				Large Community					
Risk				Small Community					
Frequency				Minor					
Importance				Minimal to None					
Average	(1 + 2 + 3 + 3) / 4 = 2.25			**Summary:** Medium Impact, High Significance					

5.2.2.4 Waste Generation

During the site development stage, waste is expected to be generated on site due to the following:

- Waste from construction activity in form of wood, plastic, metals, liquid, and other scraps.
- Waste on site not directly related to the construction activities such as daily food consumption by on-site workers.
- Human and effluent waste from site workers.
- Toxic waste from operational machinery and vehicles.

During this stage, waste generation is evaluated to be high due to low legal impacts, and high risk, frequency and importance of impact. It shall require significant resource commitment to manage the generated waste during this stage giving it a high significance as presented in Table 5.6.

Table 5.16: Waste Generation Evaluation and Impact

Predicted Negative Impact				Waste Generation					
Consequence Category				Environmental					
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Environmental Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				Major/Extended Duration/Full Scale Response					
Risk				Serious / Significant Resource Commitment					
Frequency				Moderate/Limited Response of Short Duration					
Importance				Minor / Little or No Response Needed					
Average	(1 + 3 + 3 + 3) / 4 = 2.5			**Summary:** High Impact, High Significance					

5.2.2.5 Increase in Storm Water Run-Off

During to the site development stage, soil infiltration and water holding capacity of the site will be reduced due to added concrete and impervious surfaces. The capacity of the project site to retain storm water will therefore be minimised, increasing the possibility of flooding and will impact negatively on surface water percolation and recharging of underground water resources. Run-off water may also carry significant amounts of toxins and chemicals released from construction activities to surrounding soils or water bodies. The incidence shall also only occur mainly during the wet season with limited response required, giving it a medium significance as presented in Table 5.17.

Table 5.17: Storm Water Run-Off Evaluation and Significance

Predicted Negative Impact				Increase in Storm Water Run-Off					
Consequence Category				Environmental					
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Environmental Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				Major/Extended Duration/Full Scale Response					
Risk				Serious/Significant Resource Commitment					
Frequency				Moderate/Limited Response of Short Duration					
Importance				Minor / Little or No Response Needed					
Average	(1 + 2 + 1 + 2) / 4 = 1.5			**Summary:** Medium Impact, Medium Significance					

5.2.2.6 Pollution

Construction activities shall result in air pollution of the site and immediate surroundings due to the operation of heavy machinery, dust generation, and other particulate matter in the air. It shall contribute to the greenhouse effect caused by CO2,

CO, SO, and SO2, with some emissions contributing to odour, acid rain, soil quality depletions, and respiratory disorders that can result in death. Oily wastes from motor vehicles and other machinery are also expected which could result in soil pollution. Water pollution is not expected at this point as there is no collected water body in the immediate site environment and the natural drainage gradient flows eastward, away from the closest collected water body. The risk, importance, and frequency of this impact are evaluated to be high low legal impact. It also has a high significant as presented in Table 5.18.

Table 5.18: Pollution Evaluation and Significance

Predicted Negative Impact			Pollution						
Consequence Category			Environmental						
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Environmental Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				Major/Extended Duration/Full Scale Response					
Risk				Serious / Significant Resource Commitment					
Frequency				Moderate/Limited Response of Short Duration					
Importance				Minor / Little or No Response Needed					
Average	(1 + 3 + 3 + 3) / 4 = 2.5			**Summary:** High Impact, High Significance					

5.2.2.7 Traffic Generation

During the site development stage, traffic is expected to be generated based on the following:

- Transportation of operational machinery, vehicles, and building/construction materials to the project site.
- Daily transportation of site workers to, from, around, and within the project site.
- Transportation of services and service providers when not available on site.

The expected traffic shall increase pressure in form of heavy to light vehicles, motorcycles, tricycles, and pedestrians on Itapaji/Oke-Ako road which provides access to the site. This could impair the performance of the street to by an overload of traffic beyond its capacity especially at peak hours. The Hub's Concept Master Plan proposes addition of driving lanes on Itapaji/Oke-Ako road which will require road expansion work at this stage. This will cause further traffic challenges along the road. Traffic generation shall also contribute to other impacts like pollution and noise generation. Expected transportation activities shall have low legal impacts but a higher frequency and importance than during earlier stages of the project. Community disruption from traffic shall also occur repeatedly by a small community of site workers as site population at this stage is still limited. Traffic within the site is expected to be well managed as road networks shall be structured based on the master plan. The evaluation and impact of traffic generation during this period is summarised in Table 5.19.

Table 5.19: Traffic Generation Evaluation and Significance

Predicted Negative Impact			Traffic Generation						
Consequence Category			Public Disruption						
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Public Disruption Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				Large Community					
Risk				Small Community					
Frequency				Minor					
Importance				Minimal to None					
Average	(1 + 2 + 2 + 3) / 4 = 2			**Summary:** Medium Impact, High Significance					

5.2.2.8 Population Increase

Population Increase is expected in and around the project site as workers and service providers are attracted to the development at the site development period. This shall result in the demand for living, commercial, and recreational spaces

close to the construction area. The population increase will contribute to other impacts like increase in waste generation, traffic generation, and water demand so far evaluated, as well as these other following impacts.

5.2.2.9 Increased Risk of Contracting and/or Spreading Diseases

The spread of infectious diseases which are a major cause of human morbidity, mortality, and suffering are influenced by various steps in human civilisation including urbanisation (Straif-Bourgeois, Ratard, & Kretzschmar, 2014). The coming together of a new population of people for construction in previously undeveloped land therefore increases the volume of people liable to contract diseases and the risk of the transmission of disease agents if contracted. This is evaluated to be of medium impact (low legal implications, medium risk and frequency because of the limited population at this stage, and high importance) as presented in Table 5.20.

Table 5.20: Increased Risk of Contracting and/or Spreading Diseases Evaluation and Significance

Predicted Negative Impact				Increased Risk of Contracting and/or Spreading Diseases					
Consequence Category				Safety/Health					
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Health Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				Fatalities/ Serious Impact on Public					
Risk				Serious Injury to Personnel/ Limited Impact on Public					
Frequency				Medical Treatment for Personnel/ No Impact on Public					
Importance				Minor Impact on Personnel					
Average	(1 + 2 + 2 + 3) / 4 = 2			**Summary:** Medium Impact, High Significance					

5.2.2.10 Occupational Hazards to Workers

Construction activities pose certain occupational hazards to personnel on site such as fire outbreaks and accidents from the use of heavy machinery and equipment. This impact is evaluated to be high and significant. While it comprises of no illegal activity, the risk is high and constant if activities are being carried out, making it frequent. It is also an important impact which could occur as isolated incidents but cause serious injury to personnel (limited to the public outside of the site) as presented in Table 5.21.

Table 5.21: Occupational Hazards Evaluation and Significance

Predicted Negative Impact				Occupational Hazards					
Consequence Category				Safety/Health					
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Health Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				Fatalities/ Serious Impact on Public					
Risk				Serious Injury to Personnel/ Limited Impact on Public					
Frequency				Medical Treatment for Personnel/ No Impact on Public					
Importance				Minor Impact on Personnel					
Average	(1 + 3 + 3 + 3) / 4 = 2.5			**Summary:** High Impact, High Significance					

5.2.2.11 Increased Risk of Gender Based Violence and Harassment

According to several research, construction of major infrastructure projects can be a high-risk environment for Gender Based Violence and Harassment (GBVH) including sexual exploitation and abuse affecting (nearby) community members, workers,

and service providers/users (ICED, 2017; Social Development Direct, 2020; USAID, 2015; World Bank, 2018). This risk is generated due to a usually large influx of transient male workers without their families into small and rural host communities. Other risk factors include the remote locations of development projects, increased in associated workers who are not on the project site and are more elusive such as truck drivers, vulnerability of informal workers, and poorly designed physical spaces on project sites. This impact has high legal consequences and importance and is of high risk and medium frequency. Risk of isolated incidents of GBVH affecting a small community gives it a high significance as presented in Table 5.22.

Table 5.22: Increased Risk of Gender Based Violence Evaluation and Significance

Predicted Negative Impact				Increased Risk of Gender Based Violence and Harassment					
Consequence Category				Public Disruption					
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Public Disruption Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				Large Community					
Risk				Small Community					
Frequency				Minor					
Importance				Minimal to None					
Average	(3 + 3 + 2 + 3) / 4 = 2.75			**Summary:** High Impact, High Significance					

5.2.2.12 Increased Risk of Crime and Juvenile Delinquency

Construction sites within or around a community, on the other hand, are usually liable to suffer from theft and vandalism from miscreants within the community who may target building equipment or materials. This has been long noted as a problem that affects productivity and drain profits despite the application of different techniques by construction firms to deter thieves and vandals (Berg & Hinze, 2005). This impact is evaluated to have a high legal implications and importance with medium risk and frequency and affects a small community of construction workers (and activities) as presented in Table 5.23.

Table 5.23: Increased Risk of Crime and Juvenile Delinquency Evaluation and Significance

Predicted Negative Impact				Increased Risk of Crime and Juvenile Delinquency					
Consequence Category				Public Disruption					
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Public Disruption Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				Large Community					
Risk				Small Community					
Frequency				Minor					
Importance				Minimal to None					
Average	(3 + 2 + 2 + 3) / 4 = 2.5			**Summary:** High Impact, High Significance					

5.2.2.13 Threat to Community Culture

The influx of external workers close to the host community poses a threat to community culture, particularly depending on the duration of the project and the degree of access and contact to/with the host community. Habits such as cigarette smoking, alcohol drinking, sexual liberty, etc. which are typically frowned upon within rural communities may be imbibed. This is however considered to be of medium significance (unlikely to happen), having a low impact evaluation as presented in Table 5.24.

Table 5.24: Threat to Community Culture Evaluation and Significance

Predicted Negative Impact				Threat to Community Culture					
Consequence Category				Public Disruption					
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Public Disruption Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				Large Community					
Risk				Small Community					
Frequency				Minor					
Importance				Minimal to None					
Average	(1 + 1 + 1 + 2) / 4 = 1.25			**Summary:** Low Impact, Medium Significance					

5.2.2.14 Risk of Child Labour

Despite international conventions and legal laws discouraging and banning it, at least, 43% of Nigerian children are engaged in different forms of child labour such as hawking, begging, lifting loads in market places, and more relevant to this assessment, activities on construction sites (Ajekaye, 2019; International Labour Organisation, 2000). The presence of under-aged workers on construction sites is caused by several factors including poverty, lack of affordable schools, illiteracy, cheap labour, etc. and results in higher risk of death/injuries (due to lack of experience, formal training, or physical/mental capacity), drug addiction, increase in out-of-school children, violence, crime, prostitution, quick aging, and decline in ethical and moral standards (Uche, Afolabi, Onwumere, & Chinedum, 2020). These risks shall be present during the site development stage of this project, and its evaluation and significance are presented in Table 5.25.

Table 5.25: Risk of Child Labour Evaluation and Significance

Predicted Negative Impact				Increased Risk of Child Labour					
Consequence Category				Public Disruption					
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Public Disruption Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				Large Community					
Risk				Small Community					
Frequency				Minor					
Importance				Minimal to None					
Average	(3 + 2 + 2 + 3) / 4 = 2.5			**Summary:** High Impact, High Significance					

5.2.2.15 Increased Pressure on Existing Infrastructure and Facilities

Additional presence of site workers at the site development stage shall further increase the pressure on existing infrastructure and facilities as discussed from during the site preparation stage. While added first aid and emergency response, or waste disposal measures are expected at this stage, workers shall still rely on infrastructure and facilities in nearby communities for their severe health issues and water/sanitation needs depending on the water source during construction. The related impacts of these such on facilities due to increased water demand, power demand, and traffic generation are also considered. Posing no illegality, the risk, frequency, and importance of this impact are increased at this stage, and it affects a small community of workers and host as presented in Table 5.26.

Table 5.26: Pressure on Infrastructure and Facilities Evaluation and Significance

Predicted Negative Impact				Pressure on Existing Infrastructure and Facilities					
Consequence Category				Public Disruption					
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Public Disruption Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				Large Community					
Risk				Small Community					
Frequency				Minor					
Importance				Minimal to None					
Average	(1 + 2 + 2 + 2) / 4 = 1.75			**Summary:** Medium Impact, High Significance					

5.3 Operation Stage

The refers to the period during which the Processing Hub has become operational with a high level of agro-industrial activity. Operations are expected to begin after construction of Phase 1 which shall have the following impacts.

5.3.1 Positive Impacts

5.3.1.1 Job Creation

When the Hub become operational, the employment of 3010 workers and service providers are expected in Phase 1. They shall be involved in operational processing industries, logistics and warehousing industries, administrative and technical support

services, skills development and empowerment services, and other supporting amenities. Other jobs not directly associated to industrial activities shall also be created including the provision of welfare services, transportation, and agricultural production.

5.3.1.2 Improvement of Local Economy

In addition to jobs created, this stage of the project shall also improve the economy through market activity for the sourcing of raw materials and agricultural produce from local farmers and agricultural production companies around the industries. It shall lead to an increased in the amount of money in circulation as capital to invest in agriculture products producing and processing, purchase of goods and finished products, and purchase of services.

5.3.1.3 Reduced Loss of Farm Yield

The availability of processing industries shall reduce the loss of farm products which may have farmers may have been unable to completely trade off during peak production seasons. Industries shall provide additional customer base to collect farm produce and encourage increased production from the agricultural sector.

5.3.1.4 Capacity Building

Industrial activities shall improve the experience of personnel who shall be granted employment or engaged in other ways by provide opportunities for technology and knowledge transfer. It shall lead to increased intellectual capital for the local government and Ekiti State. The Research and Development Centre which is proposed in Phase 1 of the Hub provides facilities for the knowledge creation and transfer with opportunities for partnerships and cooperation with higher institutions within the state, around the country, and internationally.

5.3.1.5 Improvement in Food Security

Food security is a critical concern for any nation and the ability to make optimal use of agricultural produce through industrialisation increases the chance of providing this basic necessity, The Ekiti SAPZ provides opportunities to improve food production and distribution as well as affordability of food in two ways: increasing supply and increasing financial capacity to purchase food and other agricultural products through job creation and improved economy.

5.3.1.6 Increase in Revenue Generation

Industrial activities shall contribute to revenue generation for the Ekiti State government through the payments for industrial operation licenses, improvement of income tax revenue, and improvement in GDP per capita (increased earnings for industrial workers).

5.3.1.7 Attraction of FDIs

Securing the interest of potential investors is one of the objectives of the SAPZ with some investors having already expressed interest to secure land parcels. The SAPZ and its Hub shall attract FDI the agro-industrial sector in the development and operation of industries and for service provision.

5.3.1.8 Contribution to FOREX

The agricultural products expected through industrial operations shall be marketed to the local and international markets. Attracted FDIs may also be international industries seeking to expand to Nigeria or Africa or operate a branch at the SAPZ. This shall contribute to exchange of foreign currency though purchase of products developed locally or payment of wages from international sources, which can ultimately contribute to strengthening the value of the Naira.

5.3.1.9 Pull Factor for Urbanization

Industries are the earliest influential factor for urbanisation as they attract individuals from the rural areas seeking employment and improved standards of living. This is expected to be the case as the SAPZ will serve as an urban magnet that facilitates local and inter-state migration, causing a gradual transformation of the SAPZ area into an urban settlement. It

presents several benefits of urbanisation including improved trade, commerce, and business opportunities, diversity in culture, improvement in science, art, knowledge, and creativity through and agglomeration of talent. This factor must however be managed efficiently; otherwise, it presents the risk of slum development.

5.3.1.10 CSR to Host Community

The industries operating in the SAPZ are expected to fulfil some Corporate Social Responsibilities (CSR), which is the operation in ways that enhance the society and the environment through concerted efforts to improve their brand image (Fernando, 2022). Expected CSR efforts include advocacy, responding to local events and solving specific problems within local communities, volunteering efforts and opportunities, charity giving, and mentorship.

5.3.1.11 Improvement of the State's Brand

Ekiti State has long had an objective of diversifying its economy through the agricultural sector by realising the full potentials of its agricultural resources. The Ekiti SAPZ shall bring the State closer to achieving this objective and thereby position Ekiti as a front player in Nigeria's agricultural sector.

5.3.2 Negative Impacts

5.3.2.1 Noise Generation

At this stage, noise is expected to be generated mainly from industrial operations and traffic movement. The impact at this stage is significant as it shall affect a large community of people (industrial workers, nearby host communities, and growing residential community). With a high frequency of noise generation, medium risk and importance, and no legal implications, the impact of noise generation shall be medium as presented in Table 5.27.

Table 5.27: Noise Generation Evaluation and Significance

Predicted Negative Impact				Noise Generation					
Consequence Category				Public Disruption					
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Public Disruption Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				Large Community					
Risk				Small Community					
Frequency				Minor					
Importance				Minimal to None					
Average	(1 + 2 + 2 + 2) / 4 = 1.75			**Summary:** Medium Impact, High Significance					

5.3.2.2 Increased Water Demand

At this stage, water shall be required for industrial purposes, domestic purposes, sanitation, and direct consumption. The Hub's Concept Master Plan estimates cumulative water demand of 2.78Ml per day for the first phase with a 48-hour storage demand of 5.56Ml. The demand is planned to be met by sourcing water from the Itapaji Dam with a water pump station transmitted to a water treatment plant and reservoir at the industrial area (see Section 3.4.4). However, concerns about the capacity of the dam to provide a steady supply of water with no interruptions beyond the 48-hour storage room remain high and unaddressed. The increase in water demand is frequent and of high importance and risk. Failure to meet the demand poses significant risk to the industrial activities and the sanitation/welfare of industrial workers. The impact shall also affect a large community of site workers and other communities which the Itapaji Dam originally served as presented in Table 5.28.

Table 5.28: Increase in Water Demand Evaluation and Impact

Predicted Negative Impact				Increased Water Demand					
Consequence Category				Public Disruption					
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Public Disruption Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				Large Community					
Risk				Small Community					
Frequency				Minor					
Importance				Minimal to None					

Average	(1 + 3 + 3 + 3) / 4 = 2.5	**Summary:** High Impact, High Significance

5.3.2.3 Increased Power Demand

A high supply of power shall be required for industrial and domestic purposes during the operational stage of the project. The Hub's Concept Master Plan estimates cumulative power demand of 94MVA for the first phase. The demand is planned to be met by the development of a power plant (for standby emergency power) and several power substations, with PV solar and other renewables considered as alternative power sources (see Section 3.4.4.1). However, with a capacity of 80-140MVA (TCN, 2018), the primary source of power available, expected to be the closest Ado-Ekiti power transmission station (see Figure 5 of the Ekiti SAPZ ESIA Scoping Report) is insufficient to serve as a primary source of power for the Hub's demand in Phase 1 alone while still serving the residents of Ado-Ekiti. The Transmission Company of Nigeria (TCN) optimistically estimates a capacity of 20,000 megawatts by 2023, over 100% increase from its current capacity (Jeremiah, 2020), from which a memorandum of understanding with the Ekiti State Government to construct two additional substations in Ilupeju and Ijesha-Ishu, in addition to the existing substation in Ado-Ekiti has been signed (TCN, 2020). Nonetheless, the realistic capacity to meet the power demand of the Hub remains questionable and thus insufficient. This is of high impact and high significance as presented in Table 5.29.

Table 5.29: Increase in Power Demand Evaluation and Impact

Predicted Negative Impact				Increased Power Demand					
Consequence Category				Public Disruption					
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Public Disruption Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				Large Community					
Risk				Small Community					
Frequency				Minor					
Importance				Minimal to None					
Average	(1 + 3 + 3 + 3) / 4 = 2.5			**Summary:** High Impact, High Significance					

5.3.2.4 Waste Generation

During the operation stage, waste is expected to be generated due to the following:

- Industrial waste (liquid, solid, and gaseous) from heavy and light industrial activities.
- Domestic waste from workers and residents at the residential areas.
- Human and effluent waste (sewage) from increased population.
- Toxic waste from operational machinery and vehicles.

The amount of industrial solid and gaseous waste to be generated shall the depend on the nature and scale of industrial activities, and the waste management and machinery operation systems they employ. However, liquid waste from all activities which shall be disposed as sewage is estimated to have an average daily flow of 2.22Ml in Phase 1. Other solid waste shall be generated by activities not related to direct industrial operations such as packaging materials, food waste, household waste, etc as the zone's population increases. At operation, waste generation is evaluated to be high, having medium legal impacts (particularly if industrial wastes are not properly managed) high risk, frequency, and importance. It shall require significant resource commitment to manage the generated waste during this stage giving it a high significance as presented Table 5.30.

Table 5.30: Waste Generation Evaluation and Impact

Predicted Negative Impact				Waste Generation					
Consequence Category				Environmental					
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Environmental Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				Major/Extended Duration/Full Scale Response					

Risk				Serious / Significant Resource Commitment					
Frequency				Moderate/Limited Response of Short Duration					
Importance				Minor / Little or No Response Needed					
Average	(2 + 3 + 3 + 3) / 4 = 2.75			**Summary:** High Impact, High Significance					

5.3.2.5 Increase in Storm Water Run-Off

At the point of operation, storm water is expected to be collected in constructed drainage systems along the road networks and drained eastward towards stormwater attenuation points before they are released at lower pressure into the surrounding natural environment. With drainage systems and soft landscaping in the zone, the increase in storm water is considered to be of low risk of erosion or flooding, requiring limited response and occurring only during the wet season. The evaluation and impact of the increase in storm water run-off is presented in Table 5.31.

Table 5.31: Storm Water Run-Off Evaluation and Significance

Predicted Negative Impact			Increase in Storm Water Run-Off						
Consequence Category			Environmental						
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Environmental Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				Major/Extended Duration/Full Scale Response					
Risk				Serious/Significant Resource Commitment					
Frequency				Moderate/Limited Response of Short Duration					
Importance				Minor / Little or No Response Needed					
Average	(1 + 1 + 1 + 2) / 4 = 1.25			**Summary:** Low Impact, Medium Significance					

5.3.2.6 Pollution

Industrial activities at the operation stage shall result in gaseous emissions from industries' heavy machinery and vehicles which shall contribute to the greenhouse effect caused by CO2, CO, SO, and SO2. Some emissions shall contribute to odour, acid rain, soil quality depletions, and respiratory disorders. Soil pollution is expected to be minimised at this stage due to landscaping of the developed area. Stormwater management plans are also expected to minimise soil and water pollution due to control of stormwater run-off. Industrial liquid waste however has further environmental and health impacts if not treated before released into the drainage systems. The risk, importance, and frequency of this impact are evaluated to have medium legal implications (particularly of pollution from industries), with high risk, frequency, and importance as presented in Table 5.32.

Table 5.32: Pollution Evaluation and Significance

Predicted Negative Impact			Pollution (Air, Soil, and Water)						
Consequence Category			Environmental						
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Environmental Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				Major/Extended Duration/Full Scale Response					
Risk				Serious / Significant Resource Commitment					
Frequency				Moderate/Limit					

				ed Response of Short Duration					
Importance				Minor / Little or No Response Needed					
Average	(2 + 3 + 3 + 3) / 4 = 2.75			**Summary:** High Impact, High Significance					

5.3.2.7 Traffic Generation

During the operation stage, traffic is expected to be generated based on the following:

- Transportation of raw materials to the Hub from surrounding farmlands for industrial processing.
- Transportation of processed products out of the Hub for market distribution.
- Daily transportation of industry workers to, from, around, and within the Hub.
- Transportation of services and service providers to, from, around, and within the Hub.

Within the industrial zone, the expected traffic shall be in form of heavy vehicles (delivery trucks), light vehicles and pedestrians. Tricycle and motorcycle traffic generation shall depend on their allowance within the zone. 20,698 cumulative daily trips are estimated for Phase 1 of the Hub. The Concept Master Plan proposes a grid pattern circulation system which offers permeability and multiple choices at intersections with sufficient road-widths (see Section 3.4.3). This shall enhance accessibility to industrial plots within the zone, but traffic hotspots may be generated at the cross intersections of primary access roads. Outside the zone, traffic pressure in form of heavy to light vehicles, motorcycles, tricycles, and pedestrians shall be increased on Itapaji/Oke-Ako road. However, the road expansion is expected to have been completed at the stage, making it capable of handling the expected traffic without complications.

Traffic generation shall also contribute to other impacts like pollution, noise generation, traffic disruptions through truck vehicle breakdown and increased risk of road accidents. Expected transportation activities shall have low legal impacts but a high frequency, importance, and risk (if not managed efficiently). The impact and significance of traffic generation at the operation stage is presented in Table 5.33.

Table 5.33: Traffic Generation Evaluation and Significance

Predicted Negative Impact				Traffic Generation					
Consequence Category				Public Disruption					
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Public Disruption Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				Large Community					
Risk				Small Community					
Frequency				Minor					
Importance				Minimal to None					
Average	(1 + 3 + 3 + 3) / 4 = 2.5			**Summary:** High Impact, High Significance					

5.3.2.1 Risk of Industrial Hazards

Industrial activities pose occupational hazards to workers such as fire outbreaks, accidents from the use of heavy machinery and equipment, and exposure to harmful chemicals. This impact is evaluated to be high and significant. While it comprises of no illegal activity, the risk is high and constant if industrial activities are being carried out, making it frequent. It is also an important impact which could occur as isolated incidents but cause serious injury to personnel (limited to the general public outside of the site) as presented in Table 5.34.

Table 5.34: Industrial Hazards Evaluation and Significance

Predicted Negative Impact				Risk of Industrial Hazards					
Consequence Category				Safety/Health					
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Health Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				Fatalities/ Serious Impact on Public					

Risk				Serious Injury to Personnel/ Limited Impact on Public					
Frequency				Medical Treatment for Personnel/ No Impact on Public					
Importance				Minor Impact on Personnel					
Average	(1 + 3 + 3 + 3) / 4 = 2.5			**Summary:** High Impact, High Significance					

5.3.2.2 Increased Risk of Contracting and/or Spreading Diseases

The risk of contracting and/or spreading diseases carries on from the site development to operation stage. At this stage, the risk is higher due to increased population and a spread of responsibility from construction companies to multiple industries, service providers, and customers. With full operations ongoing, access to the Hub shall also be open to the general public (as compared to the site development stage) whose travel origins are more diverse and uncontrolled. This heightens the risk of contracting/spreading diseases with low legal implications, medium frequency, and high importance as presented in Table 5.35.

Table 5.35: Increased Risk of Contracting/Spreading Diseases Evaluation and Significance

Predicted Negative Impact				Increased Risk of Contracting and/or Spreading Diseases					
Consequence Category				Safety/Health					
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Health Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				Fatalities/ Serious Impact on Public					
Risk				Serious Injury to Personnel/ Limited Impact on Public					
Frequency				Medical Treatment for Personnel/ No Impact on Public					
Importance				Minor Impact on Personnel					
Average	(1 + 3 + 2 + 3) / 4 = 2.25			**Summary:** Medium Impact, High Significance					

5.3.2.3 Population Increase

Population Increase is expected in and around the Hub as industrial workers and service providers are attracted to the development for proximity to job opportunities. This shall result in the demand for living, commercial, and recreational spaces in and around the Hub. The population increase will contribute to other impacts like increase in waste generation, traffic generation, and water demand so far evaluated, as well as these other following impacts.

5.3.2.4 Increased Pressure on Existing Infrastructure and Facilities

When the Hub is operational, there shall be a significant increase in population in and around the site by industrial workers and service providers. To accommodate and serve the expected population beyond their industrial activities, the Hub's Concept Master Plan provides spaces for residential developments, guest houses, commercial and retail developments, and social amenities. At this stage therefore, infrastructure and facilities in nearby communities shall not be relied on as much. However, the Hub management should ensure equitable and inclusive access to households, commercial services, social amenities, and recreational spaces for all social groups particularly the low-income industrial workers. Failure to do this may result in continuous reliance on communal infrastructure and facilities despite availability within the Hub. Other related pressure on facilities due to increased water demand, power demand, and traffic generation have been considered. The evaluation and significance of this impact are presented in Table 5.36.

Table 5.36: Pressure on Infrastructure and Facilities Evaluation and Significance

Predicted Negative Impact				Pressure on Infrastructure and Facilities					
Consequence Category				Public Disruption					
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Public Disruption Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				Large Community					
Risk				Small Community					
Frequency				Minor					
Importance				Minimal to None					
Average	(1 + 2 + 2 + 2) / 4 = 1.75			**Summary:** Medium Impact, High Significance					

5.3.2.5 Risk of Slum Development and Squatter Settlement

Town Planning as a formal profession was born in response to poor sanitation, poor health conditions, and the fast spread of diseases because of haphazard development and overcrowded housing in fast-industrializing Europe (Kniivila, 2007; Mohajan, 2019). Historically, a straight line can therefore be drawn from the development of industries to the formation of slums. Centuries later, large scale industrial developments still pose the risk of slum development and squatter settlement due to the attraction of population and resulting urbanization if not properly managed. This is a high impact, as it has further health, environmental, and social consequences with medium legal implications due to the typical lack of tenure of slum dwellers and settlers. Evaluation of the potential impact and significance are presented in Table 5.37.

Table 5.37: Risk of Slum Development and Squatter Settlement Evaluation and Significance

Predicted Negative Impact				Risk of Slum Development and Squatter Settlement					
Consequence Category				Public Disruption					
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Public Disruption Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				Large Community					
Risk				Small Community					
Frequency				Minor					
Importance				Minimal to None					
Average	(2 +3 + 3 + 3) / 4 = 2.75			**Summary:** High Impact, High Significance					

5.4 Decommissioning Stage

The decommissioning stage refers to the period during which operations of the Processing Hub are terminated. While reaching this stage is uncertain, it remains necessary to consider the impact if it occurs, which are as follows.

5.4.1 Positive Impacts

5.4.1.1 Gradual Ecological Restoration

If the Processing Hub is decommissioned and no activity is carried out in the site area, ecological restoration is expected in the long term inclusive of the return of vegetation cover and living organisms/animals to the abandoned site which brings the environmental closer to its original best self.

5.4.1.2 Reduction in Pollution

Decommissioning shall result in the discontinuation of activities which were a source of water, air, noise, and soil pollution. A glimpse of this was observed after COVID-19 related lockdowns where reduced population-weighted concentration of nitrogen dioxide and particulate matter levels in the atmosphere by about 60% and 31% was recorded in 34 countries (Venter, Aunan, Chowdhury, & Lelieveld, 2020).

5.4.1.3 Opportunities for Repurposing

Following decommissioning, opportunities for repurposing of industrial areas shall become available. This will require less capital cost due to the existence of infrastructure including buildings, roads, and other facilities. Possible repurposing options include recreation and tourism, educational institution, creative industries, and residential uses.

5.4.2 Negative Impacts

5.4.2.1 Redundancy of Abandoned Structures

If decommissioned with no repurposing, the existing structures within the Hub shall lose their need and usefulness, rendering them redundant. In effect, this shall translate to an abuse of all accumulated investments regardless of the profits or benefits already enjoyed. The redundancy of abandoned structures is of medium impact and high significance as presented in Table 5.38, as it constitutes no illegality, but has medium risk of resulting into other negative impacts. The financial considerations are also high due to the financial investments rendered redundant.

Table 5.38: Redundancy of Abandoned Structures Evaluation and Significance

Predicted Negative Impact				Redundancy of Abandoned Structures					
Consequence Category				Financial Considerations					
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Financial Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				High					
Risk				Medium					
Frequency				Low					
Importance				None					
Average	(1 + 2 + 2 + 2) / 4 = 1.75			**Summary:** Medium Impact, High Significance					

5.4.2.2 Loss of Employment

The discontinuation of industrial activities shall lead to the direct loss of employment for about 11,382 people (projected cumulative employment provision in all phases of the Hub). This shall be highly impactful as it presents the risks associated with unemployment such as increased crime, low income earning, reduced capacity for providing good quality of life, etc. It is a highly important factor with medium legal implications due to the possibility of wrongful contract terminations (Table 5.39).

Table 5.39: Loss of Employment Evaluation and Significance

Predicted Negative Impact				Loss of Employment					
Consequence Category				Financial Considerations					
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Financial Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				High					
Risk				Medium					
Frequency				Low					
Importance				None					
Average	(2 + 3 + 3 + 3) / 4 = 2.75			**Summary:** High Impact, High Significance					

5.4.2.3 Reduction in Revenue Generation

Decommissioning shall further result in loss of revenue generation for the Ekiti State Government which were formerly enjoyed from the site development to operation stage of the Hub (and SAPZ) such as increased tax revenue, operational licence fees, and improvement in GDP. This is a high impact with high significance as it shall reduce the governance capacity of the State which poses several other consequences as presented in Table 5.40.

Table 5.40: Reduction in Revenue Generation

Predicted Negative Impact	Reduction in Revenue Generation
Consequence Category	Financial Considerations
Impact Evaluation	**Impact Significance**

Impact	High (3)	Medium (2)	Low (1)	Financial Considerations	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				High					
Risk				Medium					
Frequency				Low					
Importance				None					
Average	(1 + 3 + 3 + 3) / 4 = 2.5			**Summary:** High Impact, High Significance					

5.4.2.4 Loss of Foreign Exchange

Inactivity of the industries within the Hub shall lead to a decrease in exportable products which shall translate to a loss of foreign exchange previously contributed to. The financial considerations of these impact are high despite it being a medium impact as it shall not worsen the situation prior to industrial operations. The summary of this impact is presented in Table 5.41.

Table 5.41: Loss of Foreign Exchange

Predicted Negative Impact				Loss of Foreign Exchange					
Consequence Category				Financial Considerations					
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Financial Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				High					
Risk				Medium					
Frequency				Low					
Importance				None					
Average	(1 + 2 + 2 + 2) / 4 = 1.75			**Summary:** Medium Impact, High Significance					

5.4.2.5 Effects of Building/Infrastructure Abandonment

The abandonment of buildings and infrastructure in the Hub if not repurposed has further socio-economic effects. From an economic perspective, the effects (some of which have already been considered) as listeb by Ihuah & Benebo (2014) are as follows:

1. It reduces the real property total values.
2. It affects the total income receivable from real property.
3. It becomes a disappointing thing to the owner and the populace.
4. It increases the negative effects of environmental issues to the real property and the built environment.
5. It negatively reduces the motivation to attracting investment in real properties.
6. It becomes a waste of financial and material resources.
7. Employment opportunity in real property and other sectors are impacted negatively.
8. It deprives government the expected revenue from property tax.

Socially, building and infrastructure abandonment promotes criminal activity by serving as dead zones to where hoodlums operate or hide to avoid detection during and after their crimes. Such spaces are liable to be used for criminal activities like sexual harassment, drug abuse, assault, and murder (or dumping of victim's body). The social impacts are considered more highly in this scenario as other economic impacts have been addressed. As presented in Table 5.42, it is considered to have high legal implications, risk, and importance but a moderate frequency.

Table 5.42: Effects of Building/Infrastructure Abandonment

Predicted Negative Impact				Increased Risk of Crime					
Consequence Category				Public Disruption					
Impact Evaluation				**Impact Significance**					
Impact	High (3)	Medium (2)	Low (1)	**Public Disruption Considerations**	Repeated Incidents	Isolated Incidents	Occurring Sometimes	Unlikely	Impossible
Legal				Large Community					
Risk				Small Community					

Frequency				Minor					
Importance				Minimal to None					
Average	(3 +3 + 2 + 3) / 4 = 2.75			**Summary:** High Impact, High Significance					

5.5 Summary of Impacts

The summary of impacts during all stages of the project, along with their category, evaluation, and significance (for negative impacts) are presented in Table 5.43.

Table 5.43: Summary of Impacts

Stage	+/-	Category	Impacts	Evaluation	Significance
Site Preparation	Positive	Financial	Job Creation		
			Improvement of Local Economy		
			Profitable Use of Land Resources		
		Social	Capacity Building		
			Communal Participation		
	Negative	Environmental	Deforestation	Medium	High
			Impacts on the Ecosystem	Medium	Medium
			Pollution	Medium	Medium
			Waste Generation	Medium	High
			Increase in Storm Water Run-Off	Low	Medium
			Predisposition of Soil to Erosion	Low	Low
		Safety/Health	Risk of Accidents	High	High
		Public Disruption	Noise Generation	Low	Medium
			Traffic Generation	Medium	High
			Increased Pressure on Community Infrastructure	Low	Low
Site Development	Positive	Financial	Job Creation		
			Improvement of Local Economy		
			Profitable Use of Land		
			Revenue Generation		
		Social	Capacity Building		
			Increased Infrastructure Development		
			Communal Participation		
	Negative	Environmental	Waste Generation	High	High
			Increase in Storm Water Run-Off	Medium	Medium
			Pollution	High	High
		Safety/Health	Increased Risk of Diseases	Medium	High
			Occupational Hazards to Workers	High	High
		Public Disruption (some with legal implications)	Noise Generation	Medium	Medium
			Increased Water Demand	Medium	High
			Increased Power Demand	Medium	High
			Traffic Generation	Medium	High
			Increased Risk of Gender Based Violence and Harassment	High	High
			Increased Risk of Crime and Juvenile Delinquency	High	High
			Threat to Community Culture	Low	Medium
			Risk of Child Labour	High	High
			Increased Pressure on Existing Infrastructure and Facilities	Medium	High
Operation	Positive	Financial	Job Creation		
			Improvement of Local Economy		
			Reduced Loss of Farm Yield		
			Increase in Revenue Generation		
			Attraction of FDIs		
			Contribution to FOREX		
		Social	Capacity Building		
			Urbanisation		
			CSR to Host Community		
			Improvement in Food Security		
			Improvement of State's Brand		
	Negative	Environmental	Waste Generation	High	High
			Increase in Storm Water Run-Off	Low	Medium

			Pollution	High	High
		Safety/Health	Increased Risk of Diseases	Medium	High
			Risk of Industrial Hazards	High	High
		Public Disruption (some with legal implications)	Noise Generation	Medium	High
			Increased Water Demand	High	High
			Increased Power Demand	High	High
			Traffic Generation	High	High
			Increased Pressure on Existing Infrastructure and Facilities	Medium	High
			Risk of Slum Development / Squatter Settlements	High	High
Decommissioning	Positive	Environmental	Ecological Restoration		
			Reduction in Pollution		
		Social / Financial	Opportunities for Repurposing		
	Negative	Financial	Redundancy of Abandoned Structures	Medium	High
			Loss of Employment	High	High
			Reduction in Revenue Generation	High	High
			Loss of Foreign Exchange	Medium	High
		Public Disruption	Building/Infrastructure Abandonment	High	High

6 Mitigation Measures

The following mitigation measures are proposed to eliminate, reduce, control or offset the negative potential and associated environmental and social impacts of the Hub during its site preparation, site development, operation, and decommissioning stages. The mitigation measures are proposed for medium or high evaluated impacts. The complete and adequate implementation of the mitigation measures are expected to address the predicted environmental and social impacts. They were generated through exploration of the predicted negative impacts by the ESIA preparers with reliance on previously approved ESIAs and external research. The measures were proposed to be concise, practical, attainable, and efficient. These mitigation measures also provide the bases for the development of the Environmental and Social Management Plan to meet federal environmental standards.

6.1 Site Preparation Stage

6.1.1 Deforestation

- **Activities' Scope Limitation:** Site preparation activities should be limited to within the site boundaries to prevent needless felling of trees. Site clearance should also be done where developments are to be undertaken in the short or medium term. Site areas for future development (such as Phase 2 and 3) should be left untouched until time of development.
- **Tree Reservation:** Complete clearance of trees within the site should be avoided. Site clearing should be done in line with the project Master Plan and trees that do not interfere with roads or buildings should be maintained. This can help in reducing the cost of replanting as well as provide shade for the workers on site.
- **Landscape Plan Implementation:** A landscape plan for the Hub based on the Master Plan should be prepared and implemented. Records of existing tree composition in the site should be taken before site clearance – to be included for replanting in the landscape plan.
- **Perimeter Trees:** Trees along the site perimeter and buffer zones should be maintained.

6.1.2 Impacts on Ecosystem

- **Activities' Scope Limitation:** Activities should be limited to within the site boundaries to prevent impacting the ecosystem beyond the site, particularly of birds that may be displaced by noise.
- **Apply Pollution Mitigation Measures:** Mitigation measures to limit the adverse effects of pollution should be adhered to so as to prevent the exposure of living organisms to pollutants.

6.1.3 Pollution

6.1.3.1 Air

- **Machinery Maintenance:** Pollutant emitting machinery on site such as trucks, tractors, and power generating machines should be in good working condition and serviced regularly to reduce emissions into the air.
- **Ground Wetting**: The ground should be wetted regularly especially during the dry season to help reduce the amount of dust generated on site.
- **Avoid Open Burning**: Open burning of bush or waste which increases the emission of greenhouse gases contributing to climate change and global warming should be highly avoided.

6.1.3.2 Soil

- **Waste Management Practices**: All solid and liquid waste should be collected and disposed appropriately and littering of waste on the site should be prohibited.
- **Avoid Bush Burning**: Bush burning on site should be avoided as it affects the fertility of the soil.
- **Machinery Maintenance:** Machinery used on site should be in good working condition to prevent oil spillage onto the soil. A dedicated area for machine maintenance with concrete floor finish should also be provided where all

maintenance of machineries on site is done. This shall help in reducing oil and toxic chemicals spillage to the soil which can cause contamination and affect plant growth.

6.1.4 Noise Generation

- **Day Time Activity:** Noise generating activities should be limited to the daytime during which other sound diffusion activities are likely to be going on. Such activities should be kept under the FMEnv recommended limit of 90dB and should not be carried out for longer than eight (8) hours in line with the FMEnv recommended maximum value of eight (8) hours occupational exposure to noise.
- **Breaks Observation**: Breaks should be taken from activities that generate noise and vibrations to reduce the unpleasant effect and for better adherence to the eight (8) hours occupational exposure to noise standard.
- **Use of Earmuffs:** Earmuffs that fit over the entire outer ear to form an air seal which helps in bringing down loud noise to a manageable level should be provided for workers who are exposed to loud noise. Workers are required to utilize the use of earmuffs, as to be regulated by a HSE Policy.
- **Use of Soundproof Generators and/or Noise Absorbents: N**oise absorbers to reduce the level of noise and vibration from machinery should be employed. Sound-proof power generating sets are recommended when necessary.
- **Machinery Maintenance**: Machinery used on site should be in good working condition to prevent loudness due to equipment faults or ageing.

6.1.5 Waste Generation

- **Provision of Waste Bins:** Waste bins should be provided at various locations on the project site to prevent littering and provide a clean working environment.
- **Waste Collection and Disposal:** The waste bins should be emptied regularly, separated, and disposed appropriately with the use of waste collection trucks. Partnership with the Ekiti State Waste Management Authority is recommended.
- **Recycling:** Solid waste should be separated from source for recycling. It is encouraged for vegetal waste from site clearance to be reused for example as animal feed or converted to biogas.
- **Training and Awareness Raising:** Workers on site should be trained and informed on proper waste disposal methods and should be prohibited from defecating openly or leaving other human waste on site.

6.1.6 Traffic Generation

- **Roadside Parking Avoidance:** Parking by the side of the Itapaji – Oke-Ako road during the site preparation stage, particularly of trucks and tractors, should be discouraged as it shall affect traffic flow, narrow the driveway, obstruct driver visibility, and increase risk of road accidents.
- **Use of Road Signs:** Appropriate signs should be placed at strategic points to inform traffic of construction activity and increase driver/rider caution.
- **Personnel to Direct Traffic:** Personnel should be employed to direct/control traffic during working hours.
- **Driver Experience:** The qualification and experience of all drivers engaged during the site preparation stage, particularly those operating heavy vehicles, should be thoroughly vetted.

6.1.7 Risk of Accidents

- **Health, Safety and Environment (HSE) Policy:** Companies engaged in site preparation activities should have and enforce a comprehensive HSE Policy that protects workers, reduces the risk of workplace injuries, illness and death as well as the suffering and financial hardship these events can cause for workers, their family, and employers. This is a proactive approach to managing workplace safety and health.
- **Safety Drills and Instructions:** Safety instructions should be given to all workers on site and safety tips and reminders should be placed at activity areas on site. Safety drills should also be carried out randomly and without warning to prepare workers for an emergency. For example, workers should undergo fire drills so it can help educate them on how to respond to fire incidence within the work environment.

- **Personal Protective Equipment (PPE):** All workers be provided with PPE and trained on its proper use. Example of PPE include hand gloves, safety boot, safety jackets, earmuffs, reflective jacket, etc. Other non-workers visiting the site for different reasons should also be provided with protective gear for the duration of their visit.
- **Emergency Management Equipment:** Emergency management equipment, particular in case of fire, including extinguishers and hoses with uninterrupted water supply should be put in place at easily accessible locations on site for use during fire or other emergency incidences.
- **First Aid Kits and Emergency Response:** First aid kits should also be put in place for emergency response to sick or injured persons. In some cases, it can be the only care someone may need, while in others, it may help them before taken to the hospital depending on the magnitude of the injury. It is also recommended that workers are being trained on first aid treatment.
- **Fumigation of Site:** The working environment should be fumigated to reduce the number of insects or reptiles which can be harmful to both the workers and machines.
- **Insurance Policies for the Workers:** Workers engaged on site should be provided with health, medical, or life insurance for financial protection in cases of accidents.

6.2 Site Development Stage

6.2.1 Noise Generation

- Mitigation measures proposed for noise generation during the site preparation stage should be carried on during the site development stage.

6.2.2 Increased Water Demand

- **Drilling of Boreholes:** It is recommended that industrial grade boreholes are drilled at on site due to the limited sources of water. A water distribution system should also be used to spread the availability of water across the site and reduce on-site transportation for water. The locations of the boreholes should be strategically selected to ensure that they remain functional during the operation period. Drilling boreholes shall reduce the reliance of external sourced for water, reducing the cost and traffic generated for water sourcing.

6.2.3 Increased Power Demand

- **Self-Reliant Power Generating Set:** It is recommended that an alternative power source separate from the national grid is provided to help reduce pressure on the national grid and ensure constant supply of power during the site development stage.

6.2.4 Waste Generation

- Mitigation measures proposed for waste generation during the site preparation stage should be carried on during the site development stage. Recycling of construction waste is highly recommended.
- **Provision of Toilet Facilities:** Temporary toilet facilities should be provided on site with access granted to all site workers to prevent open defecation and help in maintaining a clean and conducive working environment.

6.2.5 Increase in Strom Water Run Off

- **Construction of Drainage Channels:** Drainage channels should be constructed to control the run-off of water by increasing the length of flow and channelling them to designated locations.
- **Dry Season Construction:** Construction during the dry season should be considered to reduce the amount of construction waste or sediments that may be carried by storm water.

6.2.6 Pollution

- Mitigation measures proposed for pollution during the site preparation stage should be carried on during the construction stage with increased caution relative to the expected increase in activities that can pollute the air and soil.

6.2.7 Traffic Generation

- Mitigation measures proposed for traffic generation during the site preparation stage should be carried on during the site development stage.
- **Staff Bus Provision: C**onstruction workers, particularly those that shall not be provided on-site accommodation should be provided with a staff bus to convey them to-and-from the site and to-and-from their homes or community landmarks to reduce the flow of traffic by limiting individual travel.

6.2.8 Increased Risk of Contracting and/or Spreading Diseases

- **Portable Water Supply:** Apart from the water used for construction, portable water should be provided for consumption on site through treatment of borehole water to prevent contracting or spreading water related/borne diseases.
- **Fumigation of Site:** The construction environment should be fumigated to reduce the number of infectious insects and reptiles.
- **Waste Management Practices:** Environmental and human friendly waste management practices encompassing the collection, sorting, and disposal or recycling of waste should be employed to limit exposure to waste which can be harmful to health.
- **Provision of Toilet Facilities:** Temporary toilet facilities should be provided on site with access granted to all site workers to prevent open defecation and its related health impacts.

6.2.9 Occupational Hazards to Workers

- Mitigation measures proposed for risk of accidents during the site preparation stage should be carried on during the site development stage.

6.2.10 Increased Risk of Gender Based Violence and Harassment

- **Leadership and Company Culture:** Senior focal points in both clients and contractors should be appointed with responsibility for ensuring that commitments and policies to prevent GBVH are implemented. Women's representation, including at senior and decision-making levels should be increased in construction companies. Monitoring and reporting systems should be placed.
- **Code of Conduct of Workers:** A code of conduct which is expected to outline appropriate actions and non-actions for the construction workers and other personnel on site should be prepared and publicised. The consequences of acting against the code should also be publicised and enforced where triggered.
- **Training and awareness raising:** Periodic mandatory training covering GBVH issues such as what is unacceptable behaviour and how to report an incident should be delivered to all workers including contractors, subcontractors, core suppliers, as well as relevant consultants and clients. Engagement of expertise like local women's rights NGOs should be considered.
- **Gender Sensitive Physical Design:** The physical design and setting of the construction site should be intentionally gender sensitive to reduce the risk of GBVH. For example, safe, secure, and separate living and changing spaces and toilet facilities should be provided for the male and female workers, and proper lighting across the site should be ensured to remove dead zones.
- **Community Engagement/Employment:** Workers from the PACs should be involved in the construction to create an inclusive workplace with an already established social connection.

6.2.11 Increased Risk of Crime and Juvenile Delinquency

- **Employ workers from the stakeholder communities:** hiring construction workers from stakeholder communities create an inclusive workplace with a good social connection.
- **Security Personnel Engagement:** For the safety of the construction materials, equipment, site, and workers, security personnel should be engaged at the construction site to as a great deterrent to crime from thieves and vandals.
- **Partnership with Local Security Structures:** The existing local security agencies including the police force or vigilante should also be partnered with as they have a good knowledge of the environment and the security challenges within the area.
- **Perimeter Fencing and Access Control:** The site's perimeter should be fenced prior to construction with specific entry/exit points to control access to the site and hinder forced entry. The presence of a perimeter fence will help ease work for the security personal and also make it difficult for criminals to gain access into the construction site.
- **Community Engagement/Employment:** Workers from the PACs should be involved in the construction to give them a sense of stake of and responsibility for the project. This shall encourage them to contribute in security provision.

6.2.12 Risk of Child Labour

- **Child Employment Restriction:** Under-aged children should not be hired at any point of the construction. An age limit of 18 years and above should be clearly stated and taken with all seriousness when hiring construction workers.
- **Child Access Restriction:** Granting children access into the construction site should be highly discouraged. Where necessary, they should be accompanied by an adult and should not contribute to construction activity.

6.2.13 Increased Pressure on Existing Infrastructure and Facilities

- **On-Site Facilities Provision**. Basic facilities for health (first aid), sanitation (water and toilet facilities), commerce (pop up restaurants, etc) and relaxation should be provided on site. Power infrastructure should also be provided as in the proposed mitigation measure for increased power demand.

6.3 Operation Stage

6.3.1 Noise Generation

- **Land Use Plan Compliance:** Development of industries, facilities, and other structures should be done in compliance with the land use plan which ensures compatibility of adjoining uses and separates noise generating activities such as heavy industries from other activities.
- **Day Time Activity:** Industrial activities that generate noise should be limited to the day-time during which other sound diffusion activities are likely to be going on. Such activities should be kept under the FMEnv recommended limit of 90dB and should not be carried out for longer than eight (8) hours in line with the FMEnv recommended maximum value of eight (8) hours occupational exposure to noise. Where night-time activity is to be carried out, the Hub management should be made aware to take necessary actions like informing the public.
- **Breaks Observation**: Breaks should be taken from activities that generate noise and vibrations to reduce the unpleasant effect and for better adherence to the eight (8) hours occupational exposure to noise standard.
- **Use of Earmuffs:** Earmuffs that fit over the entire outer ear to form an air seal which helps in bringing down loud noise to a manageable level should be provided for industrial workers who are exposed to loud noise. Workers are required to utilize the use of earmuffs, as to be regulated by a HSE Policy.
- **Use of Soundproof Generators and/or Noise Absorbents: N**oise absorbers to reduce the level of noise and vibration from machinery should be employed. Sound-proof power generating sets are recommended when necessary.
- **Machinery Maintenance**: Industrial machinery and vehicles should be in good working condition to prevent loudness due to equipment faults or ageing.

6.3.2 Increased Water Demand

- **Itapaji Dam Upgrading:** The Itapaji Dam which is proposed to be the primary source of water during the operation stage should be upgraded and properly managed to ensure that it has the capacity to supply water with minimal interruptions that meet the estimated 2.78Ml daily water demand (with expansion to 12.90Ml possible at operation of Phase 3).
- **Boreholes Utilisation:** The boreholes drilled during the site development stage should continue to serve as an alternative source of water when the Hub is operational. Additional boreholes should be drilled where required.
- **Reservoir Storage:** The proposed water storage reservoir should be constructed and maintained with a storage capacity of, at least, 5.56Ml (with room for expansion to 25.81Ml at operation of Phase 3) to supply water for a minimum of 42 hours in any case of water supply interruption from the main water source. Operational industries are also encouraged to have separate water storage tanks.

6.3.3 Increased Power Demand

- **Power Plant and Substation Development:** The proposed electrical power plant and substations in the Hub should be developed and maintained to serve as stand-by emergency power supply source. The plant should also be operated as a primary source of power to give the Hub power independence from the unreliable national grid.
- **Public Power Supply:** It is highly recommended for the Ekiti State Government to expressly increase the supply of power in the state to offset reliance on the independent power plant and substation.
- **Solar Power Source:** The use of solar PVs is recommended to reduce the pressure on the primary and emergency sourced of power. This should supply electricity for lighting and AC power plugs and sockets for non-heavy appliances and devices.
- **Use of Energy Efficient Appliances/Machineries:** To reduce energy consumption, it is recommended to use energy efficient appliances and machineries during the operation of the industry. This will help reduce the power demand to run the operations of the industry.

6.3.4 Waste Generation

- **Solid Waste Management:** A comprehensive solid waste management system should be functional within the SAPS to collect, separate, and dispose waste appropriately from on-street and public waste bins, industries, residential, commercial, institutional, and recreational facilities. It is recommended for this service to be provided by private waste management companies or through public-private-partnership with the Ekiti State Waste Management Authority.
- **Provision of Waste Bins:** Waste bins should be provided at various locations along the streets and in public spaces to prevent littering and provide a clean environment.
- **Recycling:** Recyclable waste separated from source should be recycled.
- **Liquid Waste Management:** Industries operating within the Hub should be required to present a list of all hazardous chemicals used in industrial processing operations to the Hub management to inform liquid waste management processes. Hazardous liquid waste from industries should receive a basic amount of treatment before being released into the public drainage or sewage system. Mesh wires should be used to prevent particulate matter from being released into the sewage systems.
- **Training and Awareness Raising:** Industrial workers and the public should be trained or informed on proper waste disposal methods through awareness campaigns, indoor and outdoor signs, incentives, etc.

6.3.5 Pollution

6.3.5.1 Air

- **Air Quality Index Measurement:** The Air Quality Index (AQI) of the Hub should be measured periodically to provide information for air quality control measures.

- **Industrial Emissions Monitoring:** All industries operating within the Hub should be required to monitor and report the gaseous content emitted from their industries into the atmosphere to prevent the emission of hazardous emissions and control greenhouse gas contribution.
- **Landscape Maintenance:** The landscape of the Hub based on the Master Plan should maintained to ensure that planted trees and grasses are in good health to serve as environmental filters that absorb pollutant gases such as nitrogen oxides, ammonia etc. from the atmosphere.
- **Solar Energy Use:** The use of solar energy should be encouraged to reduce the emission of from diesel or petrol power generators into the air.
- **Machinery Maintenance:** Pollutant emitting machinery in Hub's industries should be in good working condition and serviced regularly to reduce emissions into the air.
- **Private Car Reliance Reduction:** Reliance and use of private cars within the Hub should be minimised through disincentives such as access and parking fees to reduce vehicular emissions. Sustainable transport alternatives such as walking, cycling, and public transport should be encouraged.

6.3.5.2 Soil

- **Landscape Plan Implementation: Landscape Maintenance:** The landscape of the Hub based on the Master Plan should maintained to protect the topsoil from exposure to pollutants.

6.3.6 Traffic Generation

- **Circulation Plan Implementation:** The circulation (traffic engineering and roads) plan from the Processing Hub Concept Master Plan should be implemented to provide transport system with the capacity to meet the cumulative daily trips estimated.
- **Traffic Management System:** A traffic management system comprising the provision of traffic lights, road traffic signs, road markings, traffic control wardens, and parking regulations should be applied to reduce traffic congestion and risk of road accidents.
- **Staff Bus Provision:** Industrial workers should be provided with staff buses to convey them to-and-from work and to-and-from their homes or community landmarks to reduce traffic congestion by limiting individual travel. This shall also contribute to industrial productivity by saving time and money for industrial workers.
- **Private Car Reliance Reduction:** Reliance and use of private cars within the Hub should be minimised through disincentives such as access and parking fees and the provision of staff buses.
- **Organised Motorcycle/Tricycle Operation:** It was established that motorcycles are the most utilised medium of transportation in nearby communities (see Section 4.3.2.12). Organised motorcycle/tricycle transport systems should be provided to prevent informal, unsafe, and rowdy motorcycle operations within the Hub. This involves the registration and identification of commercial motorcycle riders and enforcement of safety policies.

6.3.7 Risk of Industrial Hazards

- **Health, Safety and Environment (HSE) Policy:** Industries operating in the Hub should have and enforce a comprehensive HSE Policy that protects workers, prevents workplace injuries, and death as well as the suffering and financial hardship these events can cause for workers, their family, and employers. This is a proactive approach to managing workplace safety and health.
- **Safety Drills and Instructions:** Safety instructions should be given to all workers and safety tips and reminders should be placed at activity areas and public spaces of the Hub. Safety drills should also be carried out randomly and without warning to prepare for an emergency.
- **Personal Protective Equipment (PPE):** Industrial workers engaged in physically demanding activity or exposed to potentially harmful chemicals and machinery should be provided with PPEs and trained on its proper use. Example of PPE include face masks, hand gloves, safety boot, safety jackets, earmuffs, reflective jacket, etc. Other non-workers visiting industries for different reasons should also be provided with protective gear for the duration of their visit.
- **Emergency Management Equipment:** Emergency management equipment including extinguishers, hydrants, and hoses with uninterrupted water supply should be put in place at easily accessible locations around the Hub for use during fire or other emergency incidences.

- **First Aid Kits and Emergency Response:** First aid kits should also be put in place for emergency response to sick or injured persons is to minimize complications that can emanate from minor accidents that can complicate the wellbeing of the victim(s) in the future. It is also recommended that workers are being trained on first aid treatment.
- **Machinery Maintenance:** Industrial machinery should be serviced and maintained regularly to prevent a malfunction that can result in accidents during use.
- **Insurance Policies for the Workers:** Industrial workers should be provided with health, medical, or life insurance for financial protection in cases of accidents.

6.3.8 Increased Risk of Contracting and/or Spreading Diseases

- Mitigation measures proposed for pollution and waste generation should be applied to minimise exposure to infectious pollutants and waste.
- **Health, Safety and Environment (HSE) Policy:** Industries operating in the Hub should have and enforce a comprehensive HSE Policy that protects workers from illness.
- **Personal Protective Equipment (PPE):** Industrial workers should be provided with PPEs to protect them from infections.
- **Ensuring Proper Ventilation:** Buildings should be constructed with proper ventilation and extractor fans to reduce the risk of respiratory illness among workers.
- **Regular Medical Check-Ups:** Workers involved in high-risk activities should be encouraged (or supported) to go for regular medical check-ups as it can result in early detection of health challenges before it gets worse.
- **Environmental Auditing:** This is done periodically so as to ensure that environmental and health risk thresholds are not exceeded to the point it becomes detrimental to both workers and their immediate working environment.
- **Sanitation Practices:** Sanitation practices such as cleanliness of industries to prevent biohazards and the risk of contamination that can increase risk of illness should be encouraged. Cleaners and janitors should be employed to keep the working environment and toilet facilities tidy and free from infection.
- **Water Treatment:** The proposed water treatment plant should be developed and maintained to ensure that water supply is pure for drinking and other domestic or industrial uses.

6.3.9 Increased Pressure on Existing Infrastructure and Facilities

- **Complete Implementation of the Processing Hub Master Plan:** The Processing Hub Master Plan should be implemented and developed with minimal deviations to ensure the provision of new infrastructure and facilities.
- **Equitable and Inclusive Access:** Equitable and inclusive access to facilities in the Hub should be provided with particular consideration for low-income industrial workers to reduce their dependence on external existing facilities.

6.3.10 Risk of Slum Development and Squatter Settlement

- **Neighbourhood Plan Development:** Government approved residential layouts (with basic services and infrastructure) should be developed near the Hub to accommodate the expected population increase without slum formation.
- **Development Monitoring and Control:** The Ekiti State Ministry of Housing and Urban Development should be proactive in monitoring and controlling development around the Hub and general SAPZ to prevent haphazard housing and squatter settlements.
- **Housing Affordability Programmes:** Through collaborations with private sector players in housing development and mortgage provision, the Ekiti State Ministry of Housing and Urban Development should engage in programmes to make housing affordable and accessible to medium- and low- income earners, to prevent them from relying on informal housing sector.

6.4 Decommissioning Stage

Recommendations for remediation decommissioning/closure are presented in Chapter 0. Implementation of the recommendations shall mitigate the negative impacts predicted at the decommissioning stage.

7 Environmental and Social Management Plan

This chapter presents the developed ESMP for the Ekiti SAPZ project, with particular focus on the Hub. Generally, this ESMP provides a roadmap for implementation of enhancement and mitigation measures of the impacts identified by this ESIA. It comprises of the expected effectiveness of the proposed mitigations measures, the frequency of which they are to be applied, the responsible parties involved, and the minimum estimated cost for the required actions presented in Table 7.2. The expected effectiveness of the mitigation measures is assessed by expert analysis based on as presented in Table 7.1. Recommendations for enhancing the positive impacts and the parties responsible for implementing the ESMP are also provided.

Table 7.1: Effectiveness of Mitigation Measures

Expected Effectiveness	Description
Low	Impact not mitigated
Medium	Impact partially mitigated
High	Impact Completely mitigated

Table 7.2: Summary of ESMP

Stage	Negative Impacts	Mitigation Measures	Expected Effectiveness	Frequency	Responsible Parties	Estimated Cost (₦)
Site Preparation	Deforestation	Activities' Scope Limitation	Medium	One-off	Contractor(s) and The Ekiti State Government.	N/A
		Tree Reservation	Medium	One-off	Contractor(s)	N/A
		Landscape Plan Implementation	Medium	One-off	Contractor(s), SAPZ Management	20,000,000.00
		Perimeter Trees	Medium	One-off	Contractor(s), SAPZ Management	15,000,000.00
	Impacts on the Ecosystem	Activities' Scope Limitation	Medium	One-off	Contractor(s) and the Ekiti State Government	N/A
		Apply Pollution Mitigation Measures	Medium	Throughout site preparation stage.	Contractor(s), SAPZ Management	Cost addressed under Pollution below.
	Pollution	Machinery Maintenance	Medium	Occasionally	Contractor(s)	100,000,000.00
		Ground Wetting	Medium	Frequently during dry season construction	Contractor(s)	5,000,000.00
		Avoid Open Burning	High	Throughout site preparation stage.	Contractor(s)	N/A
		Waste Management Practices	High	Throughout site preparation stage.	Contractor(s)	10,000,000.00
		Avoid Bush Burning	High	Throughout site preparation stage.	Contractor(s)	N/A
	Waste Generation	Provision of Waste Bins	Medium	One-off	Contractor(s)	5,000,000.00
		Waste Collection and Disposal	Medium	Occasionally within the pre-preparation stage	Contractor(s)	5,000,000.00
		Recycling	Medium	Occasionally within the Site preparation stage.	Ekiti State Waste Management Authority	N/A
		Training and Awareness Raising	Medium	Bi-Annually	Contractors to train their staff.	N/A
	Risk of Accidents	Health, Safety, and Environment (HSE) Policy	High	Throughout site preparation stage.	HSE Personnel, Contractors	N/A

		Safety Drills and Instructions	Medium	Throughout site preparation stage.	HSE Personnel, Contractors	N/A
		Personal Protective Equipment	Medium	Throughout site preparation stage.	HSE Personnel, Contractors	N/A
		Firefighting Equipment	Medium	Throughout site preparation stage.	Contractor(s)	2,000,000.00
		First Aid Kits and Emergency Response	Medium	Throughout site preparation stage.	Contractor(s)	2,500,000.00
		Fumigation of Site	Medium	One-off	Contractor(s)	10,000,000.00
		Insurance Policies for the Workers	Medium	Throughout site preparation stage.	Contractor(s)	N/A
	Traffic Generation	Roadside Parking Avoidance	High	Throughout site preparation stage.	Contractor(s)	N/A
		Use of Road Signs	Medium	Throughout site preparation stage.	Contractor(s)	500,000.00
		Personnel to Direct Traffic	High	Throughout site preparation stage.	Contractor(s)	N/A
		Driver Experience	Medium	One-off	Contractor(s), Human Resource Person	N/A
Site Development	Waste Generation	Provision of Waste Bins	Medium	Replaceable when damaged	Contractor(s)	7,500,000.00
		Waste Collection, Disposal and Recycling	Medium	Occasionally during the Site development stage	Contractor(s)	40,000,000.00
		Training and Awareness Raising	Medium	Bi-Annually	Contractor(s)	20,000,000.00
	Increase in Storm Water Run-Off	Construction of Drainage channels	High	One-off	Contractor(s)	50,000,000.00
		Dry Season Construction	High	Frequently during the dry season	Contractor(s)	N/A
	Pollution	Machinery Maintenance	Medium	Periodically during the Site development stage	Contractor(s)	150,000,000.00
		Ground Wetting	Medium	Frequently during the dry season	Contractor(s)	5,000,000.00
		Avoid Open Burning	High	Throughout the Site development stage	Contractor(s)	N/A
		Waste Management Practices	Medium	Throughout the Site development stage	Contractor(s)	10,000,000.00
		Avoid Bush Burning	High	Throughout the Construction phase	Contractor(s)	N/A
	Increased Risk of Diseases	Portable Water Supply	Medium	Throughout the Site development stage	Contractor(s)	To be provided by the contractor
		Fumigation of Site	Medium	Quarterly	Contractor	10,000,000.00
		Waste Management Practices	Medium	Throughout the Site development stage (same with Pollution)	Contractor(s)	Already addressed under pollution mitigation.

		Provision of Toilet Facilities (mobile toilets)	Medium	One-off	Contractor(s)	To be provided by the contractor
	Occupational Hazards to Workers	Health, Safety and Environment (HSE) Policy	Medium	Throughout the Site development stage	HSE Personnel, Contractor(s)	N/A
		Safety Drills and Instructions	Medium	Monthly during the Site development stage	HSE Personnel, Contractor(s)	To be organized by the contractor.
		Personal Protective Equipment (PPE)	Medium	Throughout the Site development stage	HSE Personnel, Contractor(s)	To be provided by the contractor.
		Emergency management facilities	Medium	Throughout the Site development stage	Contractor(s)	To be provided by the contractor.
		First Aid Kits and Emergency Response	Medium	Throughout the Site development stage	Contractor(s)	3,500,000.00
		Fumigation of Site	Medium	Monthly	Contractor(s)	Already addressed under mitigation for increased risk of diseases.
		Insurance Policies for the Workers	Medium	Throughout the Site development stage	Contractor(s)	To be provided by the contractor.
	Noise Generation	Day Time Activity	Medium	Throughout the Construction phase Site development stage	Contractor(s)	N/A
		Breaks Observation	Medium	Throughout the Site development stage	Contractor(s)	N/A
		Use of Ear Muffs	Medium	Throughout the Site development stage	HSE Personnel, Contractor(s)	N/A
		Use of Sound Proof Generators and/or Noise Absorbents	Medium	Throughout the Site development stage	Contractor(s)	To be provided by the contractor.
		Machinery Maintenance	Medium	Periodically during the Site development stage	Contractor(s)	Already addressed under pollution mitigation for Site development
	Increased Water Demand	Drilling of Boreholes	High	One-off	Contractor(s)	To be provided by the contractor
	Increased Power Demand	Self-Reliant Power Generating Set	High	One-off	Contractor(s)	To be provided by the contractor
	Traffic Generation	Roadside Parking Avoidance	Medium	Throughout the Site development stage	Contractor(s)	N/A
		Use of Road Signs	Medium	Throughout the Site development stage	Contractor(s)	To be provided by the contractor
		Personnel to Direct Traffic	Medium	Throughout the Site development stage	Contractor(s)	To be provided by the contractor
		Driver Experience	Medium	Throughout the Site development stage	Contractor(s)	To be provided by the contractor

		Staff Bus Provision	Medium	Throughout the Site development stage	Contractor(s)	To be provided by the contractor
	Increased Risk of Gender Based Violence and Harassment	Leadership and Company Culture	Medium	One-off	Contractor(s) Human Resource	To be provided by the contractor
		Code of Conduct of Workers	Medium	One-off	Contractor(s) Human Resource	To be provided by the contractor
		Training and awareness raising	Medium	Throughout the Site development stage	Contractor(s)	To be provided by the contractor
		Gender Sensitive Physical Design	Medium	One-off	Contractor(s)	To be delivered by the contractor
		Community Engagement/Employment	Medium	Throughout the Site development stage	Contractor(s) Human Resource	5,000,000.00
	Increased Risk of Crime and Juvenile Delinquency	Employ workers from the stakeholder communities	Medium	When required	Contractor(s)	N/A
		Security Personnel Engagement	High	Throughout the Site development stage	Contractor(s)	To be engaged by the contractor
		Partnership with Local Security Structures	Medium	Throughout the Site development stage	Contractor(s)	N/A
		Perimeter Fencing and Access Control	High	One-off	Contractor(s)	To be engaged by the contractor
		Community Engagement/Employment	Medium	Throughout the Site development stage	Contractor(s)	Already addressed under mitigation for gender-based violence.
	Risk of Child Labour	Child Employment Restriction	High	Throughout the Site development stage	Contractor(s) Human Resource	N/A
		Child Access Restriction	High	Throughout the Site development stage	Contractor(s)	N/A
	Increased Pressure on Existing Infrastructure and Facilities	On-Site Facilities Provision.	Medium	Throughout the Site development stage	Contractor(s)	To be provided by the contractor
Operation		Solid Waste Management	Medium	Throughout the Operation phase	Processing Hub Management, industries	15,000,000.00
		Provision of Waste Bins	Medium	Once in two years	Processing Hub Management	10,000,000.00
		Recycling	Medium	Monthly	Ekiti State Waste Management Authority	N/A
		Liquid Waste Management	Medium	Throughout the Operation phase	Ekiti State Waste Management Authority	The cost should be determined by the Authority
		Training and Awareness Raising	Medium	Bi-annually	Processing Hub Management and Environmental Consultants	To be anchored by the Processing Hub management
	Pollution	Air Quality Index Measurement	Medium	Monthly submission	Industry supervisors	To be costed by industries
		Industrial Emissions Monitoring	Medium	Monthly submission	Industry supervisors	To be costed by industries
		Landscape Plan Maintenance	Medium	Monthly	Processing Hub management	2,000,000.00
		Solar Energy Use	Medium	Throughout the Operation phase	Processing Hub management	To be installed by the industries

		Machinery Maintenance	Medium	Periodically during the Operation phase	Industry supervisors	To be costed by individual industries.
		Private Car Reliance Reduction	Medium	N/A	Policies from Processing Hub management	N/A
	Increased Risk of Diseases	***Same as the measures for Pollution in this stage.***				
		Health, Safety, and Environment (HSE) Policy	Medium	Throughout the Operation phase	HSE Personnel, Industry supervisors	N/A
		Personal Protective Equipment (PPE):	Medium	Throughout the Operation phase	HSE Personnel, Industry supervisors	To be provided by individual industries
		Ensuring Proper Ventilation	Medium	Throughout the Operation phase	Industry supervisors	N/A
		Regular Medical Check-Ups	High	Throughout the Operation phase	Industrial workers	N/A
		Environmental Auditing	High	Every 2 years	Environmental Consultant	To be determined by the Consultant
		Sanitation Practices	Medium	Throughout the Operation	Industry supervisors	N/A
		Water Treatment	High	Throughout the Operation	Ekiti State Water Corporation	To be costed by the Water Corporation
	Risk of Industrial Hazards	Health, Safety, and Environment (HSE) Policy	Medium	Throughout the Operation	HSE Personnel, Industry Supervisors	N/A
		Safety Drills and Instructions	Medium	Throughout the Operation	HSE Personnel, Industry Supervisors	N/A
		Personal Protective Equipment (PPE)	Medium	Throughout the Operation	HSE Personnel, Industry Supervisors	To be provided by individual Industries
		Firefighting Equipment	Medium	Throughout the Operation	Ekiti State Fire Service,	To be provided by individual Industries
		First Aid Kits and Emergency Response	Medium	Throughout the Operation	SEMA, Processing Hub Management	To be provided by individual Industries
		Machinery Maintenance	Medium	Throughout the Operation	Industry Supervisors	To be costed by individual Industries.
		Insurance Policies for the Workers	Medium	Throughout the Operation	Industries	To be provided by individual Industries
	Noise Generation	Land Use Plan Compliance	Medium	One-off	Ekiti State Ministry of Housing and Urban Development, Processing Hub Management	N/A
		Day Time Activity	Medium	Throughout the Operation	Processing Hub management, Industry supervisors	N/A
		Breaks Observation	Medium	Throughout the Operation	Processing Hub management, Industry supervisors	N/A
		Use of Earmuffs	Medium	Throughout the Operation phase	HSE Personnel, Industry Supervisors	To be provided by individual Industries
		Use of Soundproof Generators and/or Noise Absorbents	Medium	Throughout the Operation	Processing Hub Management	To be provided by individual Industries
		Machinery Maintenance	Medium	When due	Industry Supervisors	To be costed by individual Industries.
	Increased Water Demand	Itapaji Dam Upgrading	High	One-off	Ekiti State water corporation, Ekiti state ministry of	To be done by the Ekiti State Government.

					works and transportation.	
		Boreholes Utilisation	Medium	One-off (with regular maintenance)	Processing Hub Management and industries	N/A
		Reservoir Storage	Medium	One-off	Processing Hub management and industries	To be provided by Processing Hub Management and Industries
	Increased Power Demand	Power Plant and Substation Development	High	One-off	TCN, Ekiti State Electricity Board,	N/A
		Public Power Supply	Medium	One-off (with regular maintenance)	TCN, Ekiti State Electricity Board,	N/A
		Solar Power Source	Medium	One-off (with regular maintenance)	Processing Hub Management and industries	N/A
		Use of Energy Efficient Appliances/Machineries	Medium	One-off (with regular maintenance)	Processing Hub Management and industries	N/A
	Traffic Generation	Circulation Plan Implementation	High	One-off	Processing Hub Management and industries	To be provided by Processing Hub Management and Industries
		Traffic Management System	High	Throughout SAPZ operation	Processing Hub Management	To be provided by Processing Hub Management and Industries
		Staff Bus Provision	Medium	Throughout SAPZ operation	Processing Hub Management	To be provided by Processing Hub Management and Industries
		Private Car Reliance Reduction	Medium	Throughout SAPZ operation	Processing Hub Management	N/A
		Organised Motorcycle/Tricycle Operation	Medium	Throughout SAPZ operation	Processing Hub Management	N/A
	Increased Pressure on Existing Infrastructure and Facilities	Complete Implementation of the SAPZ Master Plan	High	One-off	Ekiti State Government	N/A
		Equitable and Inclusive Access	Medium	Throughout SAPZ operation	Processing Hub Management	N/A
	Risk of Slum Development / Squatter Settlements	Neighbourhood Plan Development	High	One-off	Ekiti State Ministry of Housing and Urban Development	To be provided by Ekiti State Ministry of Housing and Urban Development
		Development Monitoring and Control	Medium	Throughout SAPZ operation	Ekiti State Ministry of Housing and Urban Development	To be provided by Ekiti State Ministry of Housing and Urban Development
		Housing Affordability Programmes	Medium	Throughout SAPZ operation	Ekiti State Ministry of Housing and Urban Development	To be provided by Ekiti State Ministry of Housing and Urban Development
Estimated Cost						**₦503,000,000.00**

7.1 Positive Impacts Enhancement

While mitigation efforts are ongoing, it is also vital to engage in actions that purpose enhance the positive impacts of the project for the benefit of the environment and the PACs. For this purpose, recommendations to enhance the positive impacts of the SAPZ are presented in Table 7.3.

Table 7.3: Recommendations to Enhance Positive Impacts

Stage	Positive Impacts	Enhancement Measures
Site Preparation	Job Creation	Offer employment priority for non-skilled labour to members of PACs. Professional and skilled labour positions should also be given to members of the PACs where they qualify.
	Improvement of Local Economy	Local service providers such as food vendors should be allowed vetted entry to operate and provide services in the project site.
	Profitable Use of Land Resources	Disposal of materials cleared from the site should be done after sorting in order to salvage resources such as timber, iron etc. that can be used to generate more income.
	Capacity Building	Employed members of the PACs should undergo trainings required to conduct their jobs and to adhere to the provisions of the ESMP, granting them new or improved skills and knowledge.
	Communal Participation	The social network between workers and the community should be developed through monitored extra activities where probable.
Site Development	Job Creation	Refer to measures recommended in Site Preparation.
	Improvement of Local Economy	Refer to measures recommended in Site Preparation.
	Profitable Use of Land	The developed land use plan should be implemented accordingly to ensure that the land area is developed for its best and most profitable use.
	Revenue Generation	Project activities should be done by operators legally qualified with full operational licenses paid for and taxes paid to the State or Federal Government at due time.
	Capacity Building	Refer to measures recommended in Site Preparation.
	Increased Infrastructure Development	Ensure the coordination of infrastructure development and proper monitoring as proposed in the Master Plan.
	Communal Participation	Refer to measures recommended in Site Preparation.
Operation	Job Creation	Offer employment priority for non-skilled industrial labour to members of PACs. Professional and skilled labour positions should also be given to members of the PACs where they qualify. Other facility management roles should be offered to members of the PAC where qualifications are met.
	Improvement of Local Economy	Local farmers, local transporters and local marketers should be involved in the operations of the SAPZ and the Processing Hub.
	Reduced Loss of Farm Yield	Industries in the Processing Hub and the SAPZ generally should be willing to receive farm yield from local farmers and provide them with accessible means of delivery.
	Increase in Revenue Generation	All industries, farmers, service providers, and other operators should ensure that taxes and other operational dues are paid as required.
	Attraction of FDIs	Operation of activities within the SAPZ should accommodate interested foreign parties. Promotion of the SAPZ should be done on local and international media to attract investors.
	Contribution to FOREX	Operators should not limit their market coverage to Ekiti or Nigeria. Farm produce should be advertised and exported to other regions of the world.
	Capacity Building	Operators should offer empowerment and capacity building opportunities for their staff and should engage in public participation, civic engagement, policy making activities.

	Urbanisation	Urban development policies that foster sustainable development and takes advantage of the human (talent, knowledge, skills, power) and economic resources in urban areas should be developed and followed through.
	CSR to Host Community	Operators should be encouraged to engage in CSR activities to the communities. Impactful CSR activities should be recognised by the government to encourage engagement by other operators.
	Improvement in Food Security	Proposed storage and processing facilities should be operational at all seasons. Irrigation mechanisms should be introduced to foster engagement in dry season farming
	Improvement of State's Brand	Promotion and awareness campaigns should be engaged in to showcase the location of the SAPZ, its services and benefits to the Ekiti and Nigeria.
Decommissioning	Refer to Chapter 8	

7.2 Implementation and Monitoring

During the site preparation and development stages, the contractors engaged should be required to present and abide by a HSE Policy to ensure that they meet health, safety, and environmental concerns. They are also expected to provide training for their staff by a qualified Environmental Control Officer.

The scope of the training shall include:

- Weekly EHS toolbox talks;
- Environmental auditing;
- Non-conformance awareness and emergency response procedures;
- Continual performance review and improvement;
- Document control.

Additionally, all persons responsible for undertaking work during the life of the project must be trained on the contents of the ESMP. All site personnel shall have a basic level of environmental awareness training. Topics covered should include:

- Meaning of "Environment" and coverage;
- Why the environment needs to be protected and conserved;
- How construction activities can impact on the environment;
- Proposed mitigation against impacts; and
- Social responsibility during construction e.g., being considerate to local residents.

The activities of the contractors during the site development and preparation stages should be monitored by the FMEnv, the Ekiti State Ministry of Environment and Natural Resources, the Ekiti State Ministry of Works and Transportation, and/or other relevant MDAs through site inspections. The PACs also share the responsibility of monitoring activities and making complaints if activities result in excessive public disruptions such as noise, pollutions, traffic congestion, crime etc.

During the operation stage, the mitigation measures incorporated in this ESMP shall be overseen by an Environmental Expert who should be a part of the Hub Management on as a full-time employee or on a consultancy contract agreement. The expert shall be familiar with the scientific measurement of environmental and social impacts, remedies, and enhancement. He/she should ensure that the mitigation measures presented in the ESMP are adhered to by the responsible bodies as at when necessary.

Through environmental and social auditing, the effects of operation activities on the environment and society should also be measured after three years of operation (before the end of Phase 1) and further mitigation measures should be presented if required before commencement of Phase 2. The auditing should be done against the baseline information presented in this report. Air, water, and soil quality should be tested as different locations and socio-economic data of the PACs should be collected through questionnaire administration and interviews to measure differences now and after operation.

The schedule and responsibilities for implementation and monitoring of the ESMP are presented in Figure 7.1.

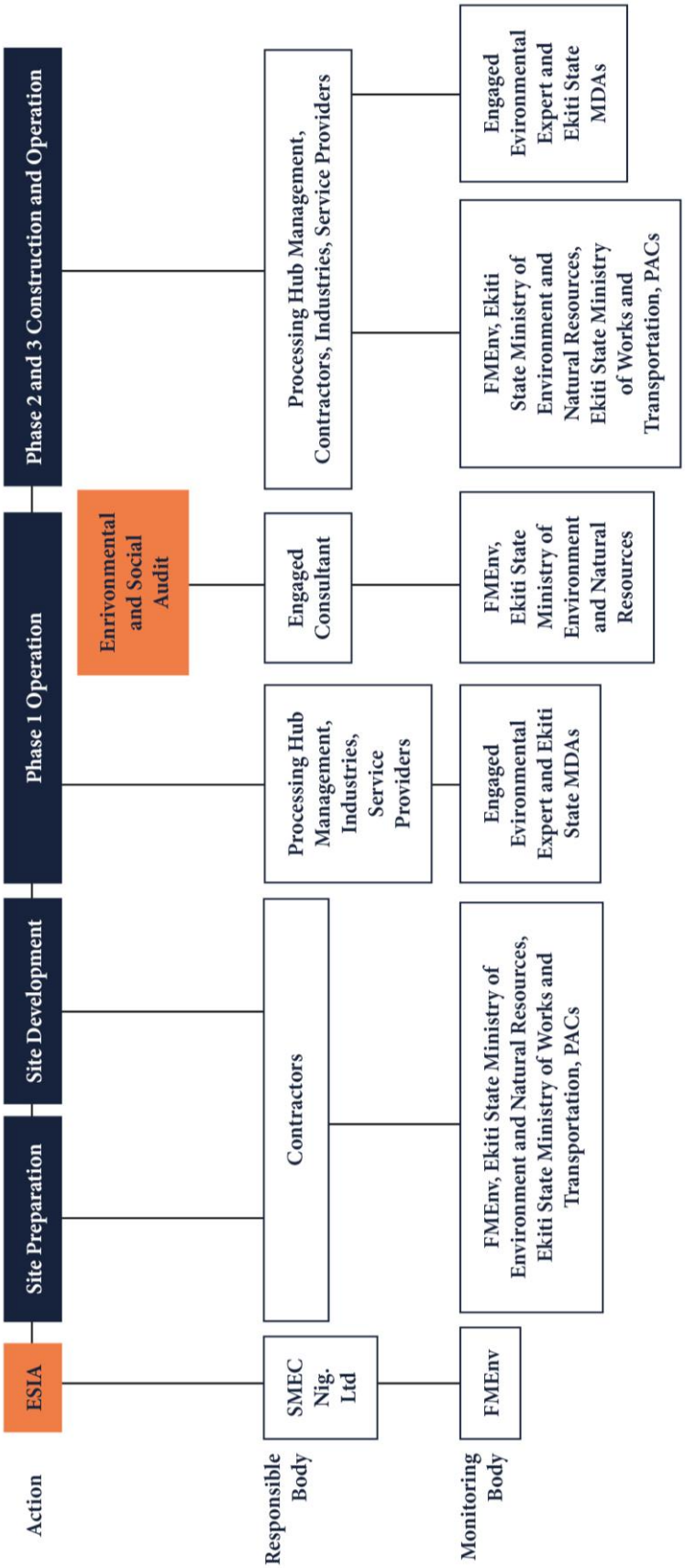

Figure 7.1: Implementation and Monitoring Schedule
Source: (Designed by Author, 2022)

7.3 Institutional Arrangement

In order to ensure the effectiveness of the ESMP, responsibilities of the institutions (as arranged in Figure 7.2) involved in implementation and monitoring are as follows.

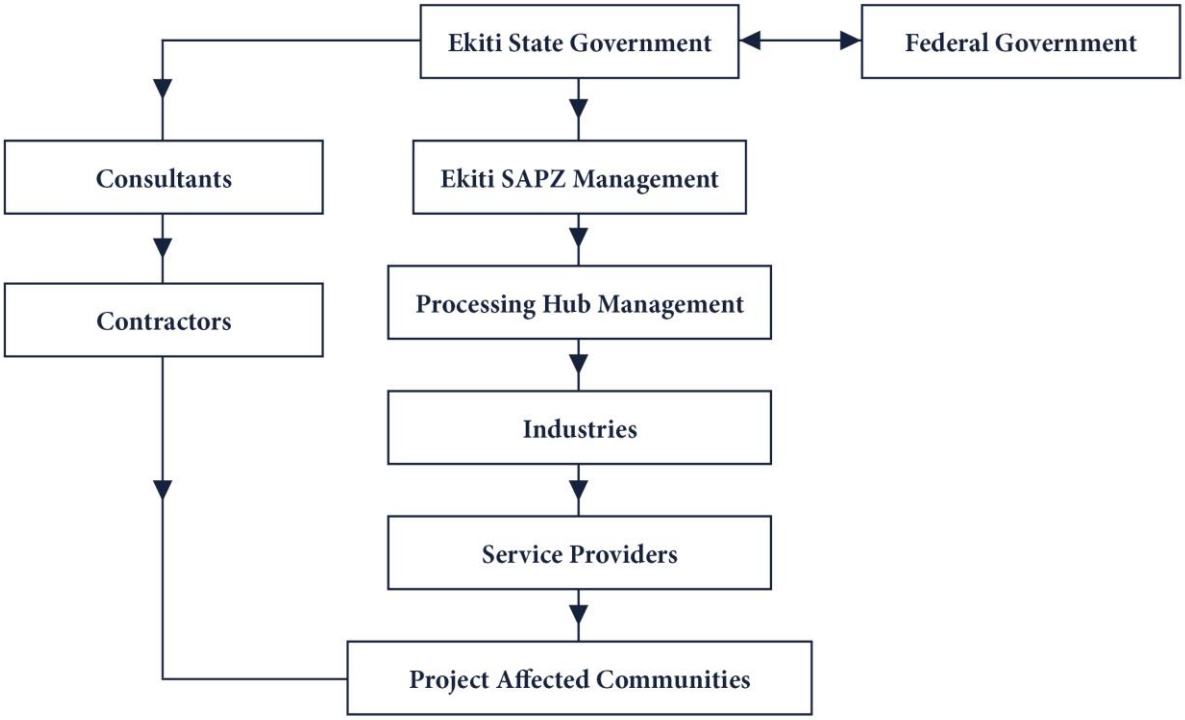

Figure 7.2: Institutional Arrangement for the ESMP
Source: (Designed by Author, 2022)

7.3.1 The Ekiti State Government

The Ekiti State Government, as represented by relevant Ministries, Departments, and Agencies, is responsible for overseeing the implementation of the ESMP to ensure that it is conforms to legal provisions and standards, and that the SAPZ functions for the benefit of the State. This shall be carried out through site inspection and reviews of reports from other parties involved.

7.3.2 The Federal Government

The Federal Government, particularly the Federal Ministry of Environment, is responsible for ensuring that environmental standards are maintained throughout the project lifespan through site inspection and monitoring and review of relevant reports.

7.3.3 Consultants (SMEC Nigeria Limited)

SMEC Nigeria Limited is responsible for the development of the ESMP based on the assessed environmental and social impacts. The conduction of an environmental and social audit shall also be the responsibility of SMEC Nigeria Limited (if consulted) or other environmental consultants.

7.3.4 Contractors

The contractors engaged for the site preparation and development shall be responsible for adhering to the relevant mitigation measures of impacts during the construction stages. They are expected to abide by all stipulated laws and guidelines, and to ensure health, safety, and environmental protection through a HSE Policy.

7.3.5 Ekiti SAPZ Management

A management/governing body should be instituted to oversee the affairs of the SAPZ comprising of representatives of the Ekiti State Government, farmland holders, investors, and PACs. They shall ensure that activities during the operation stage of the entire SAPZ generate minimal negative impacts to the environment and society, and that the socio-economic benefits and sustainability of the SAPZ, as envisaged, are realised.

7.3.6 Processing Hub Management

The Processing Hub is a subsidiary of the general Ekiti SAPZ but should be managed as a separate institution due to the concentration of activities expected. The Hub's management shall ensure that industrial, residential, commercial, and public land areas are developed in accordance with the Processing Hub Concept Plan and that mitigation measures proposed to control effects of the high concentration of activities are followed.

7.3.7 Industries

The refers to the different industries that shall operate within the Hub. They shall adhere to the guidelines provided by the Processing Hub Management and shall ensure that their responsibilities such as monitoring gaseous emissions, providing reports of industrial chemicals use, and ensuring the safety of their workers against industrial risk, etc. as presented in the mitigation measures are met.

7.3.8 Service Providers

Service providers includes non-industrial components of the Hub that provide other services such as commercial, research and education, and the operation of other facilities. They shall also ensure that their activities conform to the ESMP.

7.3.9 Project Affected Communities

The PACs are responsible for observing the direct impacts of the SAPZ on their communities and report any negative impacts to the necessary government MDA.

8 Remediation Plans after Decommissioning/Closure

Projects tend to reach a stage where it becomes less profitable than it was from its inception. This could be as a result of a "force majeure", unfriendly policies, poor management, or poor funding. When such a stage arises, a decommissioning plan should be considered a last resort. There are three approaches which the decommissioning plan may adopt as specified by the Federal Ministry of Environment (2022).

1. **Project/ Facility mothballing** - The termination of a facility with the intention to maintain building structures, and machineries in a state suitable for re-use upon reactivation by which access to the industrial site shall be monitored and controlled by government agencies to ensure compliance with applicable regulations while rehabilitating and treating contamination at the site.
2. **Partial facility decommissioning -** This shall be applicable if a part/section of the facility is to be shut down or when the facility is very large and complex. Partial decommissioning shall also be used for complete decommissioning if the environmental and financial cost of complete decommissioning is too high.
3. **Complete facility decommissioning** - Complete facility decommissioning of a facility is the total closure of an industrial site. It involves the application of all the principles and regulations necessary to protect human health and safety and minimize environmental hazards.

In the event that the SAPZ Processing Hub is scheduled for decommissioning, it shall enter what this report refers to as the decommissioning stage. During this stage, it is recommended that a partial facility decommissioning is considered because of the large expanse of land and other supporting facilities within the Processing Hub such as the residential area and training institute. The process of decommissioning should follow the following steps to ensure that the space and the infrastructural investment are not left redundant to dilapidate.

8.1 Evacuation

Evacuation of the Hub should be done in a way that all personnel and staff are relocated from the premises scheduled for partial decommissioning with the exception security personnel so as to prevent potential theft and vandalism until the decision of its repurposing is taken. Machinery and relevant appliances should be carefully removed to be resold or reused elsewhere. Other utilities and infrastructure such as lighting should be retained.

8.2 Demolition Where Necessary

After evacuation of the Hub, some structures will be unsuitable for repurposing. Therefore, demolition is necessary for such structures to give room for remodelling and redevelopment. Demolition should be safe and seamless without harm to personnel or destruction of ancillary facilities.

8.3 Site Disinfection

After the Processing Hub has been evacuated and necessary demolition is done, the site should be disinfected to rid the environment of vermin, rodents, and any contamination that may exist as a result of the concluded industrial activities within the Hub.

8.4 Restoration or Repurposing of Site

In order to discourage redundancy of infrastructure and facilities that might result in speedy deterioration of these structures within the decommissioned part of the Hub, it is strongly recommended that these decommissioned structures are converted to other uses to ensure the sustainability of use with minimal damage and cost implications. Potential options for which the decommissioned facilities could be repurposed include creative industries, tourism and recreation, and mass housing. These options are considered to be eco-friendly and economically viable, and shall prevent the abandoned structures from deteriorating and worsening environmental, economic and social problems.

8.4.1 Creative Industries

Creative industries refer to economic activities concerned with the commercialization of creativity, ideas, talent, knowledge, and information. Activities supported by creative industries include design, arts and crafts, architecture, visual arts, fashion, radio, literature, performing arts, etc. The decommissioned part of the Hub with structures retained can be remodelled to suite the listed businesses as creative industries do not require specific structures and can be accommodated in a variety of space.

In Auckland, New Zealand, research through qualitative findings show that most creative industries are accommodated in former industrial buildings (Kiroff, 2020). When scores of factories, steelworks and mines closed as a result of decades-long deindustrialisation in the United Kingdom, urban regeneration efforts also focused on converting factories and industrial buildings to creative industries, fostering jobs in IT and digital media (Stewart, 2015). A similar approach was adopted in Shanghai, China, to restore the Yangpu River Waterfront where large scale shipping industries were previously located but now serves as the venue for creativity with galleries, cafes, etc., and hosted the 2019 Shanghai Urban Space Art Season (SUSAS, n.d.).

According to Jobberman (a leading career platform in Nigeria), the creative industry employs about 4.2 million Nigerians across five sectors: Media, Entertainment. Beauty and Lifestyle, Visual Arts, as well as Tourism and Hospitality, making it the country's second-largest employer (Oluwole, 2021). Led by music and movies making global influences, it holds great potential and generates an annual revenue of about 4.5 billion dollars (Babatunde, 2021; Nwankwo, 2018). If decommissioned, repurposing the Processing Hub to a creative industrial space, like the UTC Printing and Media Centre in Abuja, shall ensure continuous revenue generation and ensure that the socio-economic benefits of the Hub are retained.

8.4.2 Tourism and Recreation

Tourism and recreation increase the leisure and experience of both local and international visitors and have the potential to attract Foreign Direct Investment (FDI) and visits. According to a report published by Statista (2022), tourism, recreation, and transport contributed to 4.4% of Nigeria's GDP in 2019 and 2.8% of Nigeria's GDP in 2020. It presents another exploration opportunity for a decommissioned Processing Hub to ensure continuous revenue generation and attraction of FDIs. Viable tourism options that could be adopted for repurposing include museums and theme parks with necessary support services like shops and restaurants.

The potential for tourism and recreation to parks was discussed by Kristiánováa, Gécováa, & Putrová (2016) who analysed the potential of green infills within old industrial sites in Bratislava, Slovakia. The potential has been applied to sites in Lisbon with the conversion of a textile factory to parks and restaurant and Zollverein Coal Mine Industrial Complex in Essen which is currently listed as one of UNESCO's World heritage Sites (Brutscher, 2022). Other successful instances are captured in Kolczak's (2017) National Geographic article.

8.4.3 Mass Housing

Housing is an essential need of man. Unfortunately, it is limited in supply in Nigeria thereby leaving a large proportion of the Nigerian populace unhoused with a current housing stock of 23 houses per 1000 inhabitants, a housing deficit of 20 million units in 2018, and a housing investment need of twenty-one trillion naira (₦ 21 trillion) (Abolo, 2019). Repurposing the decommissioned part of the Hub for mass housing will contribute to the required housing supply and eliminate the cost of providing basic infrastructure such as roads and other relevant amenities which have already been provided within the Hub. If this option is selected for repurposing, it is recommended that old industrial structures are densified through removal and redevelopment of multi-storey apartments to create more houses in the zone. This idea has since been projected by Collaton & Bartsch (1996) and is increasingly being adopted by city managers all over the globe.

9 Conclusions and Recommendations

This Environmental and Social Impact Assessment (ESIA) was conducted for the Ekiti Special Agro-Industrial Processing Zone (SAPZ) with focus on an area referred herein as the Processing Hub in Oye and Ikole Local Government Areas of Ekiti State in line with applicable Nigerian legislative requirements. The SAPZ is an Ekiti State initiative aimed at boosting the agricultural sector as a means of improving the local economy, generating employment, and positioning Ekiti as a major player in the country's agricultural sector. The scope of the ESIA was limited to:

- The assessment of the SAPZ socio-economic and environmental characteristics through the administration of questionnaires, interviews, stakeholder meetings, community consultations, and quality tests for collected air, water, and soil samples.
- The proposal of cost-effective and practical measures to avoid, reduce, or mitigate the predicted negative impacts of the project and enhance the predicted positive impacts.
- The generation of an Environmental and Social Management Plan, including institutions responsible, to guide the implementation of the mitigation measures.

The report has presented the basic physical and socio-economic characteristics of the project area; the legal and administrative frameworks under which the ESIA was carried out; the methods applied for conducting the ESIA; description of the project including the project site and the Processing Hub Master Plan; baseline information collected from stakeholder meetings, environmental assessments, socio economic assessment, and community consultations.

Based on the assessments, the Ekiti SAPZ is predicted to have economic and social positive impacts at the site preparation, site development, and operational stages which include Job Creation, Improvement of Local Economy, Profitable Use of Land and Land Resources, Capacity Building, Communal Participation, Capacity Building, Increased Infrastructure Development, Reduced Loss of Farm Yield, Increase in Revenue Generation, Attraction of FDIs, Contribution to FOREX, Increased Urbanisation, CSR to Host Community, Improvement in Food Security, and Improvement of State's Brand. Recommendations to enhance these positive impacts are contained in the report.

On the other hand, the negative impacts predicted by the assessment are mostly environmental and social. They include Deforestation, Impacts on the Ecosystem, Pollution, Waste Generation, Increase in Storm Water Run-Off, Predisposition of Soil to Erosion, Risk of Accidents, Noise Generation, Traffic Generation, Increased Pressure on Community Infrastructure, Increased Risk of Diseases, Occupational/Industrial Hazards to Workers, Increased Water Demand, Increased Power Demand, Increased Risk of Gender Based Violence and Harassment, Increased Risk of Crime and Juvenile Delinquency, Threat to Community Culture, Risk of Child Labour, and Risk of Slum Development / Squatter Settlements. Mitigation measures to mitigate these negative impacts are proposed in the report. In the event of decommissioning of the site, remediation plans are also proposed with recommendation options to repurpose the site for creative industries, tourism and recreation, or mass housing.

Reliant on the implementation of the mitigation measures, the ESIA concludes that the Ekiti SAPZ is generally more beneficial to the environment and society than it is negatively impactful. On this basis, it is recommended that the Federal Ministry of Environment grants the necessary approvals to facilitate the development of the SAPZ.

The ESIA also proposes the following other recommendations:

- The establishment of adequate institutional capacity, including the recruitment and training of a competent Environmental Control Officer, to ensure compliance with the proposed ESMP as well as the daily operations during the site preparation and development stages of the Processing Hub and to form part of the Hub Management during the operation stage.
- The conduction of Environmental and Social Audits before the commencement of Phase 2 and Phase 3 of the Processing Hub to present an understanding of the current (at the time of commencement) socio-economic characteristics of the site which are expected to have changed due to operations in Phase 1.
- The requirement of all other farm holdings and industries that shall operate within the SAPZ to present site-specific EIA reports in accordance with national legislations.

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Appendix A Zabson Laboratory Certified Results

ZABSON LABORATORY SERVICES LTD

RC 1029872

ACCREDITED BY FED. MIN. OF ENVIRONMENT

SERVICES ON:	*HEAD OFFICE:*	*BRANCH OFFICE*
Water / Waste WaterAnaiysis Soil (Agro / Engr) Purpose Air Quality Monitoring, Lab. Training General Contractor.	Block 7, Flat 1, OAU Qtrs Yusuf MaitamaSuleStr, Asokoro, Abuja, FCT.	N01, Angwan Makama Opp Lucky King Bakery Masaka .Karu L.G Nasarawa State.

CERTIFICATE OF LAB ANALYSIS

SAMPLE RECEIVED IN THE LABORATORY
Date sample collected: 17-18/11/2021
Time sample collected: 11:37am -5:38pm
Date sample delivered to the Lab: 19/11/2021
Time sample received in the lab: 01:36 pm

SAMPLE DESCRIPTION
Samples of Ground/Surface water and Topsoil &Subsoil were received for physical, chemical and Bacteriological analysis.

S/N	Item Description	Quantity
1.	Ground Water Sample	8
2.	Surface water sample	4
3.	Soil Samples (Top &Subsoil)	34
4.	Air quality analysis	-
	TOTAL	46

ZABSON LABORATORY SERVICES LTD
Manager
Zabson Laboratory
DATE

SAMPLE TYPE: UNDERGROUND WATER
VOLUME/ QUANTITY: 0.75 LITRES
PRESERVATION METHOD: REFRIDGERATION

TABLE 2: PHYSICO-CHEMICAL ANALYSIS OF WATER SAMPLE

S/N	PARAMETERS	GW1 (well) Promise farm	GW2 (well) Esun-Ekiti	GW 3 (well) Ipao-Ekiti	GW 4 (Well) Oke Ako	FMEnv. STD
A.	PHYSICAL TEST		N 07° 82' 41.9" E 08° 67' 60.6"	N 07° 84' 21.0" E 08° 73' 49.3"	N 78° 80' 80.4" E 08° 79' 73.4"	
1.	ODOUR	UNOBJECTIONABLE	UNOBJECTIONABLE	UNOBJECTIONABLE	UNOBJECTIONABLE	-
2	COLOUR	Colorless	Colorless	Colorless	Colorless	-
3	TEMPERATURE (°C)	29.7	29.5	29.9	30.0	<40
4.	pH	5.9	6.2	5.8	6.0	6-9
5.	DISSOLVED OXYGEN (mg/l)	5.55	6.0	6.50	6.1	7.5
6.	ELECTRICAL CONDUCTIVITY (µS/cm)	302	198	302	286	1000
7.	TOTAL DISSOLVED SOLIDS (mg/l)	153	101	153	145	500
8.	TURBIDITY (NTU)	1.0	0.895	1.1	1.0	5
9.	TOTAL SUSPENDED SOLIDS (mg/l)	0.223	0.063	0.215	0.249	10
B.	CHEMICAL TEST					
10.	TOTAL HARDNESS (mg/l)	68.48	239.68	85.60	256.8	200
11.	MAGNESIUM (mg/l)	17.12	51.36	17.12	51.36	50
12.	CALCIUM (mg/l)	51.36	188.32	51.36	205.44	150
13.	TOTAL CHLORINE (mg/l)	11.15	17.04	12.783	6.99	250
14.	SULPHATE (mg/l)	14.48	12.31	19.10	15.79	500
15.	PHOSPHATE (mg/l)	1.467	1.139	0.602	0.853	5
16.	NITRATE AS NITROGEN (mg/l)	8.543	10.02	5.82	7.99	20
17.	NITRITE AS NITROGEN (mg/l)	0.050	0.162	0.041	0.335	<1
18.	BIOCHEMICAL OXYGEN DEMAND (mg/l)	3.7	2.9	3.4	3.9	7.5
19.	CHEMICAL OXYGEN DEMAND (mg/l)	14.8	11.6	13.6	15.6	30
C	HEAVY METALS					
20.	LEAD (mg/l)	ND	ND	ND	ND	0.05
21	NICKEL (mg/l)	ND	ND	ND	ND	0.05
22.	CADMIUM (mg/l)	ND	ND	0.001	ND	<1
23.	MANGANESE (mg/l)	0.19	0.20	0.18	0.19	0.2
24.	COPPER (mg/l)	0.038	0.081	0.061	0.053	0.1
25.	IRON TOTAL (mg/l)	0.414	0.285	0.281	0.362	1.5
26.	ZINC (mg/l)	0.613	0.532	0.482	0.302	1
D	BACTERIOLOGICAL ANALYSIS					
27.	*total coliform (mpn/100ml)*	3.1×10^2	3.2×10^2	2.9×10^2	3.0×10^2	1.8
28	*e-coli (cfu/100ml)*	ND	1.2×10^2	ND	1.2×10^2	0.0
29.	*salmonella (cfu/100ml)*	1.2×10^2	1.0×10^2	1.0×10^2	1.1×10^2	0.0
30.	*shigella (cfu/100ml)*	ND	ND	ND	ND	0.0
31.	*staphylococcus (cfu/100ml)*	1.4×10^2	1.5×10^2	1.4×10^2	1.3×10^2	0.0
33.	*klebsellia (cfu/100 ml)*	1.4×10^2	1.3×10^2	1.3×10^2	1.5×10^2	0.0

Source: EKITI SAPZ, 2021
ND = Not Dictate NS = Not state GW = Ground Water

ZABSON LABORATORY SERVICES LTD
DATE 4/6/22 SIGN

SAMPLE TYPE: UNDERGROUND WATER
VOLUME/ QUANTITY: 0.75 LITRES
PRESERVATION METHOD: REFRIDGERATION

TABLE 3: PHYSICO-CHEMICAL ANALYSIS OF WATER SAMPLE

S/N	PARAMETERS	GW5 (B-hole) Oke-Ako	GW6 (well) Ita-Paji	GW 7 (well) Isan-Ekiti	GW 8 (Well) Control	FMEnv. STD
A.	PHYSICAL TEST	N 07° 80' 88.3" E 08° 80' 01.6"	N 07° 72' 50.9" E 08° 76' 68.7"	N 07° 56' 30.7" E 08° 75' 80.0"	N 07° 58' 48.2" E 08° 70' 37.7"	
1.	ODOUR	UNOBJECTIONABLE	UNOBJECTIONABLE	UNOBJECTIONABLE	UNOBJECTIONABLE	-
2	COLOUR	Colorless	Colorless	Colorless	Colorless	-
3	TEMPERATURE (°C)	29.9	29.9	29.6	30.1	<40
4.	pH	6.2	5.9	6.3	5.9	6-9
5.	DISSOLVED OXYGEN (mg/l)	5.90	4.85	5.64	6.0	7.5
6.	ELECTRICAL CONDUCTIVITY (µS/cm)	276	199	211	206	1000
7.	TOTAL DISSOLVED SOLIDS (mg/l)	140	102	107	105	500
8.	TURBIDITY (NTU)	0.783	1.1	1.0	1.0	5
9.	TOTAL SUSPENDED SOLIDS (mg/l)	0.032	0.088	0.063	0.076	10
B.	CHEMICAL TEST					
10.	TOTAL HARDNESS (mg/l)	154.08	171.2	222.56	171.2	200
11.	MAGNESIUM (mg/l)	34.24	51.36	34.24	34.24	50
12.	CALCIUM (mg/l)	119.84	119.84	188.32	136.96	150
13.	TOTAL CHLORINE (mg/l)	3.193	2.856	11.946	6.783	250
14.	SULPHATE (mg/l)	13.29	18.18	22.36	19.80	500
15.	PHOSPHATE (mg/l)	1.203	0.864	1.139	0.712	5
16.	NITRATE AS NITROGEN (mg/l)	10.00	6.83	9.22	10.00	20
17.	NITRITE AS NITROGEN (mg/l)	0.130	0.113	0.099	0.053	<1
18.	BIOCHEMICAL OXYGEN DEMAND (mg/l)	3.0	3.3	4.1	3.6	7.5
19.	CHEMICAL OXYGEN DEMAND (mg/l)	12.0	13.2	16.4	14.3	30
C	HEAVY METALS					
20.	LEAD (mg/l)	ND	ND	ND	0.001	0.05
21	NICKEL (mg/l)	ND	ND	ND	ND	0.05
22.	CADMIUM (mg/l)	0.001	ND	ND	ND	<1
23.	MANGANESE (mg/l)	0.18	0.20	0.19	0.20	0.2
24.	COPPER (mg/l)	0.093	0.011	0.064	0.081	0.1
25.	IRON TOTAL (mg/l)	0.102	0.544	0.710	0.311	1.5
26.	ZINC (mg/l)	0.286	0.401	0.512	0.484	1
D	BACTERIOLOGICAL ANALYSIS					
27.	*total coliform (mpn/100ml)*	3.4×10^2	3.2×10^2	3.3×10^2	3.0×10^2	1.8
28	*e-coli (cfu/100ml)*	ND	1.1×10^2	ND	ND	0.0
29.	*salmonella (cfu/100ml)*	1.1×10^2	1.2×10^2	1.0×10^2	1.1×10^2	0.0
30.	*shigella (cfu/100ml)*	ND	ND	1.0×10^2	ND	0.0
31.	*staphylococcus (cfu/100ml)*	1.5×10^2	1.2×10^2	1.3×10^2	1.3×10^2	0.0
32.	*klebsellia (cfu/100 ml)*	1.3×10^2	1.2×10^2	1.4×10^2	1.2×10^2	0.0

Source: EKITI SAPZ, 2021
ND = Not Dictate NS = Not state GW = Ground Water

ZABSON LABORATORY SERVICES LTD
DATE 11/06/2021 SIGN

SAMPLE TYPE: SURFACE WATER
VOLUME/ QUANTITY: 0.75 LITRES
PRESERVATION METHOD: REFRIDGERATION

TABLE4: PHYSICO-CHEMICAL ANALYSIS OF WATER SAMPLE

S/N	PARAMETERS	SW1 Promise Farm	SW2 Esun-Ekiti	SW 3 Itapaji Dam	SW 4 Egede farm	FMEnv. STD
A.	PHYSICAL TEST		N 07° 82' 46.6" E 08° 71' 11.2"	N 07° 72' 12.1" E 08° 80' 73.9"	N 07° 71' 91.0" E 08° 88' 55.1"	
1.	ODOUR	UNOBJECTIONABLE	UNOBJECTIONABLE	UNOBJECTIONABLE	UNOBJECTIONABLE	-
2	COLOUR	Colorless	Colorless	Colorless	Colorless	Colorless
3	TEMPERATURE (°C)	29.9	29.4	30.2	26.9	25-35
4.	pH	6.6	5.9	6.6	6.3	6-9
5.	DISSOLVED OXYGEN (mg/l)	6.88	6.10	6.80	6.38	7.0
6.	ELECTRICAL CONDUCTIVITY (µS/cm)	110	89	78	210	1000
7.	TOTAL DISSOLVED SOLIDS (mg/l)	56.5	47.3	40.2	108.3	1000
8.	TURBIDITY (NTU)	1.9	2.1	2.0	2.2	5
9.	TOTAL SUSPENDED SOLIDS (mg/l)	0.408	0.399	0.169	0.222	<10
B.	CHEMICAL TEST					
10.	TOTAL HARDNESS (mg/l)	68.48	85.6	171.2	85.6	NS
11.	MAGNESIUM (mg/l)	17.12	34.24	68.48	34.24	NS
12.	CALCIUM (mg/l)	51.36	51.36	102.72	51.36	NS
13.	TOTAL CHLORINE (mg/l)	0.032	0.048	0.043	0.036	0.2
14.	SULPHATE (mg/l)	87.0	77.0	65.0	79.0	500
15.	PHOSPHATE (mg/l)	2.522	3.118	1.995	2.132	5
16.	NITRATE AS NITROGEN (mg/l)	6.62	7.19	4.90	6.70	10
17.	NITRITE AS NITROGEN (mg/l)	0.063	0.059	0.082	0.046	1
18.	BIOCHEMICAL OXYGEN DEMAND (mg/l)	12.0	11.4	14.2	10.8	30
19.	CHEMICAL OXYGEN DEMAND (mg/l)	48.0	45.6	56.8	43.2	100
C	HEAVY METALS					
20.	LEAD (mg/l)	0.001	ND	ND	0.001	0.05
21	NICKEL (mg/l)	ND	ND	0.001	0.002	0.05
22.	CADMIUM (mg/l)	0.003	0.002	0.003	0.002	0.02
23.	MANGANESE (mg/l)	0.026	0.030	0.025	0.027	NS
24.	COPPER (mg/l)	0.011	0.008	0.014	0.012	0.1
25.	IRON TOTAL (mg/l)	0.353	0.175	0.442	0.293	0.2
26.	ZINC (mg/l)	0.224	0.163	0.215	0.132	1
D	BACTERIOLOGICAL ANALYSIS					
27.	*total coliform (mpn/100ml)*	5.0×10^3	4.7×10^3	5.3×10^3	4.9×10^3	400
28	*e-coli (cfu/100ml)*	3.2×10^3	2.8×10^3	3.0×10^3	3.3×10^3	0.0
29.	*salmonella (cfu/100ml)*	2.8×10^3	2.5×10^3	2.7×10^3	2.3×10^3	0.0
30.	*shigella (cfu/100ml)*	2.2×10^3	1.9×10^3	3.0×10^3	2.4×10^3	0.0
31.	*staphylococcus (cfu/100ml)*	2.9×10^3	2.6×10^3	2.8×10^3	3.0×10^3	0.0
32.	*klebsellia (cfu/100 ml)*	2.2×10^3	1.7×10^3	2.0×10^3	1.9×10^3	0.0

Source: EKITI SAPZ, 2021
ND = Not Dictate NS = Not state SW = surface Water

ZABSON LABORATORY SERVICES LTD
DATE 6/6/22 SIGN

SAMPLE TYPE SOIL
QUANTITY 100G EACH
PRESERVATION METHOD AIR DRYING

TABLE 5. PHYSICAL/CHEMICAL ANALYSIS OF SOIL SAMPLE.

S/N	PARAMETER	SAPZ 1 (TS) (mg/kg) EXCEPT STATED	SAPZ 2 (TS) (mg/kg) EXCEPT STATED	SAPZ 3 (TS) (mg/kg) EXCEPT STATED	SAPZ 4 (T S) (mg/kg) EXCEPT STATED	SAPZ 5 (TS) (mg/kg) EXCEPT STATED	SAPZ 6 (TS) (mg/kg) EXCEPT STATED
A.	PHYSICAL TEST			N 07° 82' 47.8" E 08° 67' 65.6"	N 07° 82' 54.4" E 08° 67' 65.9"	N 07° 83' 55.1" E 08° 70' 68.0"	N 07° 82' 44.4" E 08° 71' 10.7"
1.	pH	5.30	6.09	5.98	6.16	5.44	6.25
2.	TEMPERATURE (°C)	30.2	30.5	30.9	29.9	30.4	30.8
3.	ELECTRICAL CONDUCTIVITY (µS/cm)	199	164	200	139	187	182
4.	PARTICLE SIZES/TEXTURE	SAND/SILT/CLAY 60.32/20.98/13.61	SAND/SILT/CLAY 45.63/37.21/13.04	SAND/SILT/CLAY 39.83/33.56/20.43	SAND/SILT/CLAY 46.43/34.83/13.52	SAND/SILT/CLAY 43.49/30.22/19.47	SAND/SILT/CLAY 42.88/31.54/19.98
5.	POROSITY (%)	27.00	30.00	23.33	33.33	26.66	40.00
6.	MOISTURE CONTENT	16.0	12.3	17.9	12.8	11.8	10.5
7.	BULK DENSITY (g/dm^3)	0.94	0.89	0.85	0.88	0.99	1.2
8.	ORGANICS						
9.	TOTAL ORGANIC CARBON	13.0	8.0	11.0	7.2	8.3	13.2
C.	EXCHANGEABLE IONS						
12.	NITRATE	21.08	18.12	20.04	17.18	13.98	19.15
13.	NITRITE	0.522	0.835	0.440	0.490	0.108	0.310
14	SULPHATE	85.2	76.12	67.8	59.40	83.10	76.23
15.	MAGNESSIUM	11.10	13.18	10.14	17.12	14.00	12.17
16.	CALCIUM	24.00	34.12	18.18	34.20	25.00	24.54
D.	HEAVY METALS						
17.	LEAD	0.001	ND	ND	0.001	ND	ND
18.	IRON	0.343	0.124	0.116	0.099	0.108	0.114
19.	COPPER	0.026	0.021	0.017	0.011	0.022	0.011
20.	MANGANESE	0.027	0.019	0.010	0.012	0.0023	0.016
21.	ZINC	0.860	0.612	0.438	0.642	0.590	1.090
22.	CADMIUM	0.001	ND	ND	ND	ND	ND
23	NICKEL	ND	ND	ND	ND	ND	ND
E.	BACTERIAL ISOLATE						
24	*Proteus(cfu/100ml)*	3.5×10^3	3.7×10^3	4.0×10^3	3.0×10^3	3.2×10^3	3.2×10^3
25.	*e-coli (cfu/100ml)*	1.0×10^2	1.3×10^2	1.0×10^2	1.0×10^2	1.1×10^2	1.0×10^2
26.	*yeast/mold(cfu/100 ml)*	1.3×10^2	1.3×10^2	1.2×10^2	1.2×10^2	1.0×10^2	1.1×10^2
27	*Shigella(cfu/100ml)*	3.0×10^2	3.2×10^2	2.7×10^2	2.4×10^2	1.9×10^2	3.0×10^2
28.	*Klebsilla(cfu/100ml)*	4.2×10^3	3.9×10^3	4.0×10^3	3.7×10^3	3.4×10^3	3.5×10^3
29.	*Staphilococcus(cfu/100ml)*	1.3×10^1	1.5×10^1	1.3×10^1	1.7×10^1	1.3×10^1	1.5×10^1

Source: EKITI SAPZ, 2021
ND = Not Dictate NS = Not state TS = Top Soil

ZABSON LABORATORY SERVICES LTD
DATE 4/01/22 SIGN

SAMPLE TYPE SOIL
QUANTITY 100G EACH
PRESERVATION METHOD AIR DRYING

TABLE 6. PHYSICAL/CHEMICAL ANALYSIS OF SOIL SAMPLE.

S/N	PARAMETER	SAPZ 7 (TS) (mg/kg) EXCEPT STATED	SAPZ 8 (TS) (mg/kg) EXCEPT STATED	SAPZ 9 (TS) (mg/kg) EXCEPT STATED	SAPZ 10 (T S) (mg/kg) EXCEPT STATED	SAPZ 11 (TS) (mg/kg) EXCEPT STATED	SAPZ 12 (TS) (mg/kg) EXCEPT STATED
A.	PHYSICAL TEST	N 07° 83′ 93.6″ E 08° 70′ 86.6″	N 07° 84′ 28.3″ E 08° 73′ 50.7″	N 07° 84′ 10.8″ E 08° 75′ 38.2″	N 07° 84′ 17.0″ E 08° 75′ 36.4″	N 07° 80′ 75.3″ E 08° 79′ 44.0″	N 07° 80′ 94.4″ E 08° 80′ 80.3″
1.	pH	6.03	5.94	6.50	6.37	5.75	6.07
2.	TEMPERATURE (°C)	29.9	30.3	31.0	30.5	31.5	31.0
3.	ELECTRICAL CONDUCTIVITY (µS/cm)	127	132	162	120	158	160
4.	PARTICLE SIZES/TEXTURE	SAND/SILT/CLAY 44.49/29.22/19.78	SAND/SILT/CLAY 50.54/25.78/17.05	SAND/SILT/CLAY 40.83/33.56/20.43	SAND/SILT/CLAY 49.28/27.43/16.79	SAND/SILT/CLAY 47.83/29.35/15.66	SAND/SILT/CLAY 53.09/26.17/13.93
5.	POROSITY (%)	30.00	27.00	36.66	43.33	30.00	25.33
6.	MOISTURE CONTENT	14.0	11.8	11.8	10.2	12.8	17.2
7.	BULK DENSITY (g/dm^3)	0.92	0.90	1.0	1.1	0.97	0.96
8.	ORGANICS						
9.	TOTAL ORGANIC CARBON	11.5	7.6	8.5	7.3	7.8	11.0
C.	EXCHANGEABLE IONS						
12.	NITRATE	15.18	9.11	6.75	12.00	8.16	7.13
13.	NITRITE	0.492	0.123	0.323	0.283	0.214	0.143
14	SULPHATE	88.0	64.41	55.76	64.53	53.40	84.13
15.	MAGNESSIUM	13.43	16.13	9.68	13.80	14.30	10.36
16.	CALCIUM	28.32	36.42	12.54	26.40	28.12	22.12
D.	HEAVY METALS						
17.	LEAD	ND	0.001	ND	ND	ND	0.001
18.	IRON	0.292	0.186	0.202	0.132	0.231	0.184
19.	COPPER	0.031	0.028	0.019	0.017	0.020	0.019
20.	MANGANESE	0.023	0.031	0.017	0.019	0.033	0.024
21.	ZINC	0.487	0.537	0.388	0.482	0.507	0.717
22.	CADMIUM	ND	ND	0.001	0.001	ND	0.001
23	NICKEL	ND	ND	ND	0.001	ND	ND
E.	BACTERIAL ISOLATE						
24	*Proteus(cfu/100ml)*	3.3×10^3	3.6×10^3	3.8×10^3	4.1×10^3	4.0×10^3	3.9×10^3
25.	*e-coli (cfu/100ml)*	1.2×10^2	1.2×10^2	1.1×10^2	1.3×10^2	1.4×10^2	1.1×10^2
26.	*yeast/mold(cfu/100 ml)*	1.2×10^2	1.1×10^2	1.1×10^2	1.2×10^2	1.2×10^2	1.4×10^2
27	*Shigella(cfu/100ml)*	3.3×10^2	3.5×10^2	3.0×10^2	2.8×10^2	2.9×10^2	3.1×10^2
28.	*Klebsilla(cfu/100ml)*	4.0×10^3	3.7×10^3	3.8×10^3	3.5×10^3	3.6×10^3	3.5×10^3
29.	*Staphilococcus(cfu/100ml)*	1.2×10^1	1.3×10^1	1.2×10^1	1.3×10^1	1.4×10^1	1.2×10^1

Source: EKITI SAPZ, 2021
ND = Not Dictate NS = Not state TS = Top Soil

ZABSON LABORATORY SERVICES LTD
DATE 14/01/22 SIGN

SAMPLE TYPE SOIL
QUANTITY 100G EACH
PRESERVATION METHOD AIR DRYING

TABLE 7. PHYSICAL/CHEMICAL ANALYSIS OF SOIL SAMPLE.

S/N	PARAMETER	SAPZ 13 (TS) (mg/kg) EXCEPT STATED	SAPZ 14 (TS) (mg/kg) EXCEPT STATED	SAPZ 15 (TS) (mg/kg) EXCEPT STATED	SAPZ 16 (T S) (mg/kg) EXCEPT STATED	SAPZ control (TS) (mg/kg) EXCEPT STATED
A.	PHYSICAL TEST	N 07° 72′ 80.5″ E 08° 77′ 90.8″	N 07° 72′ 20.4″ E 08° 80′ 62.8″	N 07° 71′ 91.0″ E 08° 88′ 55.1″	N 07° 56′ 29.3″ E 08° 75′ 76.5″	N 07° 58′ 48.2″ E 08° 70′ 37.7″
1.	pH	6.38	6.15	5.94	6.17	6.18
2.	TEMPERATURE (°C)	31.8	32.0	31.4	31.5	31.9
3.	ELECTRICAL CONDUCTIVITY (µS/cm)	199	170	148	144	152
4.	PARTICLE SIZES/TEXTURE	SAND/SILT/CLAY 51.09/26.89/16.38	SAND/SILT/CLAY 51.46/27.03/16.55	SAND/SILT/CLAY 49.16/32.63/13.51	SAND/SILT/CLAY 50.44/30.12/11.83	SAND/SILT/CLAY 49.37/32.25/12.04
5.	POROSITY (%)	26.00	28.60	43.33	40.00	43.33
6.	MOISTURE CONTENT	16.2	10.6	12.3	11.0	9.4
7.	BULK DENSITY (g/dm^3)	0.96	0.94	1.1	1.0	0.96
8.	ORGANICS					
9.	TOTAL ORGANIC CARBON	9.6	7.2	8.0	9.2	6.0
C.	EXCHANGEABLE IONS					
12.	NITRATE	18.30	9.28	20.08	16.04	12.63
13.	NITRITE	0.386	0.316	0.402	0.341	0.504
14	SULPHATE	49.6	60.00	59.16	84.13	68.10
15.	MAGNESSIUM	14.13	15.12	10.84	12.24	11.00
16.	CALCIUM	29.22	31.28	21.18	24.49	22.10
D.	HEAVY METALS					
17.	LEAD	ND	0.001	ND	ND	ND
18.	IRON	0.263	0.320	0.184	0.175	0.202
19.	COPPER	0.043	0.036	0.026	0.040	0.025
20.	MANGANESE	0.033	0.026	0.021	0.028	0.036
21.	ZINC	0.362	0.414	0.303	0.288	0.421
22.	CADMIUM	0.002	0.001	ND	ND	ND
23	NICKEL	ND	ND	ND	ND	ND
E.	BACTERIAL ISOLATE					
24	*Proteus(cfu/100ml)*	4.2×10^3	3.3×10^3	3.0×10^3	3.6×10^3	3.4×10^3
25.	*e-coli (cfu/100ml)*	1.4×10^2	1.6×10^2	1.3×10^2	1.5×10^2	1.3×10^2
26.	*yeast/mold(cfu/100 ml)*	1.4×10^2	1.5×10^2	1.4×10^2	1.2×10^2	1.3×10^2
27	*Shigella(cfu/100ml)*	3.5×10^2	3.3×10^2	3.6×10^2	3.4×10^2	3.3×10^2
28.	*Klebsilla(cfu/100ml)*	3.7×10^3	4.0×10^3	4.2×10^3	3.9×10^3	3.5×10^3
29.	*Staphilococcus(cfu/100ml)*	1.5×10^1	1.4×10^1	1.3×10^1	1.3×10^1	1.2×10^1

Source: EKITI SAPZ, 2021
ND = Not Dictate NS = Not state TS = Top Soil

ZABSON LABORATORY SERVICES LTD
DATE SIGN

SAMPLE TYPE SOIL
QUANTITY 100G EACH
PRESERVATION METHOD AIR DRYING

TABLE 8. PHYSICAL/CHEMICAL ANALYSIS OF SOIL SAMPLE.

S/N	PARAMETER	SAPZ 1 (SS) (mg/kg) EXCEPT STATED	SAPZ 2 (SS) (mg/kg) EXCEPT STATED	SAPZ 3 (SS) (mg/kg) EXCEPT STATED	SAPZ 4 (SS) (mg/kg) EXCEPT STATED	SAPZ 5 (SS) (mg/kg) EXCEPT STATED	SAPZ 6 (SS) (mg/kg) EXCEPT STATED
A.	PHYSICAL TEST			N 07° 82′ 47.8″ E 08° 67 65.6″	N 07° 82′ 54.4″ E 08° 67 65.9″	N 07° 83′ 55.1″ E 08° 70 68.0″	N 07° 82′ 44.4″ E 08° 71 10.7″
1.	pH	5.40	5.88	5.90	6.05	5.90	6.20
2.	TEMPERATURE (°C)	30.0	29.8	30.5	29.9	30.0	30.2
3.	ELECTRICAL CONDUCTIVITY (µS/cm)	174	148	182	130	190	154
4.	PARTICLE SIZES/TEXTURE	SAND/SILT/CLAY 65.29/19.84/11.42	SAND/SILT/CLAY 42.36/33.84/19.24	SAND/SILT/CLAY 51.07/27.61/14.16	SAND/SILT/CLAY 60.32/23.98/12.61	SAND/SILT/CLAY 44.84/34.70/13.80	SAND/SILT/CLAY 47.12/30.83/15.14
5.	POROSITY (%)	23.66	30.33	25.00	24.33	33.66	40.00
6.	MOISTURE CONTENT	11.9	14.0	17.0	16.3	13.6	10.0
7.	BULK DENSITY (g/dm^3)	0.89	0.90	0.88	0.97	0.86	1.2
8.	ORGANICS						
9.	TOTAL ORGANIC CARBON	10.0	10.8	11.4	9.2	8.8	7.0
C.	EXCHANGEABLE IONS						
12.	NITRATE	13.41	10.45	12.23	15.19	13.02	18.52
13.	NITRITE	0.062	0.165	0.062	0.046	0.038	0.110
14	SULPHATE	63.43	70.80	56.32	57.23	78.93	72.98
15.	MAGNESSIUM	8.40	10.00	4.81	11.07	5.83	7.43
16.	CALCIUM	20.10	32.42	14.20	31.41	19.16	24.40
D.	HEAVY METALS						
17.	LEAD	ND	ND	ND	ND	ND	ND
18.	IRON	0.480	0.225	0.331	0.121	0.332	0.153
19.	COPPER	0.036	0.020	0.032	0.048	0.028	0.025
20.	MANGANESE	0.023	0.026	0.018	0.010	0.032	0.013
21.	ZINC	0.430	0.252	0.182	0.312	0.625	0.252
22.	CADMIUM	ND	ND	0.001	0.001	ND	ND
23	NICKEL	ND	ND	ND	ND	ND	ND
E.	BACTERIAL ISOLATE						
24	*Proteus(cfu/100ml)*	3.0×10^3	3.6×10^3	3.8×10^3	3.3×10^3	2.7×10^3	2.9×10^3
25.	*e-coli (cfu/100ml)*	0.7×10^2	1.0×10^2	0.3×10^2	0.4×10^2	0.6×10^2	0.3×10^2
26.	*yeast/mold(cfu/100 ml)*	1.4×10^2	1.1×10^2	0.8×10^2	0.9×10^2	1.0×10^2	1.2×10^2
27	*Shigella(cfu/100ml)*	2.5×10^2	1.9×10^2	2.0×10^2	2.2×10^2	2.0×10^2	2.6×10^2
28.	*Klebsilla(cfu/100ml)*	3.4×10^3	4.0×10^3	3.8×10^3	3.7×10^3	2.9×10^3	3.0×10^3
29.	*Staphilococcus(cfu/100ml)*	1.0×10^1	0.8×10^1	0.6×10^1	1.0×10^1	1.0×10^1	1.3×10^1

Source: EKITI SAPZ, 2021
ND = Not Dictate NS = Not state SS = Sub Soil

ZABSON LABORATORY SERVICES LTD
DATE 14/01/22 SIGN

SAMPLE TYPE SOIL
QUANTITY 100G EACH
PRESERVATION METHOD AIR DRYING

TABLE 9. PHYSICAL/CHEMICAL ANALYSIS OF SOIL SAMPLE.

S/N	PARAMETER	SAPZ 7 (SS) (mg/kg) EXCEPT STATED	SAPZ 8 (SS) (mg/kg) EXCEPT STATED	SAPZ 9 (SS) (mg/kg) EXCEPT STATED	SAPZ 10 (TSS) (mg/kg) EXCEPT STATED	SAPZ 11 (SS) (mg/kg) EXCEPT STATED	SAPZ 12 (SS) (mg/kg) EXCEPT STATED
A.	PHYSICAL TEST	N 07° 83′ 93.6″ E 08° 70′ 86.6″	N 07° 84′ 28.3″ E 08° 73′ 50.7″	N 07° 84′ 10.8″ E 08° 75′ 38.2″	N 07° 84′ 17.0″ E 08° 75′ 36.4″	N 07° 80′ 75.3″ E 08° 79′ 44.0″	N 07° 80′ 94.4″ E 08° 80′ 80.3″
1.	pH	6.00	6.00	6.00	6.41	5.92	6.12
2.	TEMPERATURE (°C)	29.8	30.8	31.0	30.0	31.4	30.0
3.	ELECTRICAL CONDUCTIVITY (µS/cm)	118	138	151	133	154	163
4.	PARTICLE SIZES/TEXTURE	SAND/SILT/CLAY 47.11/26.85/14.48	SAND/SILT/CLAY 50.54/25.78/17.05	SAND/SILT/CLAY 41.33/31.34/21.92	SAND/SILT/CLAY 46.51/30.23/19.00	SAND/SILT/CLAY 51.28/26.64/18.13	SAND/SILT/CLAY 49.84/30.10/14.33
5.	POROSITY (%)	30.33	26.66	36.66	43.00	30.00	26.33
6.	MOISTURE CONTENT	16.0	13.4	11.3	11.0	14.8	18.0
7.	BULK DENSITY (g/dm^3)	0.91	0.94	1.0	0.99	0.95	0.97
8.	ORGANICS						
9.	TOTAL ORGANIC CARBON	12.2	10.1	8.5	9.0	10.2	11.6
C.	EXCHANGEABLE IONS						
12.	NITRATE	13.04	3.99	6.21	12.60	9.86	8.36
13.	NITRITE	0.490	0.280	0.226	0.270	0.143	0.064
14	SULPHATE	49.9	38.17	50.13	69.12	57.48	77.62
15.	MAGNESSIUM	10.22	12.44	9.90	13.30	15.00	10.30
16.	CALCIUM	24.12	33.22	12.44	26.0	23.63	20.81
D.	HEAVY METALS						
17.	LEAD	ND	ND	ND	ND	ND	ND
18.	IRON	0.402	0.191	0.246	0.174	0.301	0.163
19.	COPPER	0.036	0.022	0.013	0.021	0.020	0.018
20.	MANGANESE	0.027	0.028	0.018	0.019	0.030	0.020
21.	ZINC	0.282	0.503	0.343	0.480	0.444	0.631
22.	CADMIUM	ND	0.001	ND	ND	ND	ND
23	NICKEL	ND	ND	ND	ND	ND	ND
E.	BACTERIAL ISOLATE						
24	*Proteus(cfu/100ml)*	2.9×10^3	3.1×10^3	3.0×10^3	3.5×10^3	3.6×10^3	3.4×10^3
25.	*e-coli (cfu/100ml)*	1.2×10^2	1.0×10^2	0.8×10^2	1.3×10^2	1.2×10^2	1.1×10^2
26.	*yeast/mold(cfu/100 ml)*	0.8×10^2	0.6×10^2	0.5×10^2	0.8×10^2	1.0×10^2	1.0×10^2
27	*Shigella(cfu/100ml)*	3.0×10^2	3.1×10^2	2.8×10^2	2.4×10^2	2.4×10^2	2.7×10^2
28.	*Klebsilla(cfu/100ml)*	3.7×10^3	3.0×10^3	3.4×10^3	3.2×10^3	3.5×10^3	3.4×10^3
29.	*Staphilococcus(cfu/100ml)*	0.8×10^1	1.0×10^1	0.6×10^1	0.7×10^1	1.0×10^1	0.9×10^1

Source: EKITI SAPZ, 2021
ND = Not Dictate NS = Not state SS = Sub Soil

ZABSON LABORATORY SERVICES LTD
DATE 14/10/21 SIGN

SAMPLE TYPE SOIL
QUANTITY 100G EACH
PRESERVATION METHOD AIR DRYING

TABLE 10. PHYSICAL/CHEMICAL ANALYSIS OF SOIL SAMPLE.

S/N	PARAMETER	SAPZ 13 (SS) (mg/kg) EXCEPT STATED	SAPZ 14 (SS) (mg/kg) EXCEPT STATED	SAPZ 15 (SS) (mg/kg) EXCEPT STATED	SAPZ 16 (TSS) (mg/kg) EXCEPT STATED	SAPZ control (SS) (mg/kg) EXCEPT STATED
A.	PHYSICAL TEST	N 07° 72' 80.5" E 08° 77 90.8"	N 07° 72' 20.4" E 08° 80 62.8"	N 07° 71' 91.0" E 08° 88 55.1"	N 07° 56' 29.3" E 08° 75 76.5"	N 07° 58' 48.2" E 08° 70 37.7"
1.	pH	6.40	6.10	6.02	6.18	5.94
2.	TEMPERATURE (°C)	30.4	31.6	31.2	30.9	31.2
3.	ELECTRICAL CONDUCTIVITY (µS/cm)	184	161	150	139	160
4.	PARTICLE SIZES/TEXTURE	SAND/SILT/CLAY 48.68/29.46/17.12	SAND/SILT/CLAY 55.27/22.42/15.84	SAND/SILT/CLAY 52.75/24.06/16.27	SAND/SILT/CLAY 43.65/28.92/20.48	SAND/SILT/CLAY 44.29/33.10/16.67
5.	POROSITY (%)	26.33	28.00	43.00	40.00	43.33
6.	MOISTURE CONTENT	15.8	10.2	8.9	11.2	10.0
7.	BULK DENSITY (g/dm^3)	0.96	0.95	1.0	0.98	0.97
8.	ORGANICS					
9.	TOTAL ORGANIC CARBON	10.0	7.4	8.4	8.0	7.3
C.	EXCHANGEABLE IONS					
12.	NITRATE	19.21	10.43	20.00	14.83	12.11
13.	NITRITE	0.187	0.119	0.295	0.101	0.365
14	SULPHATE	39.9	48.97	58.06	80.21	68.00
15.	MAGNESSIUM	12.24	14.02	10.12	12.24	11.95
16.	CALCIUM	28.42	24.48	24.20	24.40	24.12
D.	HEAVY METALS					
17.	LEAD	ND	ND	ND	ND	ND
18.	IRON	0.194	0.300	0.263	0.132	0.192
19.	COPPER	0.027	0.019	0.020	0.032	0.029
20.	MANGANESE	0.030	0.032	0.045	0.062	0.098
21.	ZINC	0.193	0.333	0.264	0.245	0.310
22.	CADMIUM	ND	ND	ND	ND	ND
23	NICKEL	ND	ND	ND	ND	ND
E.	BACTERIAL ISOLATE					
24	*Proteus(cfu/100ml)*	3.1×10^3	2.7×10^3	3.2×10^3	2.6×10^3	3.0×10^3
25.	*e-coli (cfu/100ml)*	0.7×10^2	1.2×10^2	0.7×10^2	1.2×10^2	0.9×10^2
26.	*yeast/mold(cfu/100 ml)*	1.0×10^2	1.2×10^2	1.1×10^2	0.8×10^2	0.8×10^2
27	*Shigella(cfu/100ml)*	2.9×10^2	2.9×10^2	3.2×10^2	3.0×10^2	3.0×10^2
28.	*Klebsilla(cfu/100ml)*	3.2×10^3	3.6×10^3	3.7×10^3	3.2×10^3	3.0×10^3
29.	*Staphilococcus(cfu/100ml)*	1.0×10^1	1.1×10^1	0.9×10^1	0.7×10^1	0.5×10^1

Source: EKITI SAPZ, 2021
ND = Not Dictate NS = Not state SS = Subsoil Soil

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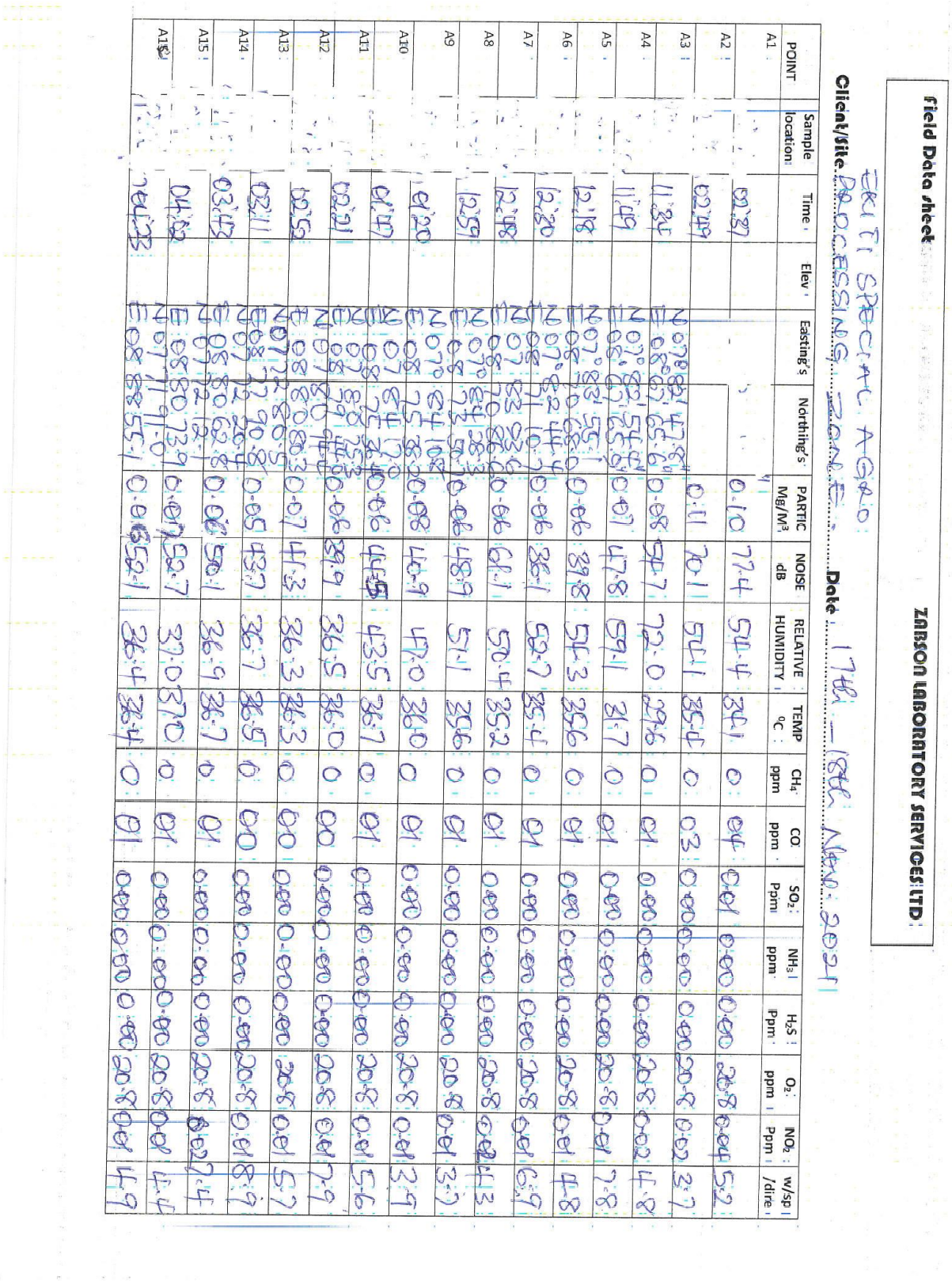
Appendix B Federal Ministry of Environment EIA Format

Table of Contents	The table of content shows the chapter, titles and pages of the items in the ESIA report for references and easy navigation through the report.
Executive Summary	The executive summary simplifies what the entire ESIA report is about, highlighting the aim and objectives of the report, processes involved in undertaking the study, as well as critical findings/deductions.
List of Maps	This part contains the title and pages of all maps included in the report for easy navigation.
List of Tables	This part contains the title and pages of all tables included in the report for easy navigation.
List of Acronyms	This section contains the list of all acronyms used in the ESIA report and their full meaning, arranged in alphabetical order.
Acknowledgement	Under this heading, the efforts and contribution of individuals and MDAs which facilitated the ESIA report are noted and appreciated.
EIA Preparers	This part of the report contains the names and designation of the ESIA Consultants involved in the preparation of the ESIA report.
Introduction	This is the first chapter of the ESIA report, which explains the essence of the report from the global perspective to the local perspective. This Chapter contains headings such as Background Information, Administrative and Legal Framework, Terms of Reference amongst others
Project Justification	This is the Second Chapter of the FMEnv ESIA format, it justifies the importance and need of the proposed project and the benefits which are likely to emanate from its execution. The subheadings under this includes Need for the Project, Value of the Project and the Envisaged Sustainability of the Project.
Project and Process/Description	This is the third chapter in this format, it elaborates the nature of the project, its processes and method of operations. This chapter contains sub - headings such as: Project Type, Input and output of raw materials and products, Location, Technological layout, Production Process, Project Operation and Maintenance, and Project Schedule.
Description of the Environment including Data Acquisition	This is the Fourth Chapter in this ESIA format, it explains the nature of the environment where the project is to be undertaken and contains the following sub headings: Study Approach, Baseline Data Acquisition Methods, Geographical Location, Climatic Condition, Air quality assessment, Noise level assessment, Vegetation cover characteristics, Potential land use and landscape patterns, Ecologically sensitive areas, Terrestrial fauna and wildlife, Soil studies, Aquatic studies, Groundwater resources, Socio-economic studies and; Infrastructural services.
Associated and Potential Environmental Impact	This is the fifth chapter in this ESIA format, this chapter predicts the potential impacts that can emanate from the execution of the projection in both adverse and beneficial terms. The subheadings to be elaborated on includes; Impact Prediction Methodology, Significant positive impacts, Significant negative impacts, Site preparation and construction impacts,

	Transportation impacts, Raw materials impacts, Process impacts, Project specific incremental environmental changes (if any), Project specific cumulative effects, Project specific long/short term effects, Project specific reversible/irreversible effect, Project specific adverse/beneficial effects and Project specific risk and hazard assessments (if any).
Mitigation measures and alternatives	The sixth chapter of the FMEnv ESIA report format is the mitigation measures and alternatives which is based on the nature of predicted impact from the previous chapter. This chapter includes Best available control technology, Liability compensation, Site alternative, location/route, No project option and a table of impacts with corresponding mitigation measures.
Environmental Monitoring Plan (EMP)	Based on the Mitigation measures proffered in the previous chapter, chapter seven which is the environmental monitoring plan explains the methods and cost required to mitigate the potential negative impacts when they arise. This chapter would explain the scope of monitoring, the parameters to be monitored, methodology and the monitoring schedule.
Remediation Plans after De-commissioning/closure	The eight chapter of the report explains the likely repercussion of the project decommissioning and what should be done if the project is no longer sustainable or is obsolete.
Conclusions and Recommendations	This chapter (ninth Chapter) concludes the report with a statement summary highlighting the viability of the project and recommendations based on findings and analysis which will aid the sustainability of the project.
Glossary of terms, Bibliography and Appendices	The concluding part of the report where uncommon used terms would be explained under the glossary of terms, references would be added and appendices.

Appendix C Sample Collection Log Records



field Data sheet

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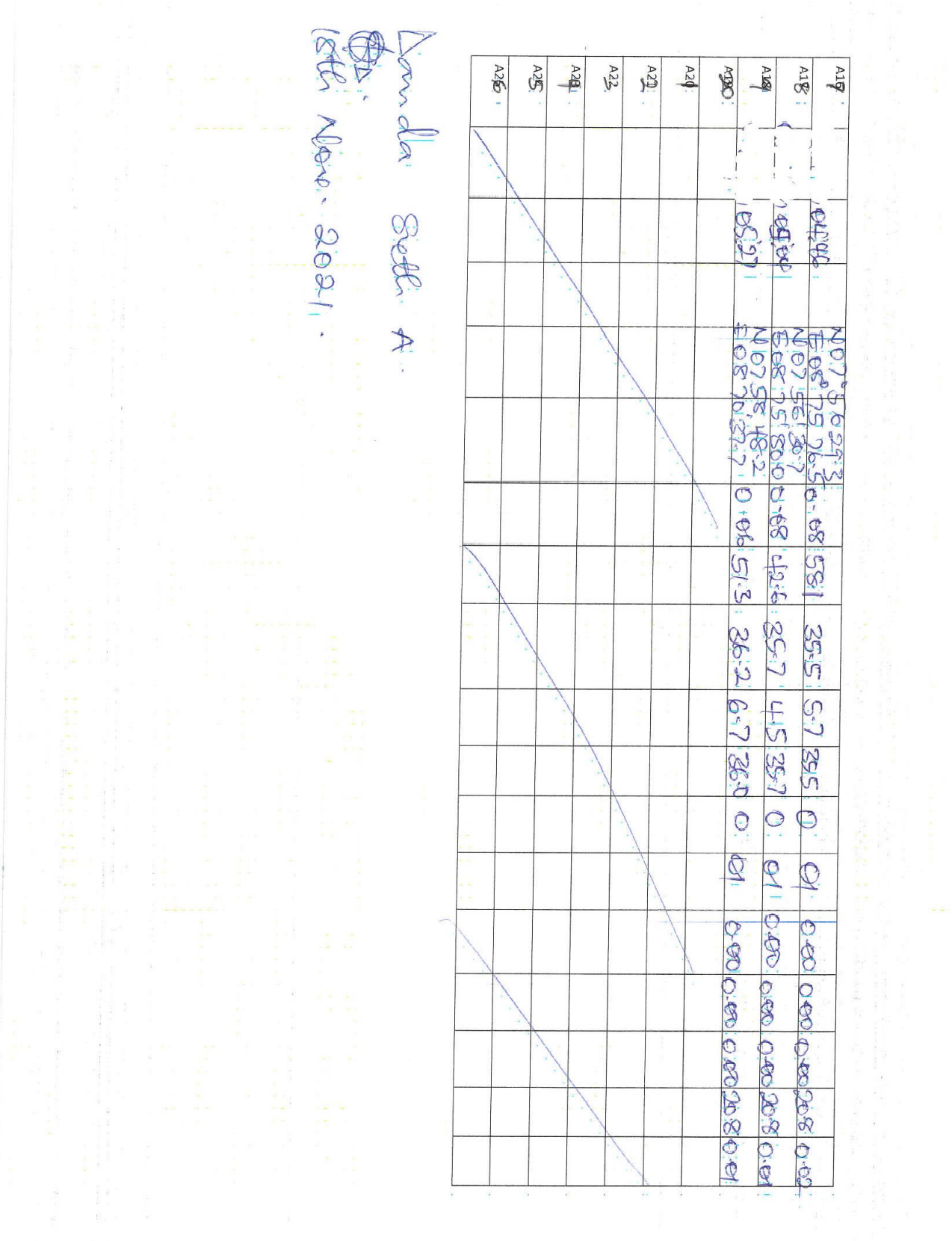
Client/Site: EKITI SPECIAL AGRO PROCESSING ZONE. Date: 17th - 18th NOV. 2021

POINT	Sample location	Time	Elev	Easting's	Northing's	PARTIC Mg/M³	NOISE dB	RELATIVE HUMIDITY	TEMP °C	CH_4 ppm	CO ppm	SO_2 Ppm	NH_3 ppm	H_2S ppm	O_2 ppm	NO_2 Ppm	w/sp /dire
A1		02:37				0.10	77.4	54.4	34.1	0	04	0.01	0.00	0.00	20.8	0.04	5.2
A2		02:49				0.11	70.1	54.1	35.4	0	03	0.00	0.00	0.00	20.8	0.02	3.7
A3		11:34				0.08	54.7	72.0	29.6	0	01	0.00	0.00	0.00	20.8	0.02	4.8
A4		11:49				0.07	47.8	59.1	31.7	0	01	0.00	0.00	0.00	20.8	0.01	2.8
A5		12:18				0.06	39.8	54.3	30.6	0	01	0.00	0.00	0.00	20.8	0.01	4.8
A6		12:30				0.06	36.1	58.2	35.4	0	01	0.00	0.00	0.00	20.8	0.01	6.7
A7		12:48				0.06	61.1	57.4	35.2	0	01	0.00	0.00	0.00	20.8	0.01	6.7
A8		12:59				0.06	48.9	57.1	30.6	0	01	0.00	0.00	0.00	20.8	0.01	3.7
A9		01:20				0.08	40.9	47.0	36.0	0	01	0.00	0.00	0.00	20.8	0.01	4.8
A10		01:47				0.06	44.5	43.5	36.7	0	01	0.00	0.00	0.00	20.8	0.01	5.6
A11		02:21				0.06	39.9	36.5	36.0	0	00	0.00	0.00	0.00	20.8	0.01	7.9
A12		02:52				0.07	44.3	36.3	36.3	0	00	0.00	0.00	0.00	20.8	0.01	5.7
A13		02:11				0.05	43.7	36.7	36.5	0	00	0.00	0.00	0.00	20.8	0.01	8.9
A14		03:43				0.06	50.1	36.9	36.7	0	01	0.00	0.00	0.00	20.8	0.01	8.9
A15		04:02				0.07	52.7	37.0	37.0	0	01	0.00	0.00	0.00	20.8	0.02	7.4
A15		04:23				0.07	55.1	36.4	36.4	0	01	0.00	0.00	0.00	20.8	0.01	4.9



Appendix D Socio-Economic Assessment Questionnaire

EKITI SAPZ ESIA STUDY

Registration

Name of Community/Ward:
What is the name of the community/ward?

_____

Name of Enumerator:
Your name

_____

Field Supervisor:
Who is your Supervisor?

_____

Date of Survey:
Today's date

yyyy-mm-dd

Geographical coordinates:

_____

latitude (x.y °)

_____

longitude (x.y °)

_____

altitude (m)

_____

accuracy (m)

_____

Socio-Economic Data

Gender:
Respondent's gender

- ◯ Male
- ◯ Female

Age:

Respondent's age.

- ◯ 18-25 years
- ◯ 26 – 35 years
- ◯ 36 – 50 years
- ◯ Above 50 years

Religious Group:

Respondent's religious group

- ◯ Islam
- ◯ Christianity
- ◯ Traditional

Marital Status:

Respondent's marital status

- ◯ Single
- ◯ Married
- ◯ Divorced
- ◯ Widow/Widower

Number of Wives:

- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5 and above

Total Family Size:

Family size of the respondent including parents.

- ◯ 1-3
- ◯ 4-6
- ◯ 7-9
- ◯ 10 and above

Educational Level:

- ◯ No formal education
- ◯ SSCE and below
- ◯ OND
- ◯ HND/Bachelors' Degree
- ◯ Post Graduate
- ◯ Others

Specify _:

Specify educational level

Employment Status:

Respondent's employment status.

- ◯ Unemployed
- ◯ Self Employed
- ◯ Employed
- ◯ Retired
- ◯ Student

Income per month:

Range of respondents monthly income

- ◯ 18,000 and below
- ◯ N18,001 to N50,000
- ◯ 50,001 to 100,000
- ◯ 100,001 to 150,000
- ◯ Above 150,000

Occupation:

Respondent's occupation

- ◯ Artisan
- ◯ Trader
- ◯ FIshing
- ◯ Farmer
- ◯ Civil Servant
- ◯ Professional
- ◯ Others

Specify :

What is the major economic activity around your area:

Respondent's economic perception of the area

- ◯ Uncertain (I do not know)
- ◯ Farming
- ◯ Trading
- ◯ Arts and crafts
- ◯ Fishing
- ◯ Civil service
- ◯ Others

Specify :

Specify economic activity based on the last question.

Primary mode of transportation:

Respondents primary mode of transportation.

- ◯ Private Vehicle
- ◯ Commercial Vehicle
- ◯ Private Motorcycle/Tricycle
- ◯ Commercial Motorcycle/Tricycle
- ◯ Bicycle
- ◯ Foot

How long have you been living in this area:

- ◯ 0-5 years
- ◯ 6-10 years
- ◯ 11-15 years
- ◯ 16-20 years
- ◯ More than 20 years

Health, Education and Recreational Facilities

Type of Health facilities present in your Community:

Health facilities within respondents community

- [ ] Hospital
- [ ] Clinic
- [ ] Chemist/Drug Store
- [ ] None

Walking distance to the closest health facility:

How far is the nearest health facility

- ◯ Less than 5 minutes (500m)
- ◯ 5-10 minutes (1km)
- ◯ 11-15 minutes' walk
- ◯ 16-30 minutes' walk
- ◯ More than 30 minutes' walk

What are the most prevalent sicknesses in your community:

- [ ] Malaria
- [ ] Typhoid Fever
- [ ] Cholera
- [ ] Diarrhoea
- [ ] Others

Specify :

Specify the sickness based on your previous selection

Type of Educational facilities present:

- [ ] Primary School
- [ ] Secondary School
- [ ] Higher Institution
- [ ] None

Walking distance to the closest educational facility:

How far is the nearest educational facility?

- ◯ Less than" 5 minutes (500m)
- ◯ 5-10 minutes (1km)
- ◯ 11-15 minutes' walk
- ◯ 16-30 minutes' walk
- ◯ More than 30 minutes' walk

Type of Recreational facilities within the community:

- [ ] Playground
- [ ] Park
- [ ] Football field
- [ ] Others

Specify :

Specify the type of recreational activity based on your previous selection

Walking distance to the closest recreational facility.

How far is the closest recreational facility?

- ◯ Less than'' 5 minutes (500m)
- ◯ 5-10 minutes (1km)
- ◯ 11-15 minutes' walk
- ◯ 16-30 minutes' walk
- ◯ More than 30 minutes' walk

How often do you engage actively in recreational activities:

- ◯ Frequently (at least twice a week)
- ◯ Occasionally (once in 2 weeks)
- ◯ Rarely (once a month)
- ◯ Never

Sanitation and Waste Management

Do you own a waste bin in your house:

- ◯ Yes
- ◯ No

Do you separate your waste before disposal:

- ◯ Yes
- ◯ No

Do you recycle your waste:

- ◯ Yes
- ◯ No

Which method of waste disposal do you use:

respondents mode of waste disposal

- ◯ Dumping Site
- ◯ Pit for burning
- ◯ Dumping by road side
- ◯ Waste collection Vendors
- ◯ Burying
- ◯ Composting
- ◯ Dumping in water bodies/drainages
- ◯ Others

Specify :

_____

How frequently do you dispose your waste:

- ◯ Every day
- ◯ Two times in a week
- ◯ Once a week
- ◯ Two times in a month
- ◯ Once in a month

How far is the waste disposal point from your house:

- ◯ In front of residence
- ◯ 0 to 50 meters
- ◯ 51 to 100 meters
- ◯ 101 to 150 meters
- ◯ 151 to 200 meters
- ◯ Above 200 meters

What is the major composition of your household waste:

- ◯ Packages and wraps
- ◯ Kitchen waste/ food waste
- ◯ Plastics
- ◯ Papers
- ◯ Others

Specify :

_____

Which type of toilet do you use:

- ◯ Water Closet
- ◯ Pit Latrine
- ◯ Open defaecation

Will you be willing to pay for waste disposal services:

- ◯ Yes
- ◯ No

If Yes, how much weekly:

How much can the respondent be willing to pay weekly for waste evacuation/removal

Water and Energy Supply

What is the Source of water supply both for drinking and domestic use:

- ◯ Stream/river
- ◯ Well
- ◯ Borehole
- ◯ Pipe-borne water

Do you purify your water before use:

- ◯ Yes
- ◯ No

If yes, What method of purification do you use.

- ☐ Use of Alum
- ☐ Boiling
- ☐ Sieving
- ☐ Others specify

Specify :

Specify purification method

Have you suffered from any of these water borne diseases within the last one year:

water borne disease suffered within the past one year.

- [ ] Typhoid
- [ ] Cholera
- [ ] Hepatitis
- [ ] Amebiasis
- [ ] Scabies
- [ ] None

What is your source of Power:

- [ ] PHCN
- [ ] Solar
- [ ] Generator
- [ ] Local (Lanterns, Candles)

What is the source of domestic energy both for cooking and other uses:

cooking energy

- ◯ Firewood
- ◯ Kerosene
- ◯ Gas
- ◯ Electric Cooker

Environmental Challenges

Has there been any Environmental challenges experienced within the area in the last 5 years:

- ◯ Yes
- ◯ No

If yes, please specify:

- [ ] Flooding
- [ ] Erosion
- [ ] Drought
- [ ] Others

Specify :

specify based on the previous selected "others"

Level of Awareness and Anticipations

How much do you know about the SAPZ Project:

awareness on the Ekiti SAPZ project

- ◯ Nothing
- ◯ Little
- ◯ Average
- ◯ Sufficient
- ◯ Very sufficient

How will you rate your relationship with the farmers/agro-investors within your community:

Respondents relationship with agro investors within the area.

- ◯ Hostile (very bad)
- ◯ Poor (bad)
- ◯ Fair (average)
- ◯ Good (friendly)
- ◯ Very good (very friendly)

What form of empowerment do you anticipate from this project:

- ◯ Allocation of land for Agriculture.
- ◯ Partnerships with service providers
- ◯ Job creation
- ◯ Establishment of inter-trade platforms
- ◯ Others

Specify :

Specify your anticipation from this project

Do you have any objections to the SAPZ project:

- ◯ Yes
- ◯ No

If yes, kindly state your objection(s):

Reasons for respondents objection to the SAPZ project

Communal Norms

Has there been any tension/unrest within the project area in the last 5 years e.g. Herders/Farmers clash, communal clash:

- ◯ Yes
- ◯ No

If yes, how is the tension/conflict or clash resolved:

- [ ] Vigilantee groups
- [ ] Police intervention
- [ ] Traditional rulers
- [ ] Litigation
- [ ] Others

Specify :

specify conflict resolution based on the previous selected "others"

Any taboos or deity in your area:

norms and taboos within the respondent's community.

- ◯ Yes
- ◯ No

If yes. specify :

Any organized festivals in the area:

Festivals within respondents community

- ◯ Yes
- ◯ No

If yes, mention some:

Appendix E Oye and Ikole 2021 Population Projection

L.G.A.: OYE							
COMMUNITY		2006 Population Figures			2021 Projected Population		
		Male	Female	Total	Male	Female	Total
1	OYE EKITI	9,322	9,219	18,540	14,956	14,790	29,746
2	AYEGBAJU EKITI	5,304	5,083	10,387	8,510	8,155	16,665
3	EJELU CAMP AND OTHERS	163	141	304	262	226	488
4	ARAROMI	50	20	70	81	32	113
5	OLOGEDE CAMP AND OTHERS	68	40	107	108	64	172
6	ISAN EKITI	4,691	4,919	9,610	7,527	7,891	15,418
7	OMIFUNFUN AND OTHERS	179	168	347	288	269	557
8	IGEDE CAMP AND OTHERS	298	250	549	479	402	880
9	ILAFON EKITI	147	157	305	236	252	489
10	ILEMESO CAMP	335	384	719	538	617	1,154
11	OMU ODO EKITI	142	109	252	228	176	404
12	OMU OKE EKITI	1,656	1,693	3,349	2,657	2,717	5,374
13	IJELU EKITI	1,710	1,740	3,450	2,743	2,792	5,535
14	AYEDE EKITI	5,622	5,571	11,193	9,020	8,938	17,958
15	ITAJI EKITI	3,011	2,402	5,413	4,831	3,853	8,684
16	IMOJO EKITI	377	361	738	605	579	1,184
17	ABIRIMOKU CAMP AND OTHERS	81	41	122	130	65	195
18	IGBIRA CAMP I AND OTHERS	163	114	277	262	183	445
19	ITAPA EKITI	6,689	6,922	13,610	10,731	11,105	21,837
20	OSIN EKITI	1,529	1,669	3,198	2,454	2,678	5,132
21	IRE EKITI	13,279	12,756	26,035	21,305	20,465	41,770
22	ADE OJO CAMP AND OTHERS	446	355	801	715	570	1,285
23	IGBIRA CAMP II AND OTHERS	648	478	1,126	1,040	766	1,806
24	OBA ADELEYE CAMP AND OTHERS	119	82	201	191	131	322
25	OLUKORO CAMP AND OTHERS	230	207	437	368	333	701
26	OBADEMO CAMP AND OTHERS	273	206	479	437	331	768
27	UGBO ATA CAMP AND OTHERS	193	177	370	309	284	593
28	ILUPEJU EKITI	13,086	12,722	25,808	20,996	20,411	41,407
TOTAL		**69,811**	**67,985**	**137,796**	**112,005**	**109,075**	**221,080**

L.G.A.: IKOLE							
COMMUNITY		2006 Population Figures			2021 Projected Population		
		Male	Female	Total	Male	Female	Total
1	IKOLE EKITI	13,162	12,439	25,601	21,118	19,957	41,075
2	TEMIDIRE	1,104	1,010	2,114	1,771	1,621	3,391
3	IKOYI	1,727	1,876	3,603	2,771	3,010	5,781
4	ORIN ODO	2,523	2,386	4,909	4,047	3,828	7,876
5	ISABA EKITI	3,174	3,205	6,379	5,092	5,142	10,234
6	ASIN EKITI	2,578	2,800	5,379	4,136	4,493	8,629
7	IGBONNA	822	808	1,630	1,319	1,296	2,615
8	OOTUNJA	1,999	1,900	3,898	3,207	3,048	6,254
9	USIN EKITI	2,629	2,609	5,238	4,218	4,186	8,405
10	ALAPOPO CAMP AND OTHERS	274	216	491	440	347	787
11	ARUNJE ARIA CAMP AND OTHERS	239	234	474	384	376	760
12	ALABI CAMP AND OTHERS	102	100	202	164	160	324
13	OYO CAMP AND OTHERS	152	100	252	244	160	404
14	OJO CAMP II AND OTHERSS	220	175	395	354	280	634
15	ALAWE CAMP AND OTHERS	149	143	292	239	229	468
16	FATUNLA CAMP AND OTHERS	330	219	549	529	351	881
17	ARIJE CAMP AND OTHERS	237	169	406	379	271	651
18	IJESA ISU	6,323	6,195	12,518	10,144	9,940	20,084
19	AJALOMO CAMP AND OTHERS	226	187	413	363	300	663
20	IRO CAMP I AND OTHERS	204	233	437	328	373	701
21	ODO ADE AND OTHERS	147	150	297	237	240	477
22	EKUN CAMP	237	184	421	379	296	675
23	ABA IGBIRA AND OTHERSS	143	157	300	230	251	481
24	PAUL CAMP	210	134	345	337	216	553
25	JUBRILU CAMP I	378	328	707	607	527	1,134
26	JUBRILU CAMP II	229	183	412	368	293	661
27	OLUMORISA CAMP AND OTHERS	339	205	544	543	329	872
28	ARA IKOLE EKITI	1,239	1,154	2,394	1,989	1,852	3,840
29	CHIEF AROGBOYE'S CAMP AND OTHERS	153	132	285	246	211	457

30	CHIEF SALODA CAMP AND OTHERS	187	198	385	300	318	618
31	ASABA CAMP OKE IJEBU & OTHERS	483	298	781	775	478	1,253
32	OKE IGBARA CAMP AND OTHERS	309	255	564	497	409	906
33	IYO CAMP AND OTHERSS	229	195	425	368	313	681
34	CHIEF ALAWE'S CAMP & OTHERSS	245	279	524	394	447	840
35	CHIEF OLOWOMEHIN AND OTHERS	283	169	452	454	271	726
36	CHIEF ODOFIN'S CAMP AND OTHERS	577	507	1,084	925	814	1,739
37	OLOJA ITAFIN CAMP AND OTHERS	253	236	488	405	378	783
38	IGBIRA CAMP II AND OTHERS	334	308	642	536	494	1,030
39	AGO IGBIRA CAMP	672	333	1,004	1,077	534	1,611
40	ILAGBO CAMP AND OTHERS	347	384	731	557	616	1,173
41	EJISUN CAMP AND OTHERS	99	105	205	159	169	328
42	AKINOLA CAMP AND OTHERS	158	123	281	253	198	451
43	CHIEF ABOBASUA AND OTHERS	169	164	333	272	262	534
44	ARIBISALA CAMP AND OTHERS	247	224	471	396	360	756
45	OLOMODURUTU CAMP ADN OTHERS	201	231	433	323	371	694
46	ESUN EKITI	1,457	1,492	2,949	2,338	2,394	4,732
47	OKE AYEDUN EKITI	4,213	4,498	8,711	6,760	7,216	13,976
48	ODO AYEDUN EKITI	8,032	8,101	16,133	12,887	12,996	25,884
49	AYEBODE EKITI I	1,225	1,196	2,421	1,965	1,919	3,884
50	AYEBODE EKITI II	223	183	406	358	293	652
51	ORISUNMIBARE CAMP I & OTHERS	378	353	731	607	567	1,174
52	AMINRINMIRIN CAMP I & OTHERS	261	198	459	419	318	737
53	IGBODIGBODI CAMP AND OTHERS	225	180	405	361	289	650
54	IGBORISA CAMP AND OTHERS	282	261	542	452	418	870
55	OLORIAWO CAMP AND OTHERS	495	504	999	794	809	1,603
56	IGBIRA CAMP AND OTHERS	283	270	553	454	434	888
57	OKE ERIGI CAMP AND OTHERS	771	795	1,566	1,237	1,276	2,513
58	OKE AKO EKITI	3,540	3,126	6,666	5,680	5,015	10,695
59	IRELE EKITI	1,762	1,736	3,498	2,827	2,786	5,613
60	IYEMERO	282	302	584	452	485	937

61	ITAPAJI EKITI	2,129	1,995	4,124	3,415	3,201	6,616
62	IGBODOKO CAMP AND OTHERS	454	240	694	728	385	1,113
63	ILADO CAMP AND OTHERSS	276	206	482	443	331	774
64	IGBOROKO CAMP AND OTHERS	612	436	1,048	981	700	1,682
65	OBA ODOFIN CAMP AND OTHERS	241	233	474	386	373	760
66	IPAO EKITI	3,880	3,934	7,814	6,226	6,311	12,537
67	ITAOMODOWA'S CAMP	229	140	369	368	225	592
68	AJIGODO'S CAMP AND OTHERS	228	216	444	365	347	712
69	ITA/IKAKO CAMP AND OTHERS	260	276	536	417	442	859
70	ARAROMI EKITI	7,391	7,423	14,814	11,859	11,909	23,768
71	AJANGA CAMP AND OTHERS	74	55	130	119	89	208
72	OLOTIN CAMP AND OTHERS	34	35	68	54	56	109
73	UGBORISA CAMP AND OTHERS	15	12	27	23	20	43
74	ODO AGALA CAMP AND OTHERS	69	57	125	110	91	201
75	ODO AGBALA CAMP AND OTHERS	185	205	390	297	329	626
76	IMEYE CAMP AND OTHERS	203	166	369	326	267	592
77	IMOYOI CAMP	333	363	696	534	582	1,117
78	ARAROMI CAMP	323	284	607	518	456	973
79	EGBESE CAMP	247	234	481	396	376	772
80	AJILEYE IGNONNA CAMP AND OTHERS	216	194	410	347	311	658
TOTAL		**86,873**	**83,541**	**170,414**	**139,379**	**134,033**	**273,412**

Appendix F **Community Consultations Records**

APPROVED ITINERARY OF STAKE HOLDER'S COMMUNITY ENGAGEMENT TO AGRICULTUR AL INVESTMENT LOCATIONS IN EKITI STATE.

1	Day 1 20th of December, 2021	Ipere	9am	
		Ijelu Omu	10am	
		Ayede	11am	
		Ilemesho	12pm	
		Isan	1pm	
		Lusajumi	1pm	
		Ilafo Oloje	1pm	
		Ekiti State College of Agric	3pm	
		Itaji	5pm	
20	Day 2 21st of December, 2021	Esun	9am	
		Ipao	11am	
		Oke-Ako	1pm	
		Irele	3pm	
		Ewu	4pm	
		Iye	4pm	
		Iludun	5pm	
3	Day 3 22nd of December, 2021	Ode Ayedun	9am	
		Oke Ayedun	11am	
		Ijowa	1pm	
		Ido	3pm	
		Orin	5pm	
4	Day 4 23rd of December, 2021	Bolorunduro/Odo Owa	9am	
		Iyemero	11am	
		Itapaji	1am	
		Oye	3pm	

STAKEHOLDERS ENGAGEMENT INTERVIEW GUIDE FOR THE PROPOSED SPECIAL AGRO-INDUSTRIAL PROCESSING ZONE PROJECT BY EKITI STATE GOVERNMENT

BETWEEN MOND. 20TH-THUR. 23RD DEC. 2021

A. General Information

1. Name of Community……..
2. GPS Location…….
3. Type of traditional system……..
4. Name of Paramount ruler……
5. Number of the council of Chiefs…….
6. Existing Development Associations in place…….

B. Community livelihood

7. Major Occupation Of The Community Members…….
8. Types of Cash Crops Produced…….
9. Types of Food Crops Produced……
10. Land Tenure System…….
11. Types of Farming System……

C. Social System

12. Major Language Spoken……..
13. Other Dominant Tribes…….
14. Predominant Religion in the Community…….
15. Existing Cultural/ Traditional Festivals……..

D. Conflict Resolution Mechanism

16. Are there Communal Clashes around this Community?……
17. If Yes?, How are they resolved?……
18. Are there border disputes with neighbouring Communities?…….

19. If Yes? How are they resolved?…….
20. Are there Herders-Farmer Clashes? ……..
21. If Yes? How are they resolved ……..

E. The Proposed Ekiti State Special Agro-Industrial Processing Zone Project

22. Are you Aware of this Project?……
23. What do you think will be the benefit of the project to your Community

…..……
……
……
24. Is the Community ready to support this Project?…….
25. What is the Community expectations from Government and sponsors of this Project……
    ……
26. How many Family Lands are involved in your Community?……..
27. How many of them have received Compensation?……..
28. What will be the possible impact of this Proposed Project on your Land and Livelihood?……
    ……
    ……

29. What message do you have to the Ekiti State Government and Sponsor of the Proposed Project?

…..……
……
……

STAKEHOLDERS ENGAGEMENT FOR THE PROPOSED SPECIAL AGRO-INDUSTRIAL PROCESSING ZONE PROJECT BY EKITI STATE GOVERNMENT

BETWEEN MON. 20TH-THUR. 23RD DEC. 2021

MEETING AGENDA

1. Meeting call to order
2. Opening Prayer
3. Introductions of Dignitaries and Stakeholders
4. Purpose of Community Engagement by Federal Ministry of Environment
5. Project Description by the Consultant
6. Stakeholders Information Collections by Consulting team
7. General response
8. Message of the Traditional heads
9. Vote of Thanks by the Ekiti State Ministry of Agriculture and Food Security/ Ekiti State Investment Promotion Agency
10. Closing Prayer

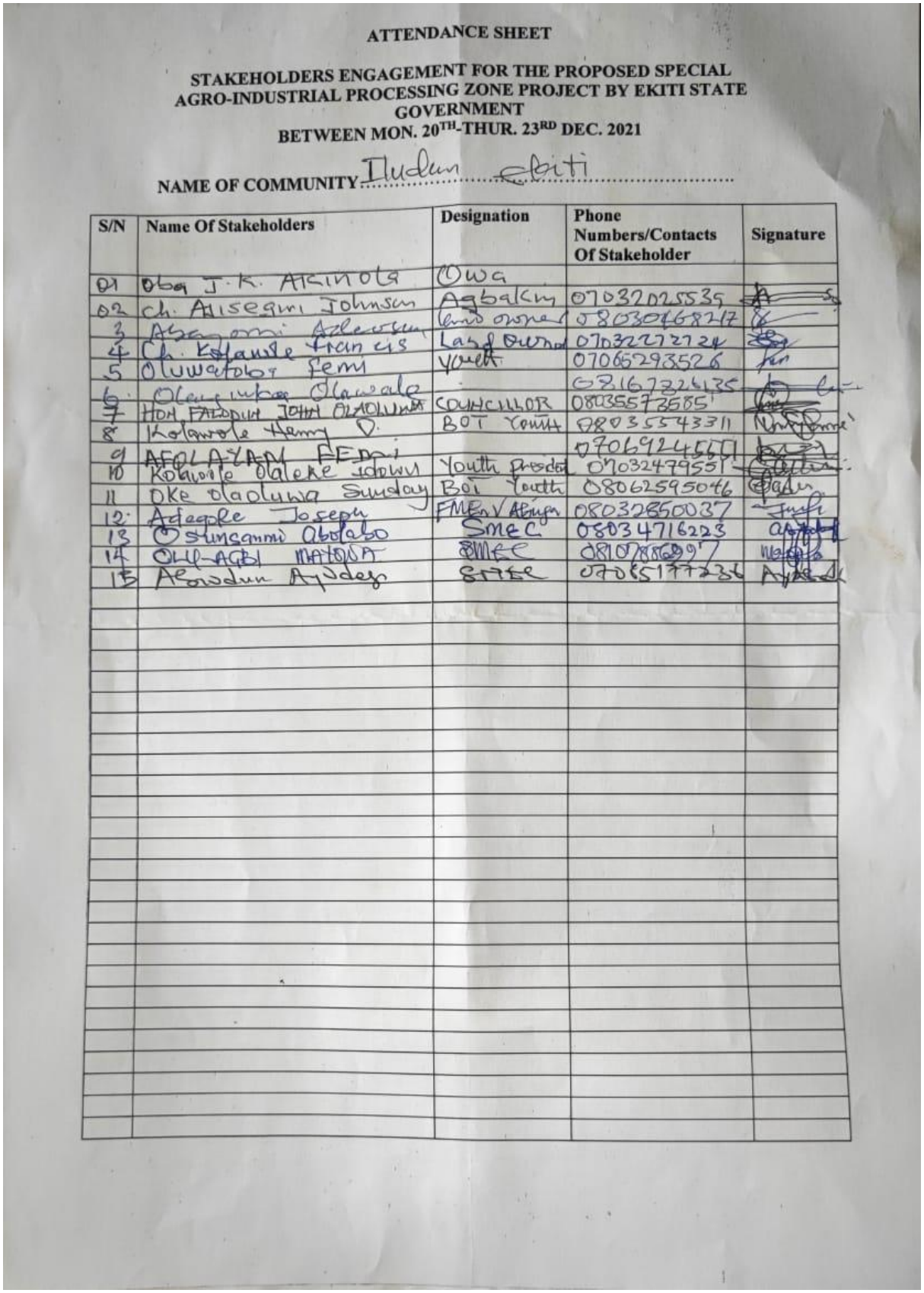
ATTENDANCE SHEET

STAKEHOLDERS ENGAGEMENT FOR THE PROPOSED SPECIAL AGRO-INDUSTRIAL PROCESSING ZONE PROJECT BY EKITI STATE GOVERNMENT

BETWEEN MON. 20TH-THUR. 23RD DEC. 2021

NAME OF COMMUNITY: Ilemesho Ekiti

S/N	Name Of Stakeholders	Designation	Phone Numbers/Contacts Of Stakeholder	Signature
1	Chief Sayode Adedibu Ayo			
1	Kabiesi Oyewumi Adegbuyi	Kabiesi		[illegible]
2	Kolawole Abdul Dahaq	Investor	09033556755	[illegible]
3	Ch/Mrs Omotoso C.O.	Iya loja	08833434519	[illegible]
4	Miss Oduwusi Eunice	Women leader		Osunbsi
5	Ch. Raphael Adeniyi		07046005466	[illegible]
6	Mr Ola Joseph Oladiyo		07035199857	[illegible]
7	Chief Ige Peter O.	Ilemeso	08104493153	[illegible]
8	Chief Kude Olorun	Atofi	07030650768	[illegible]
9	High Ch. Ayari Abejide	Onibanu	08140639087	[illegible]
10	Chief Adebeye	Olukotun		[illegible]
11	Chief Ajewole S.A.	Elemo	08067477855	[illegible]
12	Ch. Ayewole Timoh	Mesekobase	08141593070	[illegible]
13	Hon Iyiola Ogundare		08165596024	[illegible]
14	Ajewole G. Oladele	IPU Rep	08066089366	[illegible]
15	Adegoke Joseph	FMEnv Abuja	08032850037	[illegible]
16	Osunsanmi Abolobo	SMEC	08034716223	[illegible]
17	Olu-Agbi Mayowa	SMEC	08072886997	[illegible]
18	Asodun Ayodeji	SMEC	07065177236	[illegible]
19				
20				



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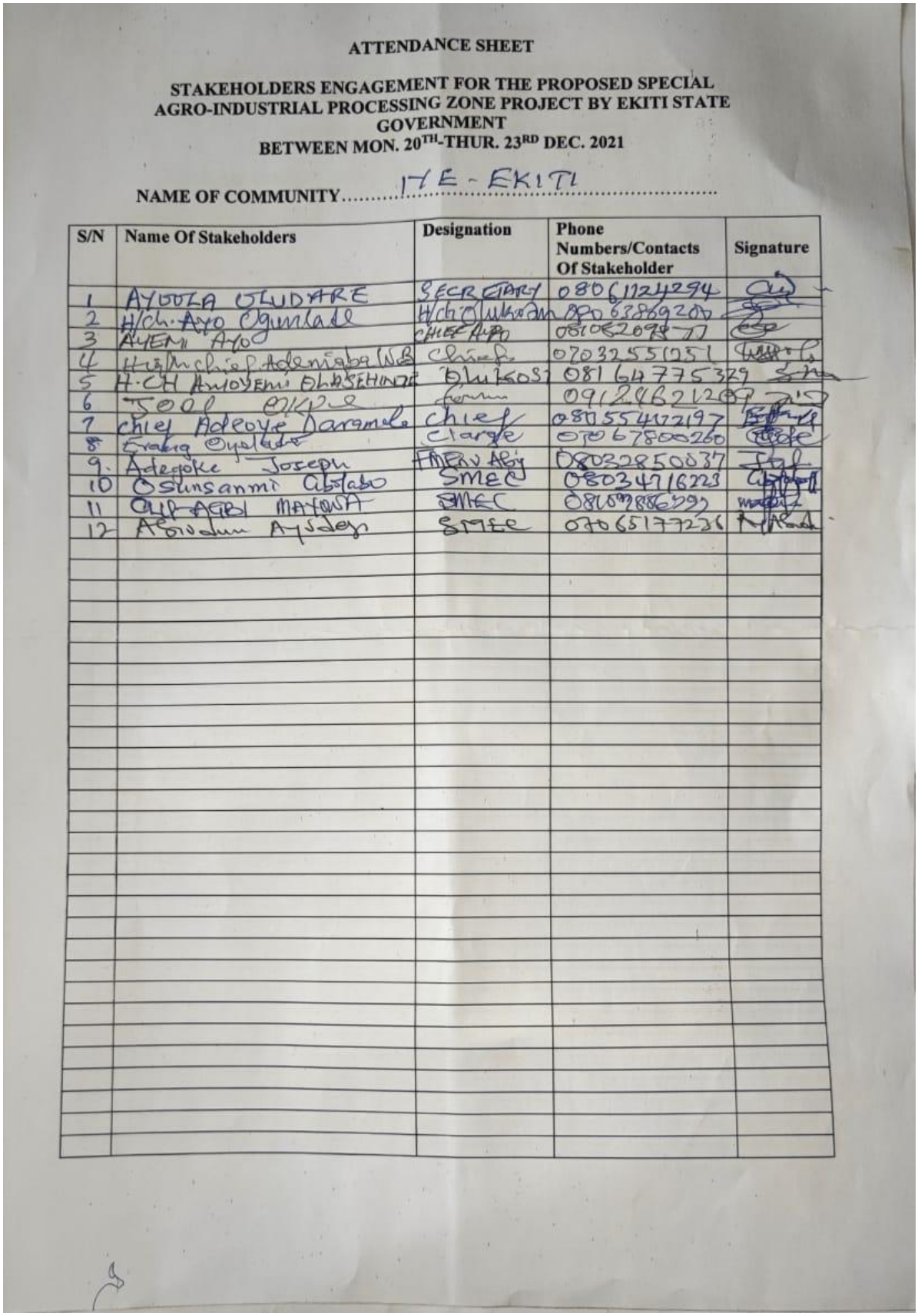
BETWEEN MON. 20TH-THUR. 23RD DEC. 2021

NAME OF COMMUNITY Ifudun Ekiti

S/N	Name Of Stakeholders	Designation	Phone Numbers/Contacts Of Stakeholder	Signature
01	Obq J.K. AKINOLA	Owa		
02	Ch. ALISEGUN Johnson	Agbalcy	07032025535	
3	Asegunmi Azeezat	Land owner	08030468247	
4	Ch. Kolawole Francis	Land Owner	07032727224	
5	Oluwatobi Femi	Youth	07065293526	
6	Olaniyan Olawale		08167226135	
7	HON. FALOPIN JOHN OLAOLUWA	COUNCILLOR	08035573585	
8	Kolawole Henry D.	BOT Youth	08035543311	
9	AFOLAYAN FEDA		07069245551	
10	Kolawole Olalere Idowu	Youth Prodot	07032479551	
11	Oke Olaoluwa Sunday	BOT Youth	08062595046	
12	Adeagbe Joseph	FMEnV Abuja	08032850037	
13	Olusanmi Abolabo	SMEC	08034716223	
14	OLU-AGBI MATOSA	SMEC	08107	
15	Aboudun Ayodeji	SMEC	07065177236	



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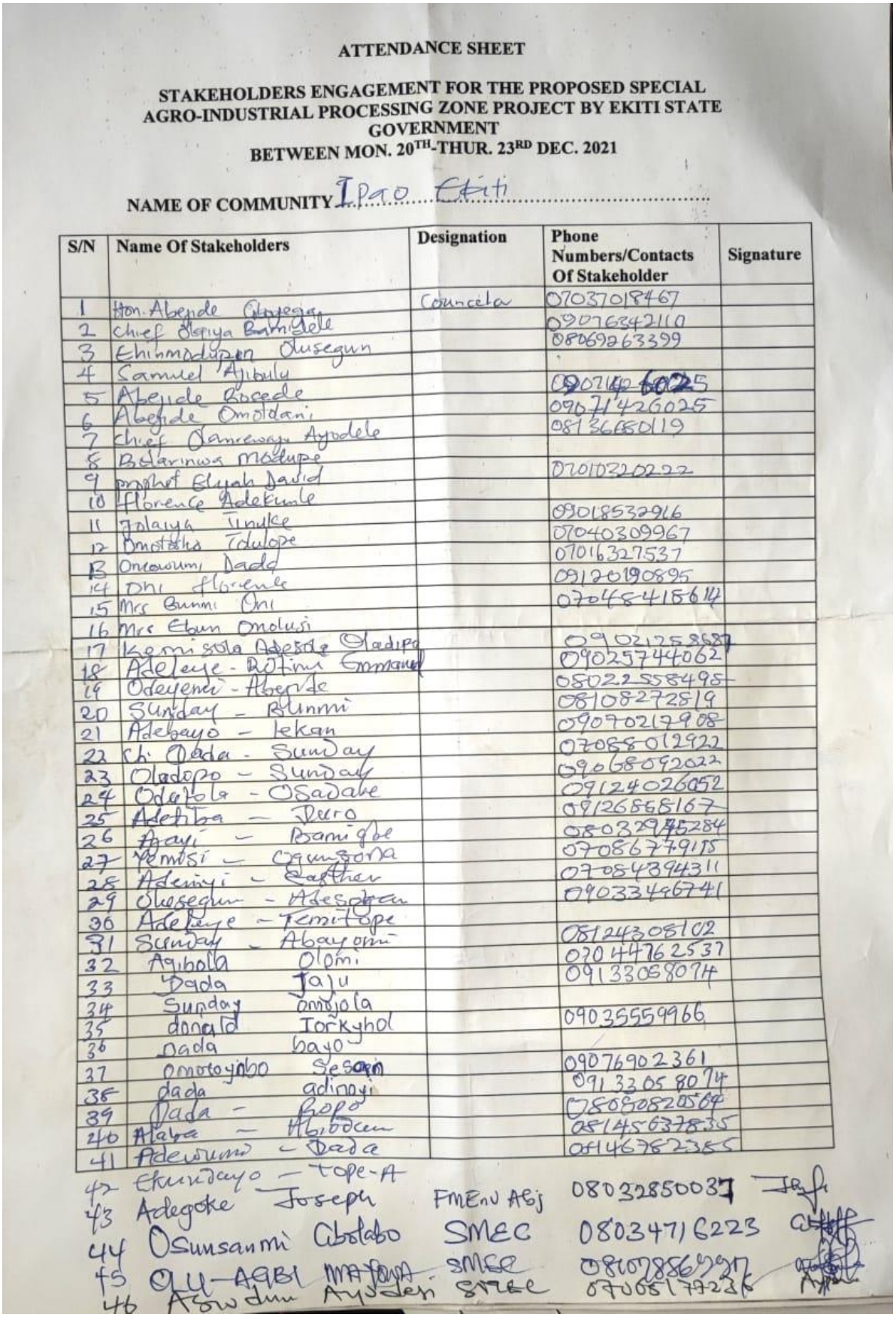
BETWEEN MON. 20TH-THUR. 23RD DEC. 2021

NAME OF COMMUNITY..... IYE - EKITI .....

S/N	Name Of Stakeholders	Designation	Phone Numbers/Contacts Of Stakeholder	Signature
1	AYOOLA OLUDARE	SECRETARY	080[illegible]24294	
2	H/Ch. Ayo Ogunlade	H/Ch[illegible]	[illegible]6388920[illegible]	
3	AYEMI AYO	CHIEF APO	08106209877	
4	His/h chief Adeniyan WB	Chief	07032551251	
5	H.CH ANIOYEMI OLABISI HOUSE	OLUKOSI	08164775329	
6	Joel Okpe	[illegible]	09[illegible]	
7	Chief Adeoye Daramola	Chief	08055477197	
8	Erabig Oyelade	Clerk	07067500260	
9.	Adegoke Joseph	FMEnv Abj	08032850837	
10	Olusanmi Abolabo	SMEC	08034716223	
11	OLUFAGBI MAYOWA	SMEC	08097886393	
12	Aboludun Ayodeji	SMEC	07065177236	



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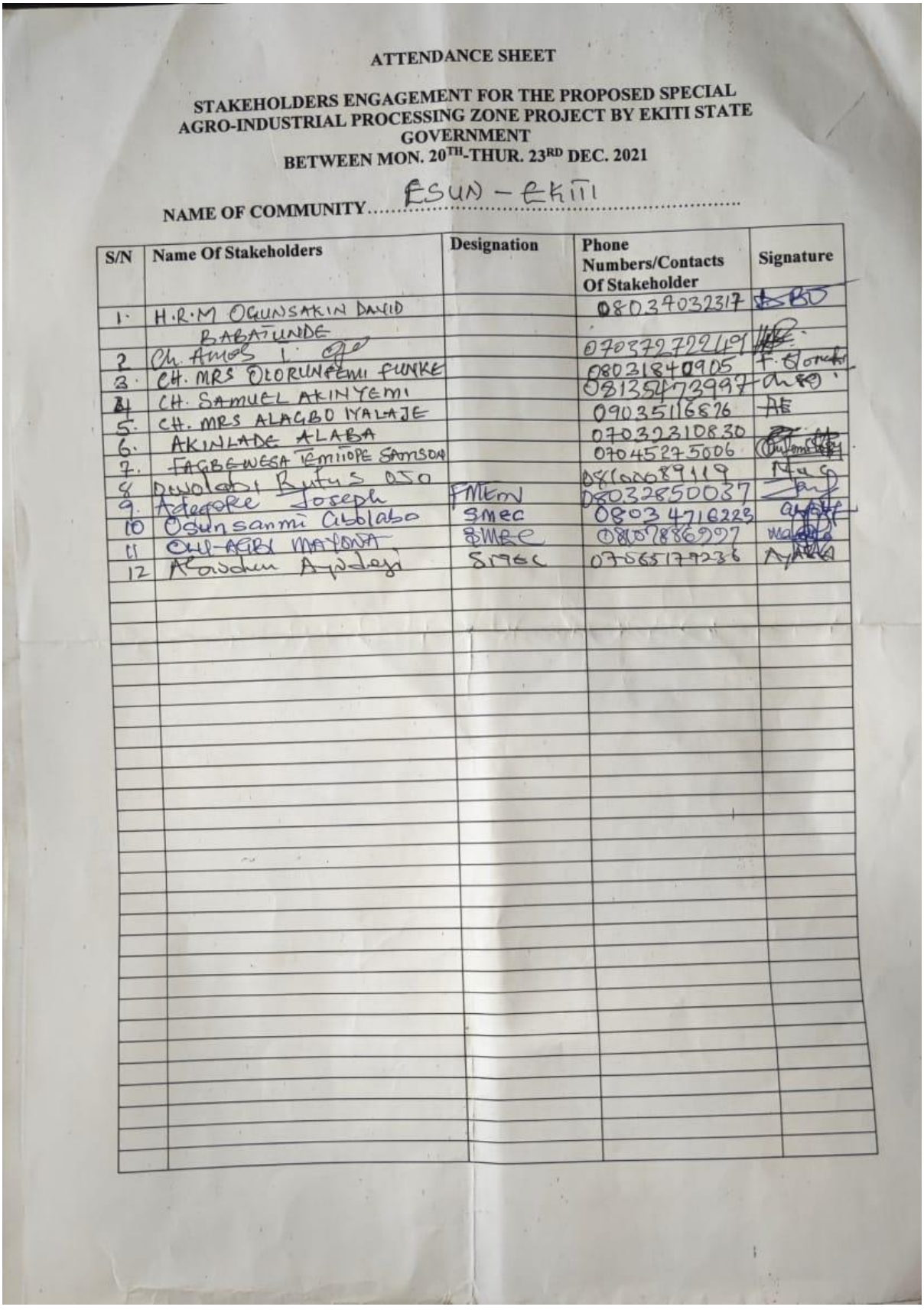
STAKEHOLDERS ENGAGEMENT FOR THE PROPOSED SPECIAL AGRO-INDUSTRIAL PROCESSING ZONE PROJECT BY EKITI STATE GOVERNMENT
BETWEEN MON. 20TH-THUR. 23RD DEC. 2021

NAME OF COMMUNITY Ipao Ekiti

S/N	Name Of Stakeholders	Designation	Phone Numbers/Contacts Of Stakeholder	Signature
1	Hon. Abegde Olayegan	Councela	07037018467	
2	Chief Ogiya Bamidele		09076842110	
3	Ehinmadupen Olusegun		08069063399	
4	Samuel Ajibulu			
5	Abegide Bosede		09071426025	
6	Abegide Omotdani		09071426025	
7	Chief Dameway Ayodele		08136650119	
8	Bolarinwa Modupe			
9	prophet Elijah David		07010320222	
10	Florence Adekunle			
11	Jolaiya Iluyke		09018532916	
12	Omotosho Idulope		07040309967	
13	Omowumi Dada		07016327537	
14	Oni florence		09120190895	
15	Mrs Bunmi Oni		07045415614	
16	Mrs Ebun Omolusi			
17	Kemisola Adesola Oladipo		09021253687	
18	Adeleye - Rotimi Emmanuel		09025744062	
19	Odeyemi - Abegde		08022558495	
20	Sunday - Bunmi		08108272819	
21	Adebayo - Iekan		09070217908	
22	Ch Dada - Sunday		07055012922	
23	Oladopo - Sunday		09068092022	
24	Odetola - Osadabe		09124026052	
25	Adetiba - Dero		09126868167	
26	Ayayi - Bamigbe		08032975284	
27	Temisi - Ogunsona		07086779155	
28	Adeniyi - Esther		07054394311	
29	Olusegun - Adesegun		09033496741	
30	Adeleye - Temitope			
31	Sunday - Abayomi		08124308102	
32	Agibola Olomi		07044762537	
33	Dada Jaju		09133058074	
34	Sunday omojola			
35	donald Iorkyhol		09035559966	
36	Dada bayo			
37	Omotoyobo Segun		09076902361	
38	dada adinoyi		09133058074	
39	Dada - Bopo		08058082058	
40	Alaba - Abiodun		08145637835	
41	Adewumi - Dada		08146762355	
42	Ekundayo - Tope-A			
43	Adegoke Joseph	FMEnv ABj	08032850037	
44	Osunsanmi Abolabo	SMEC	08034716223	
45	OLU-AGBI	SMEC	08107886937	
46	Aowdun Ayoden	SMEC	07065179236	



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STAKEHOLDERS ENGAGEMENT FOR THE PROPOSED SPECIAL AGRO-INDUSTRIAL PROCESSING ZONE PROJECT BY EKITI STATE GOVERNMENT
BETWEEN MON. 20TH-THUR. 23RD DEC. 2021

NAME OF COMMUNITY..... ESUN – EKITI .....

S/N	Name Of Stakeholders	Designation	Phone Numbers/Contacts Of Stakeholder	Signature
1.	H.R.M OGUNSAKIN DAVID BABATUNDE		08034032317	
2	Ch. Amos I.		07037272419	
3.	CH. MRS OLORUNFEMI FUNKE		08031840905	
4	CH. SAMUEL AKINYEMI		08135473997	
5.	CH. MRS ALAGBO IYALAJE		09035116876	
6.	AKINLADE ALABA		07032310830	
7.	FAGBEWESA TEMITOPE SAMSON		07045275006	
8	Owolabi Rufus Oso		08160089119	
9.	Afegbe Joseph	FMEnv	08032850037	
10	Osunsanmi Gbolabo	SMEC	08034716223	
11	CHI-AGBU MAYOWA	SMEC	08078862977	
12	Awoleye Ayodeji	SMEC	07065179236	

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BETWEEN MON. 20TH-THUR. 23RD DEC. 2021

NAME OF COMMUNITY: Odo-Ayedun

S/N	Name Of Stakeholders	Designation	Phone Numbers/Contacts Of Stakeholder	Signature
1	Prince Ola Ogundona	Comm. Leader	07030794675	[illegible]
2	Prince Abiodun Ojo	Sec Council of chiefs	07065339106	[illegible]
3	Ajibike A. O.	P. R. O.	08107067477	[illegible]
4	Ch/Mrs Funke Ogundana	Iyaloja	08069299800	[illegible]
5	Ch/Mrs Marian Omotoso	Amuagun	08764772952	[illegible]
6	Ch/(Mrs) Ojo Taiwo	Abunluse	08039015683	[illegible]
7	Ch/(Mrs) Owolabi Funke	Eyemowa	08160505767	[illegible]
8	Ch/Mrs Ogundumilola Funso	Eyelefe	09034015785	[illegible]
9	CH Mrs A. O. Ajayi	Olori Obinrin Ilu	08067355583	AOA
10	Ch. S.A. Popoola (Sajowa)	Sajowa	08066722044	[illegible]
11	E.A. Ofolaja (Ejisun)	Ejisun	07062190387	[illegible]
12	S.O. Adeniyi (Asamo)	Asamo	08137422566	[illegible]
13	Abiodun Adeoye Ogunyeni	Ajagunna	08160878798	[illegible]
14	Ch. Onipede James Abejide	Olukosi	07031893233	Onipede
15	Ch. Onipede Kolade	Eesoke	07062357006	[illegible]
15	CHAMOGAN ABRAHAM	OLOJA	08067597296	[illegible]
16	Oluseli Ogundumila	Arowa	09039301746	[illegible]
17	Akanle Dare	Comm. Leader	08035247087	[illegible]
18	Omotoso Dele	" "	08086048746	[illegible]
19	Oke Peter	" "	08732452622	[illegible]
20	Ajilo Sunday	" "	08767263206	
21	Ogunlade Ebun			
22	Ajibola Bolu	Youth	08067336065	
23	Adewumi Solomon	Youth	08133484797	
24	Adegoke Joseph	FMEnv Abuja	08032850037	[illegible]
25	Osunsanmi Gbolabo	SMEC	08034716223	[illegible]
26	OLU-AGBI MAYODA	SMEC	08078869997	[illegible]
27	Abiodun Ayodeji	SMEC	07065177286	[illegible]

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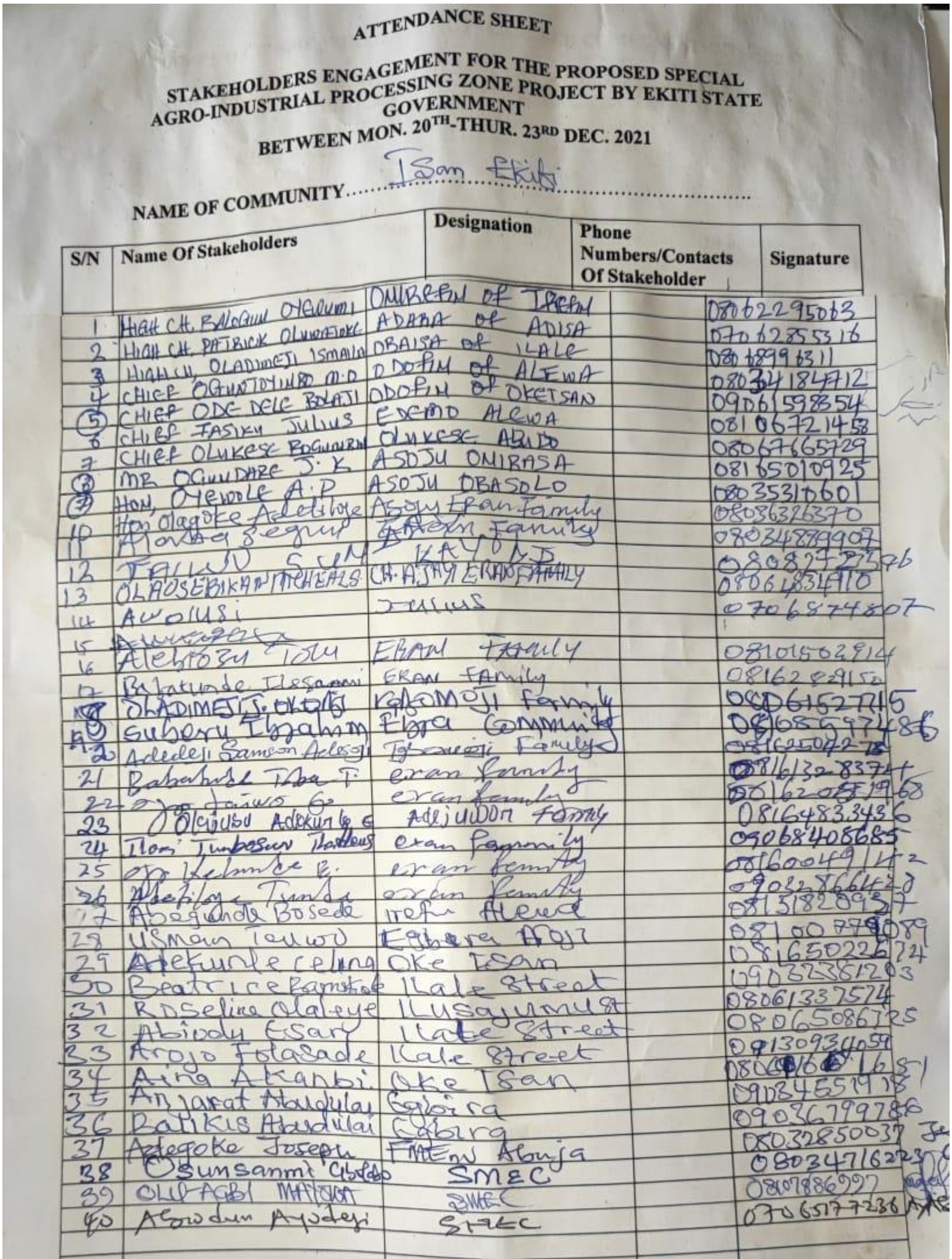
STAKEHOLDERS ENGAGEMENT FOR THE PROPOSED SPECIAL AGRO-INDUSTRIAL PROCESSING ZONE PROJECT BY EKITI STATE GOVERNMENT BETWEEN MON. 20TH-THUR. 23RD DEC. 2021

NAME OF COMMUNITY Itaji Ekiti

S/N	Name Of Stakeholders	Designation	Phone Numbers/Contacts Of Stakeholder	Signature
	HRM. JA BABALOLA	OMITAJI	08033552926	
1	Dr. ADEBAYO OLAYIDE	PRESIDENT IPU	08033462826	
2	ALHAJI BABALOLA A.	CHIEF	08061577274	
3	CHIEF ROTIMI ESTHER	W' LEADER	08065757655	
4	CHIEF AMJORIN GODWIN	CHIEF	08060340382	
5	CHIEF SEGUN THOMAS	CHIEF	07030668811	
6	CHIEF FALAYI ADEBAYO	CHIEF	08033076724	
7	CHIEF OLUGBADE GODO	ELEMESE	08140213007	
8	MRS RUKAYAT RUFAI	SEC	07034561101	
9	MISS NOLA	YOUTH LEADER	09085454650	
	Olugbade Ebenezer Olusuyi	CH ELEMESE	08140213	
10	PRINCE ADEBAYO D	ELDER	08137368990	
11	CHIEF OGUNBANJO	CHIEF	2348069427710	
12	AMJORIN JEMI	YOUTH	08064708666	
13	ADESINA DEJI	YOUTH	08034762666	
14	CHIEF ADEWOLE RASAQ	CHIEF	08063147595	
15	CHIEF DAKANIOLA	CHIEF	08160301196	
16	HON AYEGBUSI ICAYODE	COUNCILLOR	08063932536	
17	Adegoke Joseph	FMEnv Hqrs.	08032850037	
18	Osunsanmi Gbolabo	SMEC	08034716223	
19	OKE-AGBI MAYOWA	SMEC	08107886297	
20	Adedun Ayodeji	SMEC	07065177236	



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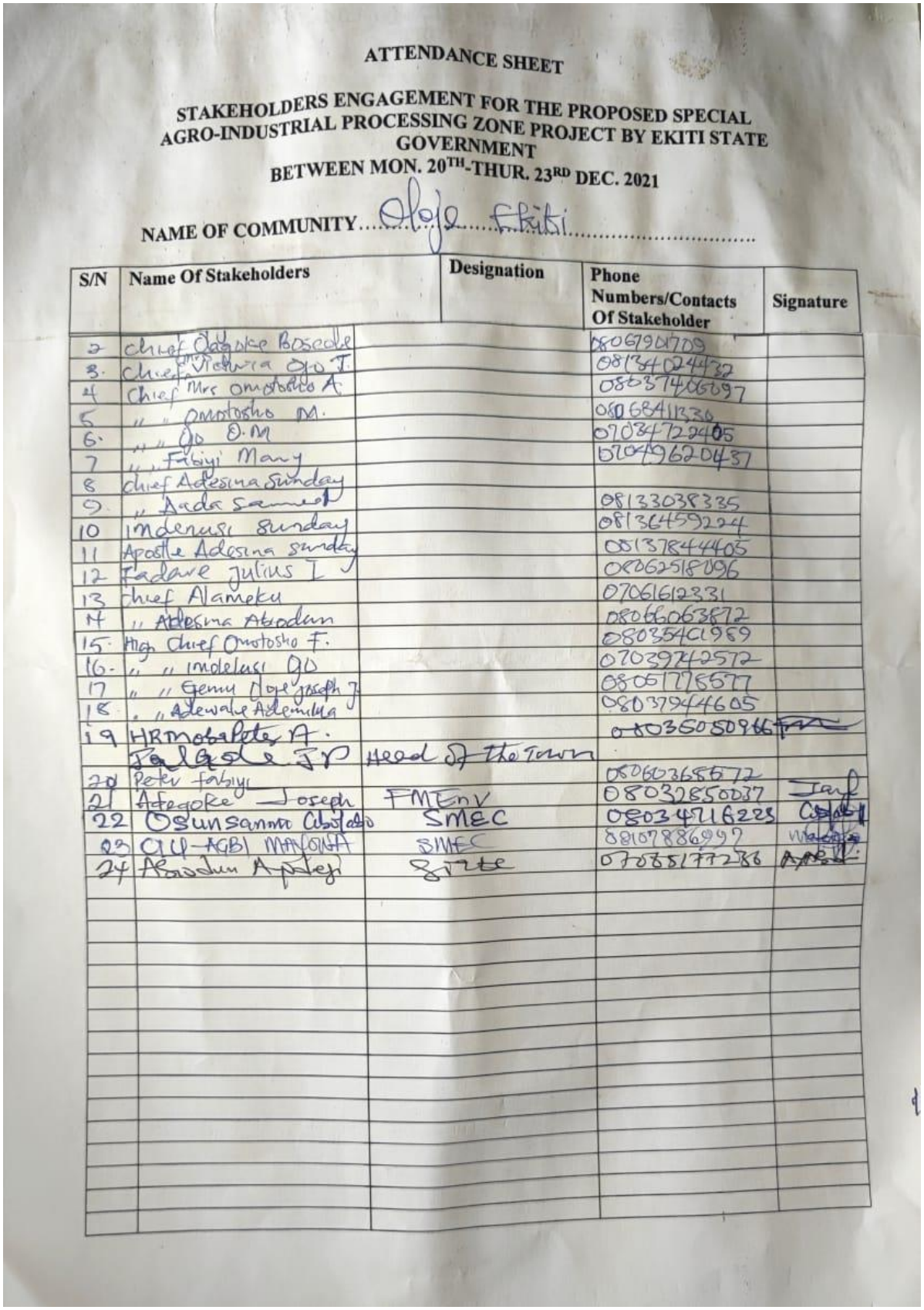
STAKEHOLDERS ENGAGEMENT FOR THE PROPOSED SPECIAL AGRO-INDUSTRIAL PROCESSING ZONE PROJECT BY EKITI STATE GOVERNMENT

BETWEEN MON. 20TH-THUR. 23RD DEC. 2021

NAME OF COMMUNITY: Isan Ekiti

S/N	Name Of Stakeholders	Designation	Phone Numbers/Contacts Of Stakeholder	Signature
		Onireefin of Ireefin	08062295063	
1	High Ch. Balogun Oyelumi	Adaba of Adisa	07062855316	
2	High Ch. Patrick Oluwafioke	Obaisa of Ilale	08068996311	
3	High Ch. Oladimeji Ismaila	Odofin of Alewa	08034184712	
4	Chief Oguntoyinbo M.D	Odofin of Oketsan	09061598354	
5	Chief Odedele Bolaji	Edemo Alewa	08106721458	
6	Chief Fasiku Julius	Olukese Abido	08067665729	
7	Chief Olukese Bogunmbi	Asoju Onibasa	08165010925	
8	Mr Ogundare J.K	Asoju Obasolo	08035310601	
9	Hon. Oyewole A.P	Asoju Eran Family	08036326370	
10	Hon Olagoke Adetiloye	Aboon Family	08034879907	
11	Alonge Segun			
12	Falilu S.A.M	Kayode	08082727396	
13	Olaosebikan Micheals	Ch. Ajayi Eran Family	08064834910	
14	Awolusi	Julius	07068748807	
15	Alebiosu Tolu	Eran Family	08101502914	
16	Babatunde Ilesanmi	Eran Family	08162829150	
17	Oladimeji J. Okonji	Kagomoji Family	08061527715	
18	Subery Ibrahim	Egbira Community	08085997486	
19-20	Adedeji Samson Adesoji	Tobaweji Family	08162504278	
21	Babatunde Taiba T.	Eran Family	08161328374	
22	Ojo Taiwo G.	Eran Family	08162081968	
23	Olowoyo Adekunle G	Adejuwon Family	08164833436	
24	Ilori Tumbosun Matthew	Eran Family	09068408685	
25	Ojo Kehinde E.	Eran Family	08160049142	
26	Adefila Tunde	Eran Family	09032866420	
27	Abegunde Bosede	Irefin Alewa	08131820937	
28	Usman Taiwo	Egbira Aroji	08100779089	
29	Adekunle Celina	Oke Isan	08165022674	
30	Beatrice Bamidele	Ilale Street	09032381203	
31	Roseline Olaleye	Ilusajumu St	08061337574	
32	Abiodun Esan	Ilale Street	08065086725	
33	Arojo Folasade	Ilale Street	09130934059	
34	Aina Akanbi	Oke Isan	[illegible]	
35	Anjarat Abdulai	Egbira	09034551918	
36	Batikis Abdulai	Egbira	09036799786	
37	Adegoke Joseph	FMEnv Abuja	08032850037	
38	Osunsanmi Gbolabo	SMEC	08034716223	
39	Oluwagbemi Mayowa	SMEC	08107886997	
40	Agunbiadun Ayodeji	SMEC	07065177236	



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BETWEEN MON. 20TH-THUR. 23RD DEC. 2021

NAME OF COMMUNITY..... Ajilo Ekiti .....

S/N	Name Of Stakeholders	Designation	Phone Numbers/Contacts Of Stakeholder	Signature
2	Chief Olagoke Bosede		08067904709	
3.	Chief Victoria Ojo T.		08134024432	
4	Chief Mrs Omotosho A.		08037406097	
5	" " Omotosho M.		08068411330	
6.	" " Ojo O.M		07034722405	
7	" " Fabiyi Mary		07049620437	
8	Chief Adesina Sunday			
9.	" Ayeda Samuel		08133038335	
10	Indenusi Sunday		08136459224	
11	Apostle Adesina Sunday		08137844405	
12	Fadare Julius I		08062518096	
13	Chief Alameku		07061612331	
14	" Adesina Abodun		08066063872	
15.	High Chief Omotosho F.		08035401989	
16.	" " Indelusi OO		07039742572	
17	" " Genu Ojo Joseph J		08051778577	
18	" " Alewale Ademuwa		08037944605	
19	HR Mobolaji A. Falade JP	Head of the Town	08035050966	
20	Peter fabiyi		08063685572	
21	Afegoke Joseph	FMEnv	08032850037	
22	Osunsanmi Abdulahi	SMEC	08034716223	
23	CLL-AGBI MAYOWA	SMEC	08107886997	
24	Abodun Ayotejo	SMEC	07085177286	

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BETWEEN MON. 20TH-THUR. 23RD DEC. 2021

NAME OF COMMUNITY……OKE – AYEDUN……EKITI

S/N	Name Of Stakeholders	Designation	Phone Numbers/Contacts Of Stakeholder	Signature
1	Ajikaye Abdul Rasheed	OKE-AYEDUN	08032784280	
2	Ogundare Ismah Tamiu	"	07033168545	
3	Adebiyi Olaoluwa	"	0	
4	Ilori Damilare	"	07067849348	
5	Olanilua Wande	"	08132171183	
6	Ogunsuyi Oluwadunsin	"	07025397357	
7	Ajibade Abiodun	"	07025397357	
8	Adeji Emmanuel	"	08168957410	
9	Awopegba Oluwaseun	"	08164369460	
10	Suleiman Jamiu	"	07032554165	
11	Emmanuel Gideon	"	08067691684	
12	Abdulrahaman Rauda	"	09035612651	
13	Lamidi Mustapha	"	07017093341	
14	Ibimaye Ayodeji	Oke-Ayedun	07068254871	
15	Adisa Bidemi	"	08065220305	
16	Joshua Emmanuel	"	07064705696	
17	Ajayi Omolayo V	"	08100127409	
18	Com. Adegboyega Akinola	youth president	08131116681	
19	Ajayi Akin	— "	—	
20	Asaye – Oluwasegun	—	07069502032	
21	Tijani Oluwaseun	"	08039956753	
22	Akinola Niyi	=	07063599313	
23	Fulati Olamide	=	08164150418	
24	Ajayi Ayo	=		
25	Haruna - Majeed	-	0816463006	
26	Owolabi Ayodeji	-	07024741132	
27	Osanyinlusi Adebayo	Oke Ayedun	08064336834	
28	Abolarinde Ayodeji	—	07064751828	
29	Ndfaiye Segun	—	—	
30	Adeyumi Adebamgo S.	✓	08068900133	
31	Falmiji Dayo S.	✓	08132240624	
32	Onipede Taiwo O.O	Oke Ayedun	08142077547	
33	Adisa Bidemi	✓	08065220305	
34	Akinola Tosin F	✓	08067329239	
35	Ogunmosunle Deji	OKE AYEDUN	08067344858	
36	Ch. M.O Adee		08034971498	
37	Ch. B.S Ajalumo		08064259149	
38	Ch. Kehinde Ogunlola		07064243736	
39	Ch. J.F Ojo		08033038048	
40	Ch. Olusola Owolabi		08062101716	
41	Ch. Esan Daramola		08131398716	
42	Toyin Daramola		08139392311	
43	Adegoke Joseph	FMEnv Abuja	08032850037	
44	Osunsanmi Gbolabo	SMEC	08034716223	
45	Olu-Agbi Mayowa	SMEC	08107886997	
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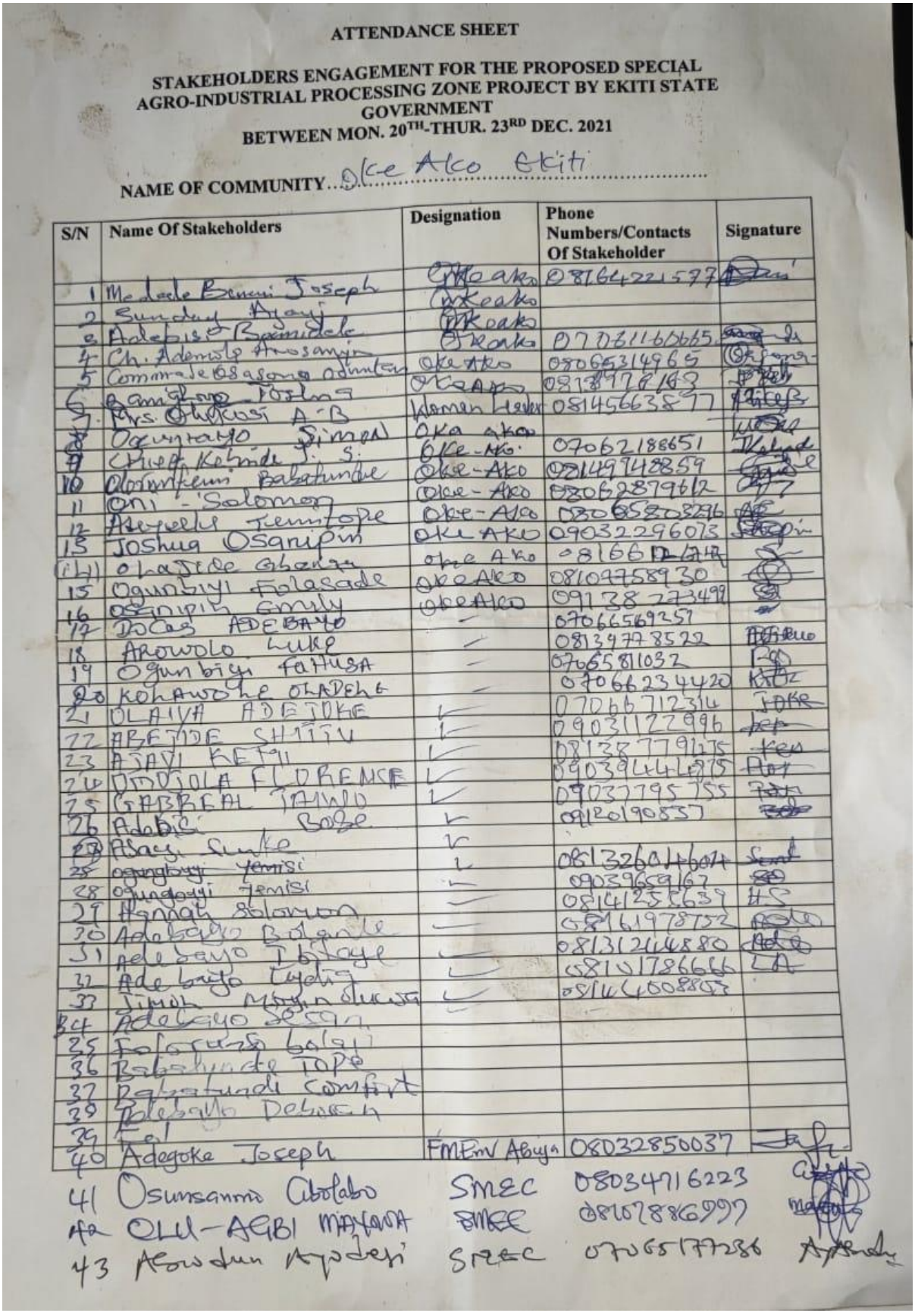

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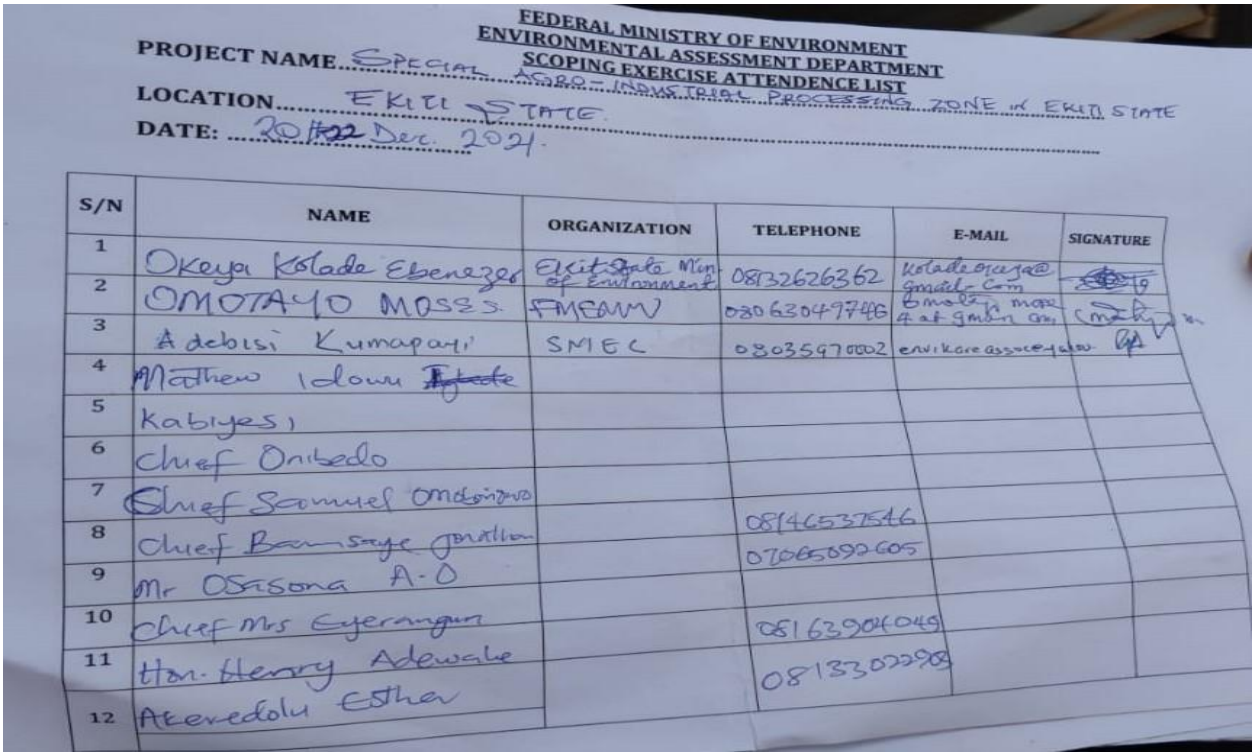
BETWEEN MON. 20TH-THUR. 23RD DEC. 2021

NAME OF COMMUNITY... Oke Ako Ekiti

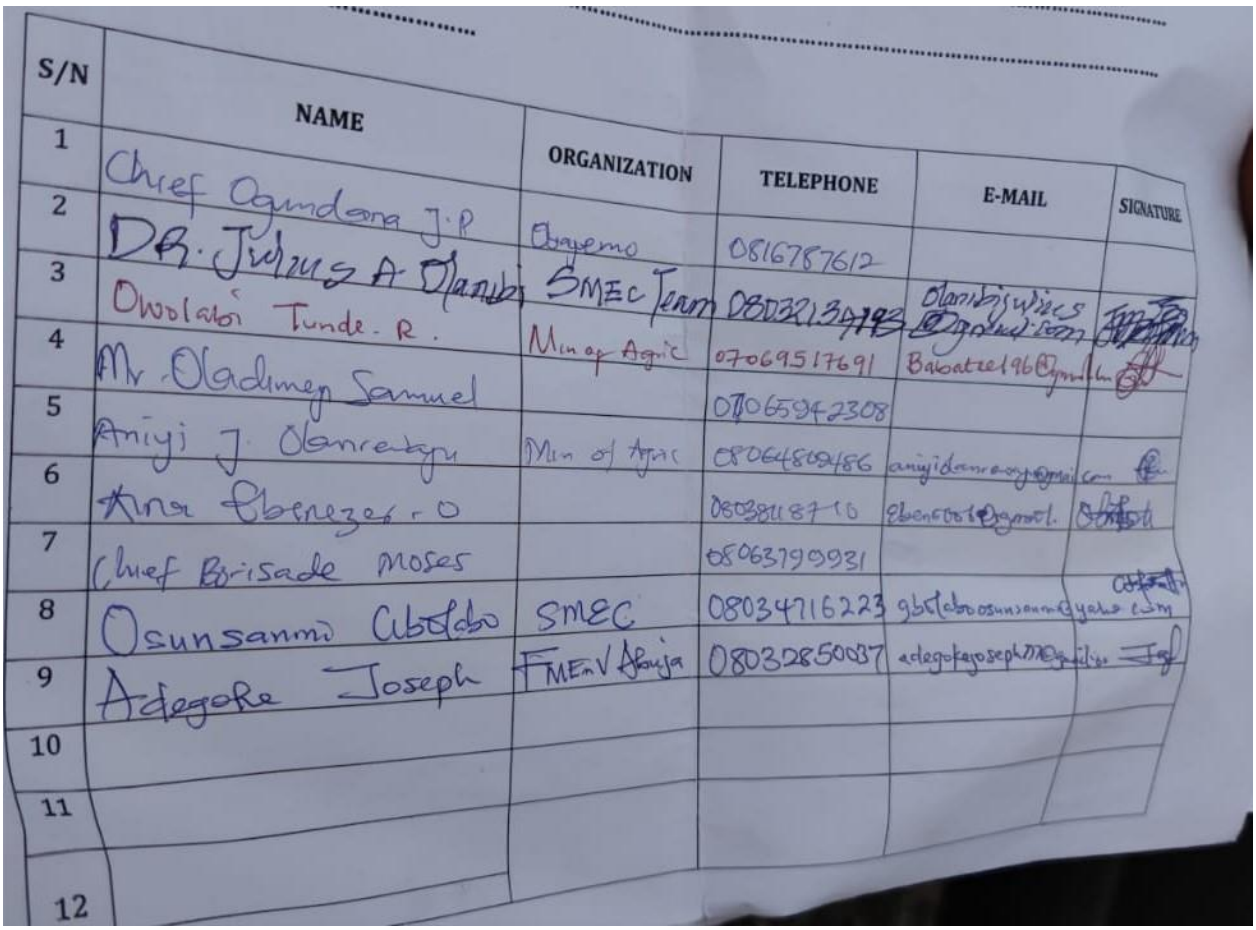
S/N	Name Of Stakeholders	Designation	Phone Numbers/Contacts Of Stakeholder	Signature
1	Medede Benson Joseph	Oke ako	08164221577	
2	Sunday Ayayi	Okeako		
3	Adebisi Bamidele	Okeako	07061160665	
4	Ch. Ademola Awosanya	Oke Ako	08065314965	
5	Comm. Adegoke Adunlen	Oke Ako	08138778183	
6	Bamigbaye Joshua	Okeako	08145663877	
7	Mrs. Oluwasi A.B	Women Leader		
8	Ogunrayo Simeon	Oka ako	07062186651	
9	Chief Kehinde J. S.	Oke-Ako	08149148859	
10	Oloruntemi Babatunde	Oke-Ako	08062879612	
11	Oni - Solomon	Oke-Ako	08065820896	
12	Akeyeke Temitope	Oke AKO	09032296073	
13	Joshua Osanipin	Oke Ako	08166	
14	Olajide Gbenga	Oke AKO	08109758930	
15	Ogunbiyi Folasade	Oke AKO	09138 273499	
16	Osanipin Emily		07066569259	
17	Docas ADEBAYO		08134778522	
18	Arowolo Luke		07065811032	
19	Ogunbiyi Fatusa		07066234420	
20	Kehinwole Oladeko		07066712316	
21	OLAIYA ADEJOKE		09031122996	
22	ABEJIDE SHITTU		08138779475	
23	AJAYI KEFAI		09039444975	
24	DIDIJOLA FLORENCE		09037795755	
25	GABRIEL JAIYEOLA		08120190557	
26	Adebisi Bose			
27	Abass Sunkanmi		08132604	
28	Ogunbiyi Yemisi		09039659167	
29	Ogunbiyi Yemisi		08141255639	
30	Hannah Solomon		08161978753	
31	Adebayo Bolanle		08131246880	
32	Adebayo Ibitoye		08141786666	
33	Adebayo Tayo		08146008805	
34	Jimoh Moyinoluwa			
35	Adebayo Seyi			
36	Folorunso Bolaji			
37	Babatunde TOPE			
38	Babatunde Comfort			
39	Adebayo Debora			
40	Fal			
41	Adegoke Joseph	FMEnv Abuja	08032850037	
42	Osunsanmi Abolabo	SMEC	08034716223	
43	OLU-AGBI MAYOWA	SMEC	08078867997	
	Akowun Ayodeji	SMEC	07065177286	



FEDERAL MINISTRY OF ENVIRONMENT
ENVIRONMENTAL ASSESSMENT DEPARTMENT
SCOPING EXERCISE ATTENDENCE LIST

PROJECT NAME: SPECIAL AGRO-INDUSTRIAL PROCESSING ZONE IN EKITI STATE
LOCATION: EKITI STATE
DATE: 20th Dec. 2021.

S/N	NAME	ORGANIZATION	TELEPHONE	E-MAIL	SIGNATURE
1	Okeya Kolade Ebenezer	Ekiti State Min of Environment	08132626362	kolade.okeya@gmail.com	
2	OMOTAYO MOSES	FMEnv	08063047446	omotayomoses4at gmail.com	
3	Adebisi Kumapayi	SMEC	08035970002	envikare.associates@yahoo.com	
4	Mathew Idowu				
5	Kabiyesi				
6	Chief Onibedo				
7	Chief Samuel Ondoinyo				
8	Chief Bamisaye Jonathan		08146537546		
9	Mr Osisona A.O		07065092605		
10	Chief Mrs Eyerangun				
11	Hon. Henry Adewale		08163904049		
12	Akeredolu Esther		08133022908		



S/N	NAME	ORGANIZATION	TELEPHONE	E-MAIL	SIGNATURE
1	Chief Ogundana J.P	Oyemo	08167876l2		
2	DR. Julius A Olanibi	SMEC Team	08032134193	olanibijuliusa@gmail.com	
3	Owolabi Tunde. R.	Min of Agric	07069517691	Babatee1968@gmail.com	
4	Mr. Oladimeji Samuel		07065942308		
5	Amiyi J. Olanrewaju	Min of Agric	08064809486	amiyidanrewaju@gmail.com	
6	Aina Ebenezer. O		08038118710	Ebenezer1@gmail.	
7	Chief Brisade Moses		08063799931		
8	Osunsanmi Abolabo	SMEC	08034716223	gbolabo.osunsanmi@yahoo.com	
9	Adegoke Joseph	FMEnv Abuja	08032850037	adegokejoseph@gmail.com	
10					
11					
12					

SMEC TEAM AND REGULATORS PRE-ENGAGEMENT BRIEFING 2OTH DEC. 2021

SMEC Nigeria Ltd.

No 24, I.T. Igbani Street, Off Obafemi Awolowo Way, Jabi
District Abuja, Nigeria

Surbana Jurong Consultants Pte. Ltd.

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