



**ENVIRONMENTAL AUDIT REPORT OF THE RUBBER
ESTATE INCLUDING RUBBER PLANTATION & RUBBER
FACTORY AT OKOMU-UDO IN OVIA SOUTHWEST
LOCAL GOVERNMENT AREA, EDO STATE, NIGERIA**



**SUBMITTED TO
NATIONAL ENVIRONMENTAL STANDARDS AND
REGULATIONS ENFORCEMENT AGENCY
(NESREA)**

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Environmental Audit Report of Okomu Oil Palm Company Plc (Rubber Estate including Rubber Plantation & Rubber Factory) at Okomu-udo in Ovia Southwest Local Government Area, Edo State, Nigeria

Submitted to:

National Environmental Standards and Regulations Enforcement Agency (NESREA)

Prepared by



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ACRONYMS AND ABBREVIATIONS

AAWUN	Agricultural and Allied Workers Union of Nigeria
AGO	Automotive Gas Oil
AIDS	Acquired Immune Disease Syndrome
ATR	African Traditional Religion
BOD	Biochemical Oxygen Demand
CBD	Convention on Biological Diversity
c ³	Cubic Meters
CO	Carbon monoxide
CO ₂	Carbon dioxide
COD	Chemical Oxygen Demand
°C	Degree Celsius
CFCs	Chlorofluorocarbons
CITES	Convention for prevention of International Trade in Endangered Species
CSR	Corporate Social Responsibility
DO	Dissolved Oxygen
DPR	Department of Petroleum Resources
ECM	Environmental Compliance Monitoring
EFB	Empty Fresh Bunches
EIA	Environmental Impact Assessment
EAP	Environment Action Plan
EAuR	Environmental Audit Report
EHS	Environmental Health and Safety
EMS	Environmental Management System
FFB	Fresh Fruit Bunches
FDS	Foremost Development Services Limited
FGD	Focus Group Discussion
FMENV	Federal Ministry of Environment
GHG	Green House Gas
Ha	Hectare
HAWS	Hand-Arms Vibration Syndrome
HSE	Health Safety and Environment
HCV	High Conservation Value
IEC	Information, Education and Communication
IFC	International Finance Corporation
IIBP	Industry International Best Practice
IPA	Impact Producing Activity
IPM	Integrated Pest Management
IPO	Initial Public Offer
ISO	International Organization for Standardization
kg	Kilogram
km	Kilometer
LCA	Life Cycle Analysis
LGA	Local Government Area

Ltrs	Liters
MoU	Memorandum of Understanding
MT	Metric Tonne
NDDC	Niger Delta Development Commission
Nm ³	Normal Cubic Meters
NSE	Nigeria Stock Exchange
NESREA	National Environmental Standards and Regulations Enforcement Agency
NPK	Nitrogen, Phosphorus and Potassium
NO _x	Oxides of Nitrogen
NPDC	Nigeria Petroleum Development Commission
PHI	Public Health Impact
PLC	Public Limited Company
PMS	Premium Motor Spirit
PPE	Personal Protection Equipment
QHSE	Quality, Health, Safety and Environment
RSPO	Roundtable on Sustainable Palm Oil
RAMSAR	Convention on the Protection of Wetlands of International Importance
R & D	Research and Development
SDS	Safety Data Sheet
SIA	Social Impact Assessment
SON	Standards Organization of Nigeria
SPM	Suspended Particulate Matter
SO ₂	Sulphur dioxide
STD's	Sexually Transmitted Diseases
TOC	Total Organic Carbon
ToR	Terms of Reference
TSS	Total Suspended Solids
ULV	Ultra-Low Volume
UV	Ultraviolet
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNICEM	United Cement Manufacturing Co. Ltd
VOC	Volatile Organic Compounds
WHO	World Health Organization
Yr	Year

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Executive Summary

ES 1.0 The Proponent

The Okomu Oil Palm Company Plc (OOPC Plc) is an agricultural and food-processing company located at Okomu-Udo, Ovia Southwest Local Government Area, Edo State, Nigeria. The company specializes in plantation development and production of special palm oil, palm kernel oil, palm kernel cake and Technically Specified Natural Rubber. It started operation in 1976 as a Federal Government project and was privatized in 1990. The then Bendel State government granted the company a total concession of about 15,000 hectares within the Okomu forest reserve in 1978.

Okomu Oil Palm Company Plc has over 12,000 individual and institutional shareholders, both Nigerian (40%) and foreign (60%). The company employs about 331 permanent workers including expatriates and Nigerians at management, intermediate, and junior cadres and about 4,331 third party workers and 1,860 daily rated (contract) workers

ES 2.0 Location and Access

The company is located at Okomu-Udo, within the Okomu Forest Reserve in Ovia Southwest Local Government Area of Edo State, Nigeria. The company is accessible through a network of roads from Lagos and Benin City. It lies between latitude 5°07' and 5°25' E and longitude 6°18' and 6°26' N.

Within the estate, there is over 600km earth road network, ensuring that all the features and plantation field are easily accessible.

ES 3.0 Project Description

The environmental audit of Okomu OPC Plc - Rubber Estate was carried out to assess the environmental performance of the Company from the point of view of conformance to local, national, and international environmental legislation, regulatory standards, and industry best practices. The audit covered all the facilities, processes, and operations of the company.

About 5,549 hectares have been developed into rubber plantations at the rubber estate. The lifespan of the project is about 200 years.

ES 4.0 Audit Findings

In addition to land use, extensive reserves of natural vegetation were established as riparian buffer zones and High Conservation Areas occupying about 324.66 ha, of the rubber estate. The buffer zone has been well maintained, and they provide important habitat for flora and fauna.

Soil conservation practices are well understood and implemented across the plantations. The roads appeared well constructed and maintained with appropriate drainage measures and sediment traps in place.

The company has put in place an incredibly good program for recycling rubber factory waste nutrients in the field by means of rubber sludge application in the field. Also, the system for distribution is professionally managed.

There is also a well-developed program for integrated pest management (IPM), but more tall trees should be retained at new development sites for attracting birds of prey. However, the approach to pesticides use is well controlled and consistent across the plantation estate.

The company is well located and operated efficiently, with high throughput, and good quality control of product.

The company maintains a list of statutory permits and certificates relevant to different operations and equipment in use. A good number of these permits and certificates have been obtained, while some are undergoing revalidation or renewal. The level of performance of the company has been improved in this regard.

The quality of the environment is high with good housekeeping at the offices and management/senior staff residences. However, the housekeeping and sanitation at the rubber quarters would need considerable improvement. The basic information for the protection of the environment, and the basic education and consciousness for safety at workplaces have been established with a high sense of safety responsibility as demonstrated by workers across board.

The operations of rubber plantation and other workplaces are fraught with hazards and pollution potentials. In addition, the company has put in place several abatement measures including the provision of PPE to protect workers against workplace hazards and pollution prevention. In similar vein, a number of provisions have been made for waste reuse, waste reduction and waste recycling. These provisions include the use of fibres and kernel shells to fuel the boiler.

Routine environmental monitoring is undertaken to ensure that the treated rubber effluent are of acceptable quality before it is discharged into the environment. So also, are surface water and groundwater are of acceptable quality as well. A monitoring well is in place about 150m from the effluent pond to check for any infiltration into the groundwater system.

The waste management system is good. For solid waste, reasonable provisions have been made for collection, transportation, and disposal. An internal solid waste dumpsite has been established thus enabling the tracking of waste. In addition, the company has a valid permit from Edo State Ministry of Environment and Sustainability to operate the solid waste dumpsite/landfill within the estate.

Signage display level, relating to safety education and safety warnings at workplaces has improved. Some of the signages including the walkway for pedestrians at the rubber factory however appear faded and would require maintenance.

There is also need for the procurement and display of more posters and safety related messages at workplaces.

The clinic is functional with a standby ambulance with the company having retainership agreement with five (5) hospitals in Edo state. Malaria cases ranked highest as records reveal, while the least prevalent ailments treated include diabetes, hypertensive disease, road traffic accidents and workplace injuries.

The preventive health education programme of the clinic should include special emphasis on the prevention of malaria.

ES 5.0 Laboratory Results

The results of laboratory analysis obtained during this audit show that the groundwater quality is good and free from pollution except for low pH thus making the water to be acidic (4.40 – 4.81), which is below the specified of 6.5-8.5 according to the national standard for drinking water quality.

The appropriate recommendation has been made for the correction of the pH of the groundwater.

The ambient air quality measurements undertaken during the audit revealed that the ambient air quality is good with the concentrations of gases and particulate matter monitored within the FMEnv. Limit except at the rubber quarters.

The result has shown the Suspended Particulate Matter (SPM) ranges between 210-351 $\mu\text{g}/\text{m}^3$; Carbon dioxide, 407 – 446ppm; Hydrocarbon, <0.1%; and Nitrogen oxides, <0.01ppm which are within FMEnv permissible limits.

The quality of the treated critical effluents parameters was well within the respective limits specified by NESREA for land application purposes. The bottom layer of the effluent pond should be scooped regularly to improve the efficiency of the rubber effluent ponds.

Consequently, a monitoring well established about 150m from the pond to check for any possible infiltration of the effluent into the groundwater system revealed no contamination.

The surface water qualities are also free of any form of pollution, including ones from agrochemical use. The buffer zones established prevents the wash down of agro-chemicals into the water body, this is in addition to the company policy of not spraying or applying chemicals to trees close to the water body.

ES 6.0 Conclusion and Recommendation

The audit has revealed the high level of consciousness and awareness of the environment by the workers and has identified the need for continuously undertaking training and education of workers widely on related environmental, safety and health issues.

For all the observed limitations, non-conformances and poor performances, appropriate recommendations have been made for improvement. In order to bring to effect the recommendations arising from this audit therefore, robust environmental action plans (EAPs) has also been developed for the estate. It is recommended that the EAPs be diligently implemented.

CHAPTER ONE

1.0 Introduction

1.1 Overview of Background Information

The Okomu Oil Palm Company Plc (OOPC Plc) is a successful and leading agricultural establishment in Nigeria that specializes in Oil Palm and Rubber plantation development and production of Special Palm Oil, Palm Kernel Oil, Palm Kernel Cake and Technically Specified Natural Rubber.

Through its sustainable activities, the Company implements key initiatives that ensure long-term economic performance, social welfare, health, security, and natural resource management, resulting in a positive impact on all. Overall, the company is committed to continual improvement in its environmental and social obligations.

Okomu Oil Palm Company commissioned Foremost Development Services Limited (independent environmental consultants) to carry out an Environmental Audit of its processes and operations covering its plantations and supplementary facilities and report accordingly.

This report is structured in line with the NESREA National guidelines for Environmental Audit in Nigeria, to present the description of the facilities and processes, provide information on environmental planning approvals and rubber processing operation, followed by analysis and facility audit in the sequence of topics listed in the IFC's Environmental, Health, and Safety Guidelines for "Perennial Plantation Crop Production" (IFC, March 30, 2016) and Vegetable Oil Production and Processing (IFC, February 12, 2015).

1.2 Company Information

1.2.1 Company History

The company was established initially in 1976 in Edo State by the Federal Government of Nigeria in a de-reserved area of the Okomu Forest Reserve with an initial surveyed area of approximately 15,580Ha in the Main Estate. Other land holdings include a 6,116Ha at Extension One Estate and 11,417Ha at Extension Two Estate planted to Oil Palm, Rubber trees and about 2,976Ha mapped out as High Conservation Areas. The company, which later became a Plc in 1990, has been in operation for over 35years.

Okomu Oil Palm Company Plc has over 12,000 individual and institutional shareholders, both Nigerian (40%) and foreign (60%). The company employs about 331 permanent workers including expatriates and Nigerians at management, intermediate, and junior cadres and about 4,331 third party workers and 1,860 daily rated (contract) workers.

1.2.2 Location and Access

The company is located at Okomu-Udo, within the Okomu Forest Reserve in Ovia Southwest Local Government Area of Edo State, Nigeria. The company is accessible through a network of roads from Lagos and Benin City. It lies between latitude 5°07' and 5°25' N and longitude 6°18' and 6°26' E.

Within the estates, there is over 600.04 km earth road network, ensuring that all the features and plantation field are easily accessible.

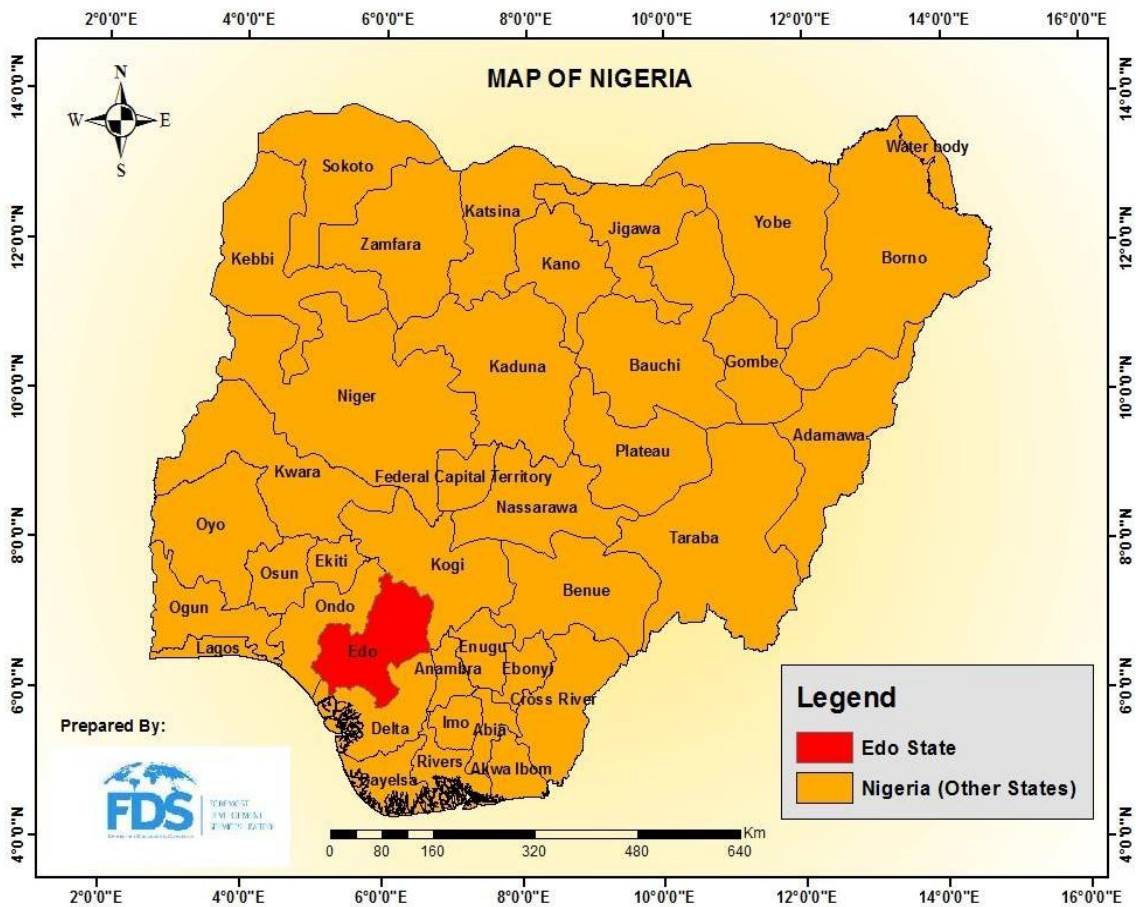


Figure 1.1: Map of Nigeria Indicating Edo State

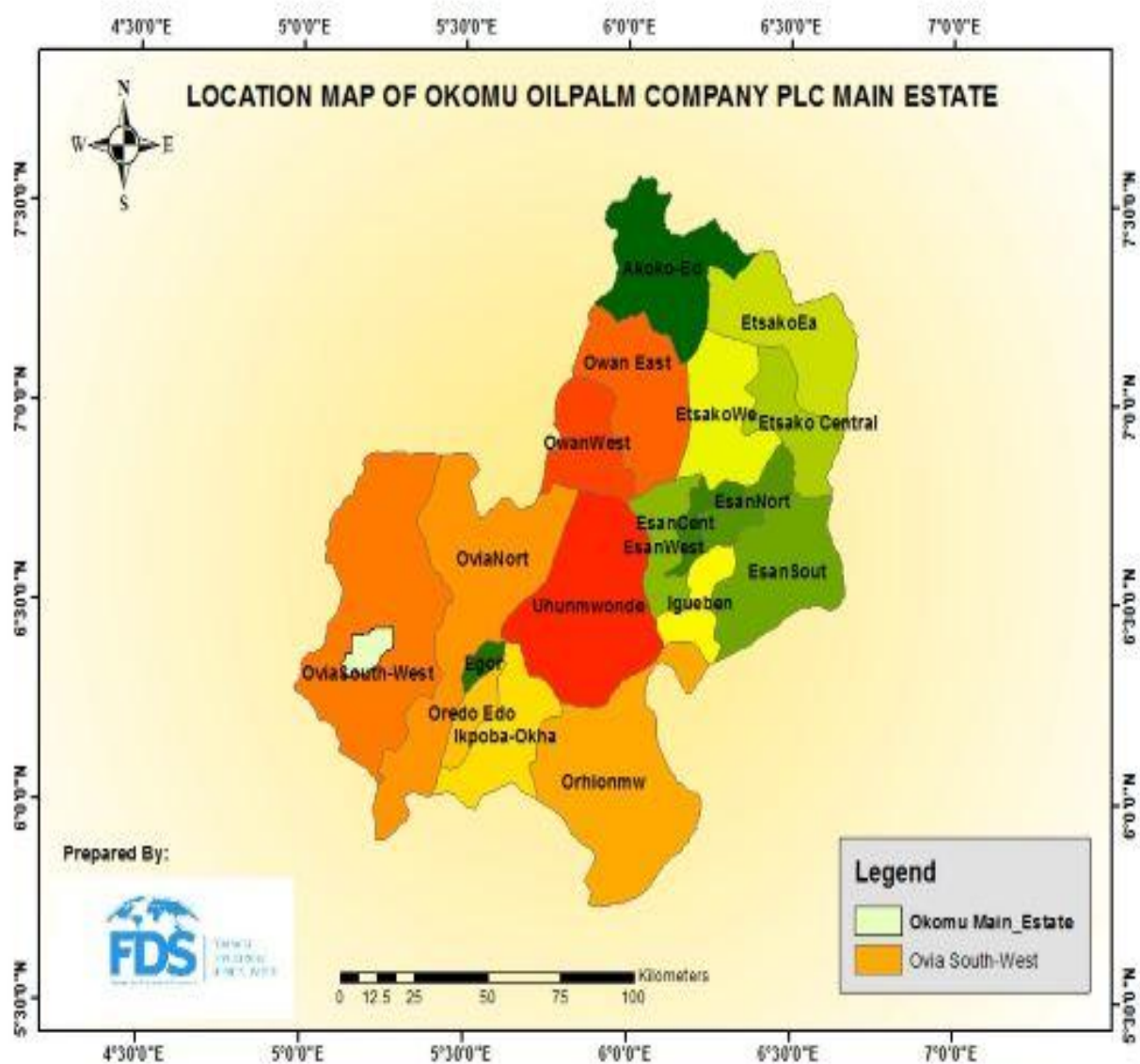


Figure 1.2: Map of Edo State Indicating Location of Okomu-OPC Plantation in Relation to Ovia Southwest LGA

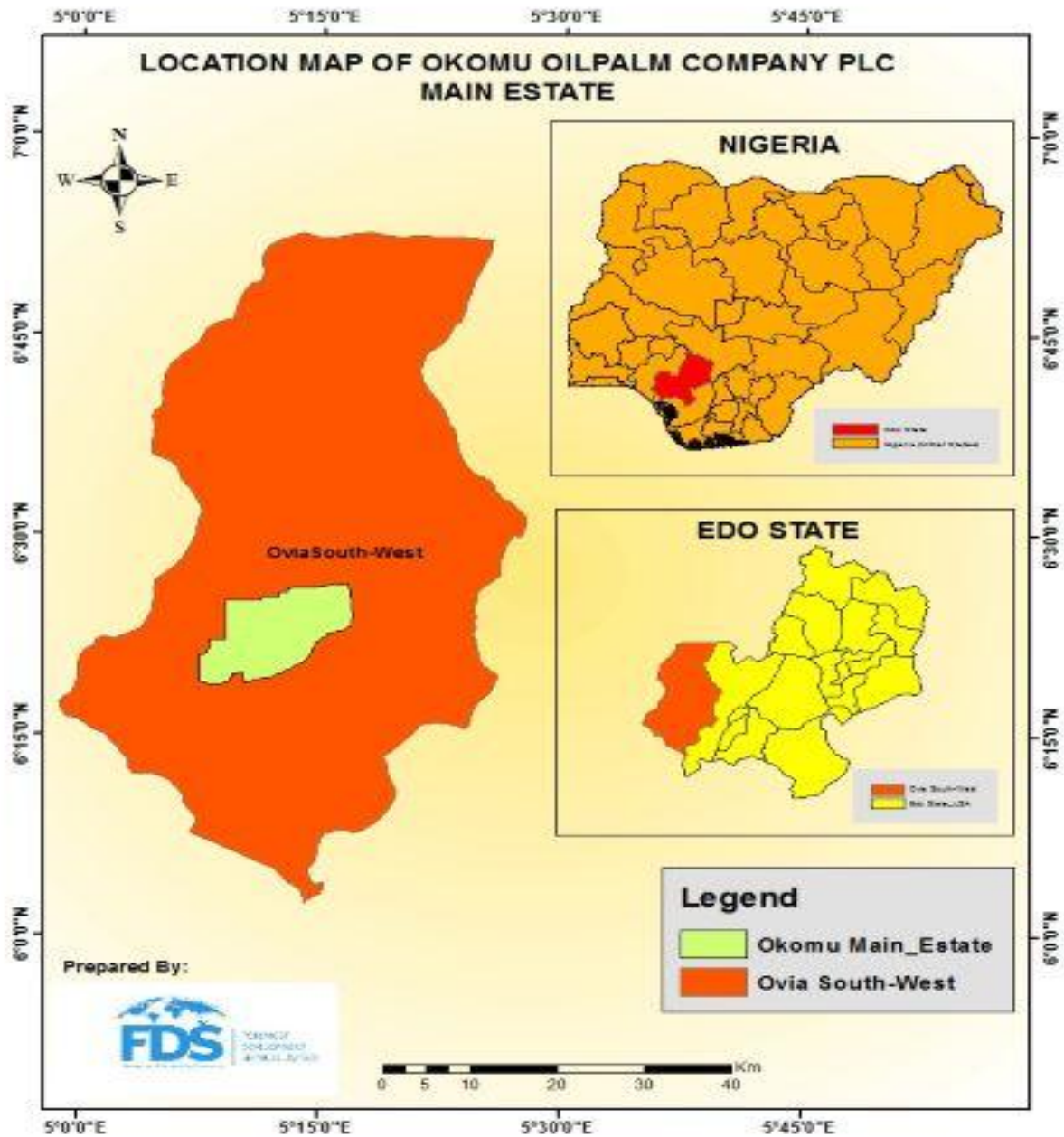


Figure 1.3: Location of Okomu-OPC Main Estate Plantation in Relation to Ovia Southwest LGA, Edo State and Nigeria.

OKOMU OIL PALM COMPANY PLC: Planting Year-2017

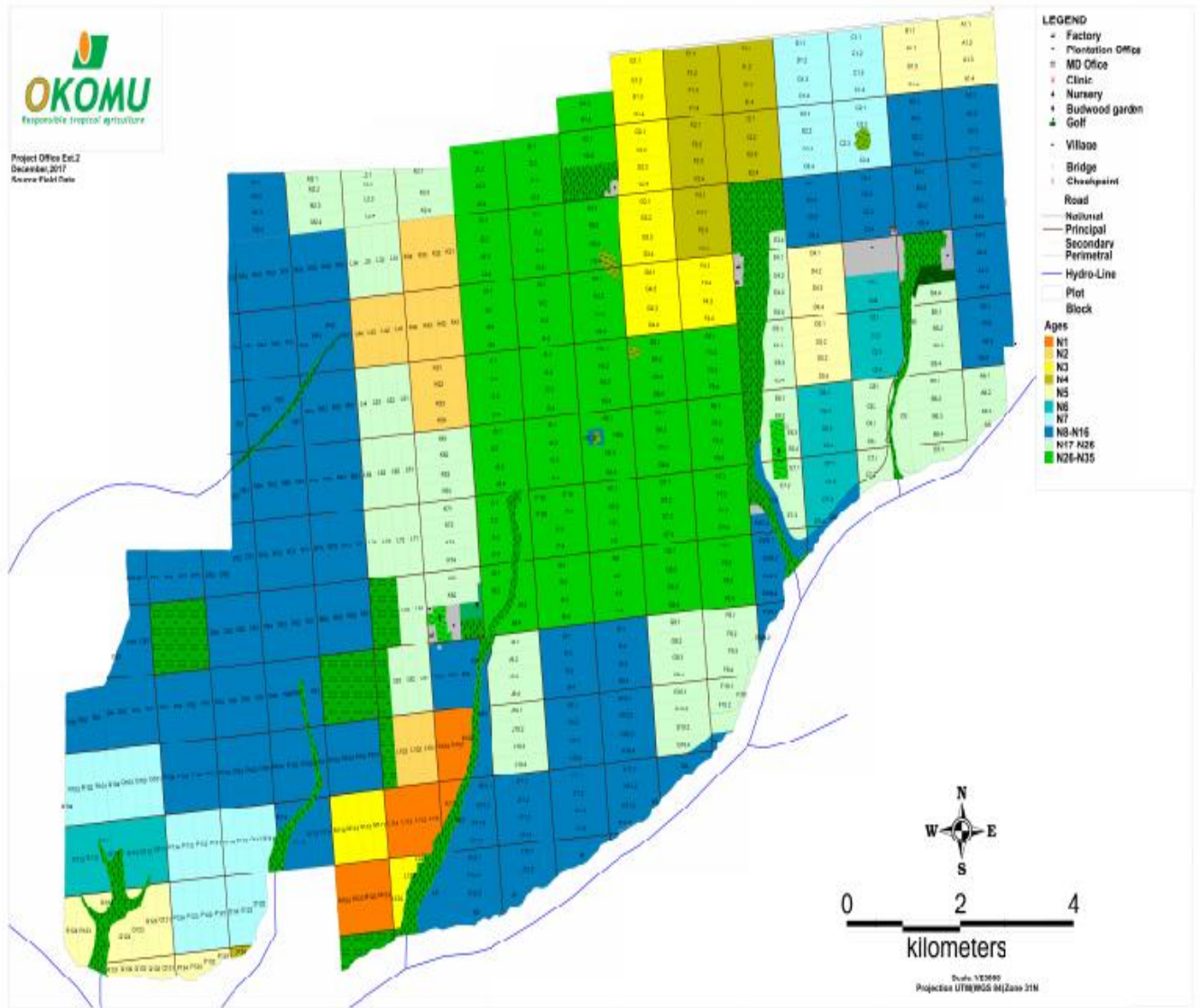


Figure 1.4: Main Estate Plantation Map

Source: Okomu OPC Plc HSE Department (December 2024)

1.2.3 Activities

The company undertakes plantation agriculture involving the cultivation of Oil Palm and Rubber trees and production of Special Palm Oil, Palm Kernel Oil, Palm Kernel Cake and Technically Specified Natural Rubber.

1.2.4 Mission Statement of Okomu Oil Palm Company Plc

To be Nigeria's leading Agro business, through the efficient and effective management of our various plantations by a highly motivated workforce, working in harmony with our stakeholders, and continuously returning favorable results to our shareholders.

1.3 Objectives of an Environmental Audit

The objective is to determine and thereby provide regulatory bodies (such as NESREA and Edo State Ministry of Environment and Sustainability) with a clear indication of the overall environmental performance of the company from the following point of view:

- Generation of adequate environmental information of the facilities for the potential environmental risks that are likely to be caused by their operations to the immediate environment;
- Determine how well the environmental management systems and equipment are performing;
- Achieving resource optimization and improved process performance;
- Encouraging organizations to self-regulate their environmental practices and to increase their responsibilities to stakeholders and society;
- Ensuring compliance, not only with laws, regulations and standards, but also with company policies, the requirements of the approved NESREA-endorsed Environmental Management Plan of the organization as standard;
- Enabling environmental problems and risks to be anticipated and responses to be planned; and
- Minimizing human exposure to risks from the environment, health and safety issues.

1.4 Terms of Reference (ToR)/Scope of Audit

The scope of the audit involves the evaluation of the company operations, records, and data between **2023 and 2024** vis-à-vis conformance to state, national and international legislations, fieldwork inspections and interview of employees. In addition, some physical environmental factors were sampled/monitored, and the samples collected were later analyzed in the laboratory. In summary, the focus would be on the following.

- **Environmental and Social performance:** (Site history, processes/materials, storage of materials, storm water management, water discharges, waste disposal, oil/chemical spill prevention, permits/licenses etc.
- **Occupational Safety:** (policies and procedures, emergency response, firefighting, safety communication/promotion/training, housekeeping, regulatory compliance) and
- **Occupational Health:** Medical Surveillance, employee exposure to hazards, PPE, ventilation and engineering controls etc.

1.5 Approach and Methodology

The following steps were involved in the conduct and analysis of the findings of this audit:

(i) Pre-study activities included among others:

- (a) Obtaining full management commitment
- (b) Setting overall goals, objectives, scope and priorities
- (c) Selecting audit team that ensured objectivity and professional competence
- (d) Reviewing the following background information and operational information with facility Management:
 - i. Permits, license, Specific information on location, layout, organizational chart, products, production processes, flow charts, and specific wastes generated etc.
 - ii. History of environmental issues
 - iii. Environmental monitoring data (solid waste disposal, gaseous emission etc.).
 - iv. Infrastructure arrangements, energy, materials and human resources that would need to be provided for the factory.
 - v. Environmental pollution load, abatement measures, permits, licenses, treatment and disposal mechanisms.
- (e) Photocopies of any of the items mentioned in (i)-(iv) were requested (where applicable) before commencement of studies.

(ii) On-Site Activities Included:

- ❖ Management brief by FDS on the scope and the audit approach.
- ❖ Inspection of every unit of operation of the factory, and findings recorded.

- ❖ Borehole, Surface water, waste water and air samples were taken for analysis.
- ❖ Measurement of air quality and noise level within and around the facility were carried out with automated, pre-calibrated equipment to obtain current data of the environment.
- ❖ Representative samples and measurements were taken according to standard analytical procedures for analysis and in accordance with the methods of the American Public Health Association (APHA) and the laboratory of the water pollution federation of the United States of America.
- ❖ The FME specifications Regulation S.1.8 and National Environmental (Food, Beverages and Tobacco Sector) Regulations, S. I. No. 33 of 2009 was used to assess the values of various parameters determined with the allowable limits.

(iii) Post Audit Activities Included:

- ❖ Discussion and evaluation of audit findings
- ❖ Preparation of the draft audit report
- ❖ Discussion of the draft report with management
- ❖ Issuance of final report
- ❖ Preparation of action plan based on findings and recommendations.

1.6 Regulatory Bodies

1.6.1 Local Government Area

The Ovia Southwest Local Government Area Council is the tier of government that is responsible for regulating and monitoring the environment at the local level especially the aspects of health and sanitation inspection of business premises to ensure that they conform to set standards.

1.6.2 State Ministry of Environment

The Edo State Ministry of Environment and Sustainability is the arm of government responsible for regulating the environment in Edo State of Nigeria. Depending on certain peculiarities of the State, the Ministry has made and established its own laws and environmental standards, which are not inconsistent with Federal laws.

1.6.3 The National Environmental Standards and Regulations Enforcement Agency (NESREA)

NESREA was established by Act 25 of 2007. One of the responsibilities of NESREA is to ensure that the regulated community complies with all environmental laws and regulations in Nigeria.

1.6.4 Federal Ministry of Environment

The Federal Ministry of Environment is the apex body with the broad mandate to regulate and protect the environment in Nigeria. The Ministry has enacted a number of environmental laws and regulations. In addition, Nigeria is party to some international agreements; protocols and conventions on Environment and is bound by their provisions and requirements.

1.7 Review of Relevant Environmental Legislation

Some of the national legislations relevant to the project operations are listed below:

- Environmental Impact Assessment (EIA) Act, Cap E12 LFN 2004.
- National Guidelines and Standards for Environmental Pollution Control in Nigeria, 1991.
- The National Policy on Environment, 1989 (revised 2016).
- Harmful Waste (Special Criminal Provisions) Act of 1988.
- National Guidelines for Environmental Audit in Nigeria, 2011 (Revised, 2024).
- National Guidelines on Environmental Management System in Nigeria, 1999.
- National Environmental Standards and Regulations Enforcement Agency, (Establishment) Act No. 25, 2007.
- National Environmental (Food, Beverages and Tobacco Sector) Regulations, S.I. 33 of 2009.
- National Environmental Protection (Pollution Abatement in Industries and Facilities Generating Wastes), Regulations S.I.9 of 1991.
- National Environmental (Ozone Layer Protection) Regulations, S.I. 32 of 2009.
- National Environmental Protection (Management of Solid and Hazardous Wastes) Regulations, S.I.15 of 1991.
- National Environmental (Sanitation and Waste Control) Regulations, S.I.28 of 2009
- National Environmental (Noise Standards and Control) Regulations, S.I. 35 of 2009.
- National Environmental (Surface and Groundwater Quality Control) Regulations, S.I. 22 of 2011.
- National Environmental (Air Quality Control) Regulations, S.I. 64 of 2014.
- National Environmental (Control of Vehicular Emissions from Petrol and Diesel Engines) Regulations, S.I. 20 of 2011.
- Factories Act CAP F1 LFN 2004
- Land Use Act, CAP L5 LFN 2004

National Policy on Environment

The National Policy on Environment (revised 2016) provides for “a viable national mechanism for cooperation, co-ordination and regular consultation, as well as harmonious management of the policy formulation and implementation process which requires the establishment of effective institutions and linkages within and among the various tiers of government, federal, state and local governments”. Prior to the launching of this policy, there was no unified co-ordination of activities of the 3-tiers of government responsible for the environment.

Environmental Impact Assessment (EIA Act CAP E12 LFN 2004)

EIA act was promulgated in 1992. It makes environmental impact assessment (EIA) mandatory for all new major projects. Therefore, an EIA is requested by the Federal Ministry of Environment for the proposed project.

National Environmental Standards and Regulation Enforcement Agency (Establishment) Act No. 25, 2007

This is the embodiment of laws and regulations focused on the protection and sustainable development of the Environment and its natural resources via some of the relevant sections are listed below:

- ❖ **Section 7** provides authority to ensure compliance with environmental laws (local and international) and also deals with Environmental sanitation, pollution prevention and control through monitoring and regulatory measures.
- ❖ **Section 8 (1)(K)** empowers the Agency to make and review regulations on air and water quality, effluent limitations, control of harmful substances and other forms of environmental pollution and sanitation.
- ❖ **Section 27** prohibits, without lawful authority, the discharge of hazardous substances into the environment.

National Environmental (Food, Beverages and Tobacco Sector) Regulations, S. I. No. 33 of 2009

These provides to prevent and minimise pollution from all operations and ancillary activities of food, beverages, and tobacco sector to the Nigerian environment.

National Guidelines and Standards for Environmental Pollution Control in Nigeria 1991

This schedule deals with the control of industrial effluent discharge, gaseous emissions, and hazardous wastes, so also noise pollution control. This schedule established environmental guidelines and standards for the abatement and control of all forms of

pollution.

The proposed and/or project would therefore have to ensure that any discharges into the land, water and atmosphere are of acceptable quality to ensure that there are no legal repercussions under this schedule.

National Pollution Abatement in Industries and Facilities Generating Wastes Regulations S.I.9, 1991

This regulation requires every industry to install anti-pollution/pollution abatement equipment to treat effluent discharges and gaseous emissions to the standards and limits prescribed in Regulation S.I.8, 1991.

National Environmental (Control of Vehicular Emissions from Petrol and Diesel Engines) Regulations, S. I. No. 20 of 2011

The purpose of this Regulation is to safeguard the Nigerian environment against pollutants from vehicular emission.

Waste Management and Hazardous Wastes Regulations S.I.15

This regulation requires that all steps that are necessary must be taken for the effective management of solid and hazardous wastes in order to safeguard public health, also ensure that waste is collected, stored, transported, recycled, reused or disposed in an environmentally sound manner and promote safety standards in relation to such waste.

National Environmental (Sanitation and Waste Control) Regulations, 2009 (S.I.28)

The purpose of these regulations is the adoption of sustainable and environment friendly practices in environmental sanitation and waste management to minimize pollution. The provisions of the regulations state that a person in care, management or control of any industrial facility shall:

- (a) Provide educational and pictorial signs to direct persons where they can drop waste.
- (b) Provide receptacles for recyclable materials in appropriate and easily accessible locations.
- (c) Keep the premises, drains and all public or private lands, street, lanes, walkways; beaches or docks within 5 meters of the boundary of the property free from litter always.
- (d) Ensure that discarded materials are regularly collected and disposed of sanitarily.
- (e) Ensure that recyclable materials are properly packed and neatly stacked.
- (f) Ensure sorting and segregation of solid waste at source.

National Environmental (Surface and Groundwater Quality Control) Regulations, S. I. No. 22 of 2011

The purpose of this Regulation is to restore, enhance and preserve the physical, chemical and biological integrity of the nation's surface waters, and to maintain existing water uses.

National Environmental (Noise Standards and Control) Regulations, 2009 (S.I.35)

The purpose of these regulations is to ensure maintenance of a healthy environment for all people in Nigeria, the tranquility of their surroundings and their psychological well-being by regulating noise levels and generally, to elevate the standard of living of the people. The regulations among others state the permissible noise levels to which a person may be exposed; control and mitigation of noise; permits for noise emissions in excess of permissible levels; and enforcement.

National Environmental (Ozone Layer Protection) Regulations, 2009 (S.I.32)

These Regulations impose ban on any person to import, manufacture in part or in whole, install, offer for sale or buy new or refurbished facilities intended to be used for the production of any ozone-depleting substance (ODS), unless for the recovery and recycling of substances already in use. The Regulations state that no person shall release or permit the release into the atmosphere an ozone- depleting substance from an equipment or any part of an equipment; fire extinguishing equipment except during firefighting; a container used in the supply, recovery, recycling, reclamation, transportation, or storage of an ozone depleting substance.

The constitution of the Federal Republic of Nigeria (1999) as the national legal framework recognizes the importance of improving and protecting the environment. The related sections of the constitution are:

- ❖ **Section 20** makes it an objective of the Nigerian State to improve and protect the air, land, water, forest and wildlife of Nigeria.
- ❖ **Section 12** establishes, though impliedly, that international treaties (including environmental treaties) ratified by the National Assembly should be implemented as law in Nigeria.
- ❖ **Sections 33 and 34** which guarantee fundamental human rights to life and human dignity respectively, have also being argued to be linked to the need for a healthy and safe environment to give these rights effect.

Land Use Act, Cap L5 LFN 2004

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

Factories Act CAP F1 LFN 2004

The regulations for Health, Safety and Welfare are under this act. This act also requires that: Before any person occupies or uses as a factory any premises which were not so occupied at the commencement of this Decree, he shall apply for the registration of such premises by sending to the Director of Factory an application containing the particulars set out in Schedule 1 to this Decree.

Any person who has not been issued a certificate of registration as aforesaid occupies or uses as a factory any premises that have not been registered as a factory shall be guilty of an offence.

1.8 International Agreements and Protocols

Nigeria's commitments to global environmental agreements includes:

The Montreal Protocol, 1985: on substances that deplete the ozone layer and the promotion of the synthesis of new and environment-friendly products.

The Basel Convention, 1989: for the control of Trans-boundary Movement of Hazardous Wastes and Substances and their disposal.

The United Nations Framework Convention on Climate Change (UNFCCC), 1992: to stabilize atmospheric concentrations of greenhouse gases at levels that will prevent human activities from interfering dangerously with the global climate system.

The Convention for the Prevention of International Trade in Endangered Species, (CITES), 1973: regulates trading with/trade restrictions involving certain wild animals and plants whose numbers are considered to be endangered.

Convention on Biological Diversity (CBD), 1992: on the conservation of biodiversity; the sustainable use of its components; and the fair and equitable sharing of the resulting benefits.

International Financial Corporation (IFC) Performance Standards: Other related international guidelines include IFC Performance Standards, they are:

▪ Performance Standard 1:	Assessment and Management of Environmental and Social Risks and Impacts
▪ Performance Standard 2:	Labor and Working Conditions
▪ Performance Standard 3:	Resource Efficiency and Pollution Prevention
▪	
▪ Performance Standard 4:	Community Health, Safety and Security
▪ Performance Standard 5:	Land Acquisition and Involuntary Resettlement
▪ Performance Standard 6:	Biodiversity Conservation and Sustainable Management of Living Natural Resources
▪ Performance Standard 7:	Indigenous People
▪ Performance Standard 8:	Cultural Heritage

IFC- Environmental Health and Safety (EHS) Guidelines for Perennial Crop Production.

1.9 REPORT STRUCTURE

This report contains six chapters. The outline of the content of each chapter is presented below:

Chapter One: Presents the Background Information, Aims and Objectives of Study, the Terms of Reference (TOR)/Scope, Legal and Administrative Framework, Audit Process, Report Structure, Study Approach and Methodology and Audit Period.

Chapter Two: Overview of the facility/development or activity under audit. This includes description of facility, organizational structure, process description and summary of ancillary operations of the company.

Chapter Three: Details of the baseline environmental assessment and Management study which includes description of the facility under study and the surrounding environment, Existing environmental management system, survey of compliance with environmental laws, regulations, and company policies

Chapter Four: Details of the audit findings are presented and cover areas such as: observations and evaluation of general housekeeping and safety practices; identification, quantification, and characterization of waste; material balance, description of environmental effects related to operational activities and impact evaluation.

Chapter Five: Impact Evaluation of the project presents the conclusions, recommendations, and the follow-up action plan.

Chapter Six : Summary of Audit findings

Chapter Seven : Remarks and Recommendation and Environmental Action Plan (EAP).

1.10 Period of Audit

The audit exercise was undertaken from 10th December – 12th December 2024.

CHAPTER TWO

2.0 Description of Facilities and Processes

2.1 Brief Description of Natural Rubber

The rubber tree, *Hevea brasiliensis*, is a perennial crop that is capable of being exploited for 35 years. The plant thrives in rainforest regions of the lowland tropics with temperatures between 21–35 °C and a well distributed rainfall of 2,000mm/year or more. Well-drained soils with a pH of 4.5 to 6.0 have been found suitable. It takes 6–7 years for the tree to get to maturity. Rubber latex, which oozes out when the tree is wounded (or tapped), can be processed into solid rubber or liquid rubber (known as latex concentrate).

2.1.1 The Rubber Nursery

The rubber nursery is located at the rubber estate, east of the rubber factory. The nursery is about 13.52 hectares and equipped with sprinkler and sumisansui irrigation facilities, where rubber seedlings are raised therein, in poly bags, until they are 10-12 months old when they are ready for transplanting to the field. The floor of the nursery is laid with fruit fibre to protect the soil from erosion and help to conserve soil moisture and control weeds.

2.1.2 Budwood Garden

The bud-wood garden has a collection of different clones of rubber of different origins. The bud-wood garden is about 12.25 hectares.



Plate 2.1: Budwood Garden

2.1.3 Rubber Plantation/Land Use

The total rubber planting is 5,549.37ha at the rubber section of the main estate. It comprises 4,340.2ha mature planting, 1,183.4ha immature planting. Other land uses include areas allotted for residential quarters, offices, roads, and reserved areas as seen in the table below.

Location (Rubber Estate)	Size (Ha)
Mature Area	4340.2
Immature Area	1183.4
Nurseries	13.52
Budwood garden	12.25
<u>Total Planted Area:</u>	5549.37
Rubber Factory/Rubber Plantation Offices	4.99
HCV	324.66
Effluent Pond	0.5
Buildings	12.04
Roads	129.99
Others (Coconut Camp)	164

Source: OOPC- HSE Department

2.1.4 Field layout

The plantation is laid out in double and single line spacing. The planting rows are aligned North-South to allow for optimum light interception. The IRCA230 and PB314 rubber clones were solely planted initially, while the GT1 PB312, PB217, RRIC100 and RRIM703 dominated the latter plantings.



Plate 2.2: Rubber Plantation/Field Layout

2.1.5 Plantation Up-keep

Rubber up-keep operations include pruning, line weeding, inter-row weeding and fertilizer application. Pruning is done manually to keep the shoot up to 2 meters high. This is done to achieve a flat panel of rubber trunk. Line weeding is done by the application of herbicides.

Different formulations of fertilizer are used including rock phosphate and urea (used in the nursery and for immature rubber). Herbicides, including glyphosate for immature rubber lines and carbondazim for tree poisoning between the rows. Also, diuron is applied in the pegged rubber lines before transplanting in the field. Usually, fertilizer and herbicides application are well guided.

In addition, the leguminous cover crop, Pueraria is planted to provide ground cover and supply Nitrogen to the soil. In some cases, Vetiver (*Chrysopogon zizanioides*) is planted for soil erosion control, soil moisture retention, weed suppression and soil health improvement.

Insect pest control is by Integrated Pest Management techniques combining cultural, biological, mechanical, and physical methods. Although, fungicides are used but mainly in the nursery at limited amounts, these include fulpan, macozeb and foldazin (folpet, macozeb and foldazin as active ingredients).



Plate 2.3: Cover Crop and Vetiver Plants for Soil Conservation

2.1.6 Tapping

Tapping knife is used in tapping the mature rubber trees. The coagulated latex (cup lumps) is collected and transported to the cup lump shed inside the factory in trucks.

There is also a tapping school where plantation workers are taught tapping techniques to ensure rubber trees are effectively tapped.



Plate 2.4: Collection of Rubber Latex and Tapping School

2.1.7 Rubber Processing

2.1.7.1 Dry storage and Blending (cup lump shed)

The rubber (cup lumps) is stored separately in a dry storage area waiting for pick up into the processing line.

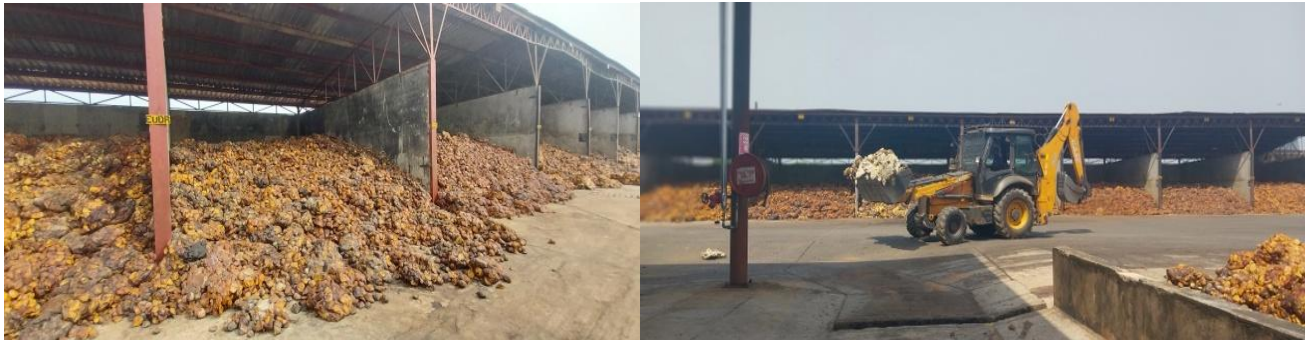


Plate 2.5: Loading of Rubber Cup Lumps from the Shed using a Shovel Loader

2.1.7.2 Slab cutter

The shovel loader picks up the rubber from the dry storage area and feeds directly into Tank 1. The rubber is transferred from Tank 1 via a bucket elevator to the Slab Cutter to reduce the rubber. Then the rubber is carried to Tank 2 via an Inspection Belt where solid contaminants and visible dirt are removed.

2.1.7.3 Twin Screw Pre-Breaker

The rubber is picked up from Tank 2 by a bucket elevator and fed into the Twin Screw Pre-breaker. The TWS is extremely rugged and efficient to reduce and clean the rubber. Then the broken rubber is discharged into Tank 3.

2.1.7.4 Coarse, Intermediate and Fine Pelletizer

From Tank 3 the rubber is picked up by a Bucket elevator to the Coarse Pelletizer. The Coarse Pelletizer will reduce again the rubber in size. The rubber is discharged into Tank 4. Same way, the rubber will pass through the Intermediate Pelletizer into Tank #5 and then into the Fine Pelletizer.

2.1.7.5 Trolley Dryers

From the Fine Pelletizer, the rubber is carried by a Conveyor belt to feed the Trolley Dryers. Then the Trolleys loaded with wet rubber crumbs are mechanically pushed from the Wet End Station into the Dryer. The automatic trolley drive system ensures that all trolleys are positively mated up for good sealing and drying condition. The Dryer works with two automatic burners.

2.1.7.6 Dry End Station

At the end of the Dryer (Dry End Station) the rubber is removed from the Trolley and weighed on the Weighing Scale. Then the rubber is pressed with a constant force before packing, storage, and shipment. The process flow chart for rubber is illustrated in Figure 2.1a and 2.1b. Apart from the main processing plant components, the ancillary equipment and facility includes forklifts trucks, belt conveyors, slab cutter, bucket elevators, Weigh Bridge, cup lump shed and metal detector. Other facilities include workshop, laboratory, fuel dump and powerhouse.

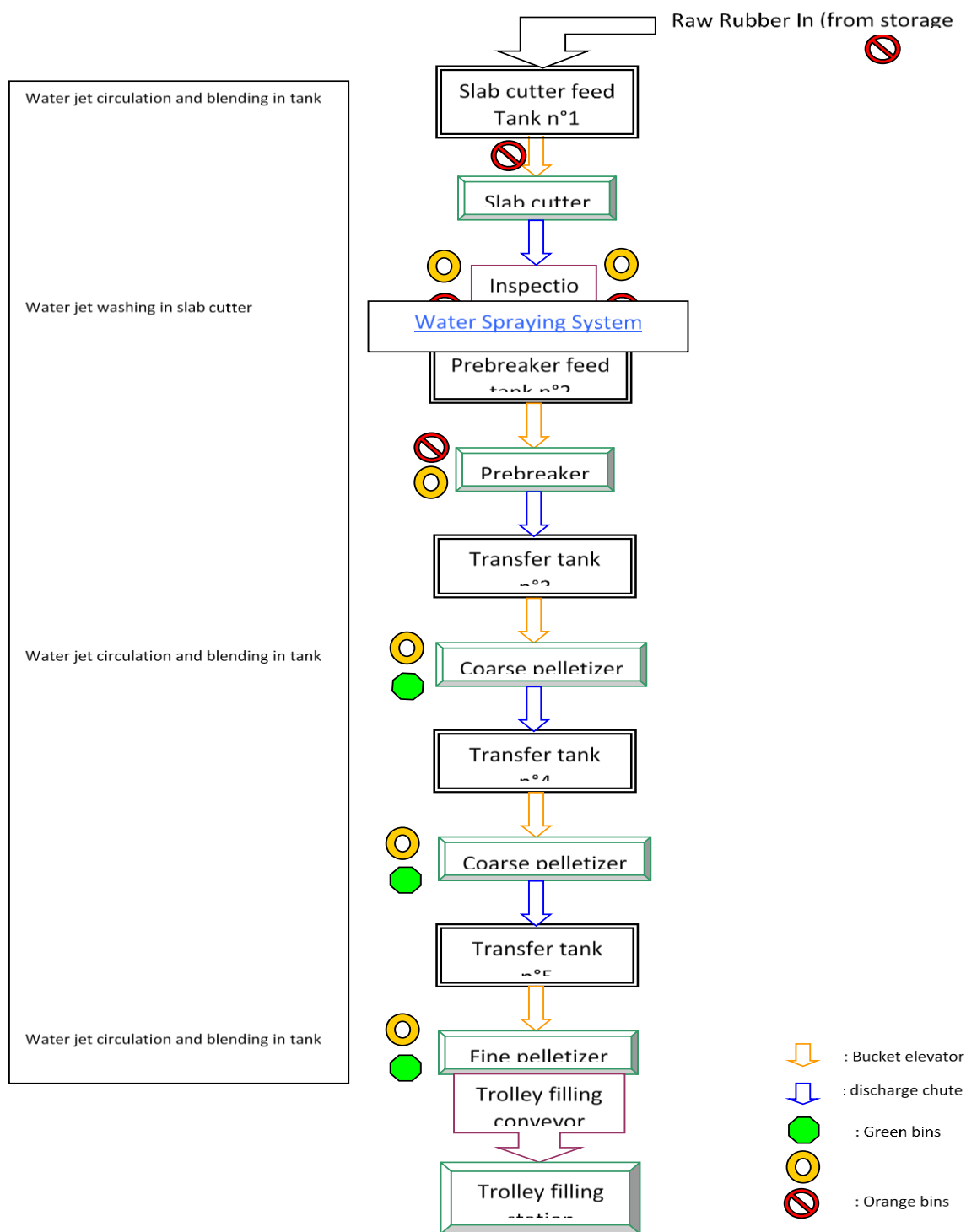


Figure 2.1a: Rubber Process Flow Diagram

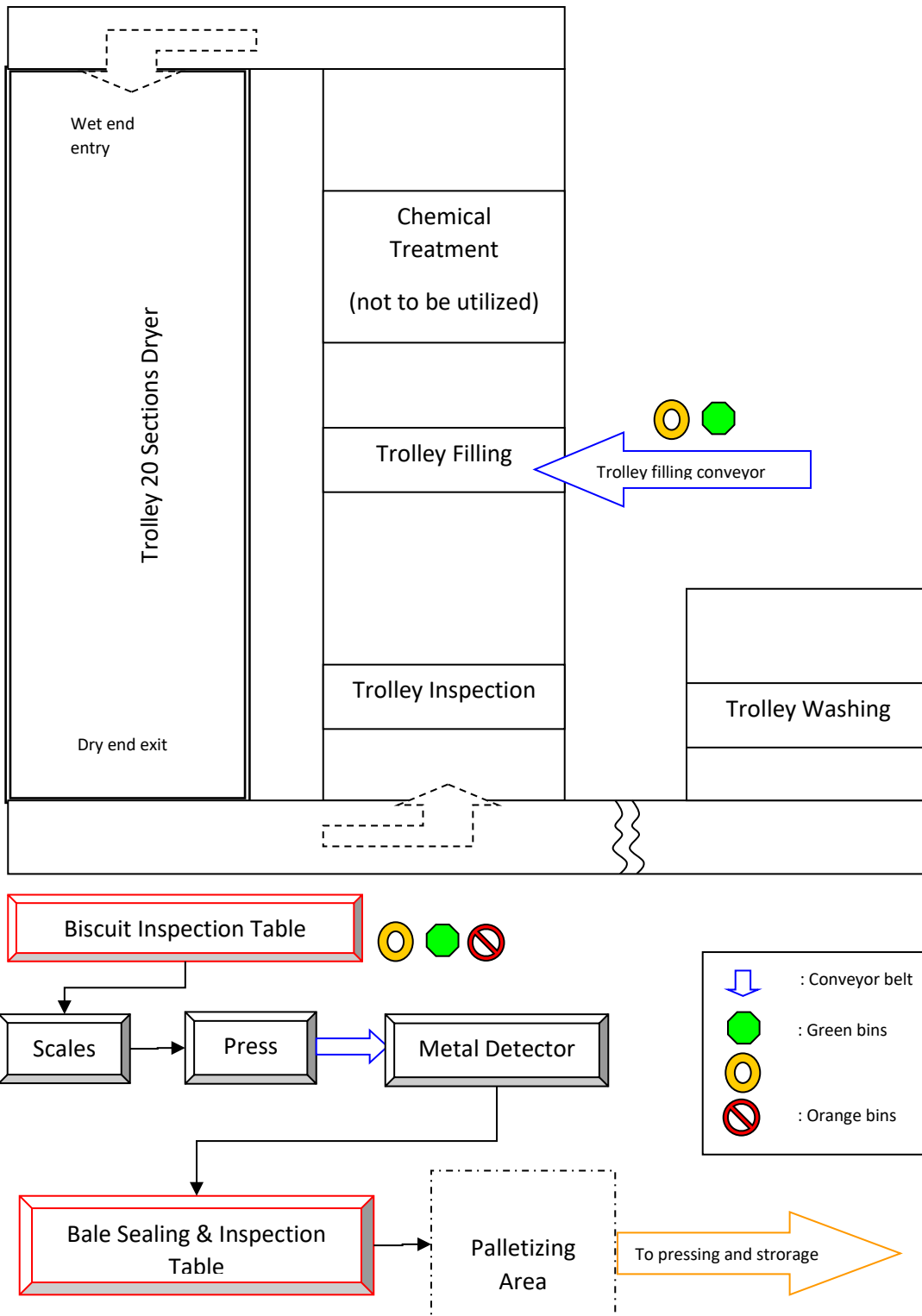


Figure 2.1b: Rubber Process Flow Diagram cont'd

Natural Rubber is a renewable raw material with many advantages and a significant carbon sink, is used in production of many domestic and medical objects such as tires (automobiles and aircraft tires), airbags, clothing, erasers, adhesives, rubber gloves, gym and commercial kitchen flooring etc. The Company usually produces TSNR 10 type products, and the rubber is marketed under the highly sought after NOKO10 label and sold worldwide to internationally renowned companies such as Michelin, Goodyear, and the like, thereby generating vital foreign exchange for the country.



Plate 2.6: Rubber Bales

Okomu also works closely with third-party stakeholders, who sell their cup lumps to the company through agents. The historical record of production between 2023 and 2024 is presented as follows:

2.1.7.7 Products and Water Consumption

Location	Products (Tonnage)	
	2023	2024
Rubber	9,822.20	6,537.40

2.2 Infrastructure & Services

The planting and processing of rubber requires infrastructure and back-up services such as road network, electricity supply, water supply, communications, fuel supply, storage services, health care delivery and others.

2.2.1 Electricity

At the estate, adequate electricity is supplied from the Main estate powerhouse generating sets, National grid and Turbine. The main estate powerhouse is the central source of power supply to the rubber estate in addition to other standby generators used for back up or continuous power supply. There are Six (6Nos.) generating sets equipped with heavy-duty industrial diesel engines, mostly Perkins's generators.

The generating sets are housed under a shed, equipped with large exhaust pipes for ventilation. The set up includes proper fencing, exhaust routing, and fuel storage.

The power generation facility is well maintained and the electricity generated from the powerhouse is supplied to the rubber factory, offices and residences.



Plate 2.7: Generating sets at the Main Estate Powerhouse

Table 2.1: Make, Model and Capacity of Electricity Generating Set

S/No	MAKE & MODEL & CAPACITY	FLEET NO.	LOCATION
1	PERKINS GEN SET - 500KVA	GS-5774	Rubber Factory
2	PERKINS GEN SET – 1100kVA	GS-5792	Main Estate Powerhouse
3	PERKINS GEN SET – 1100kVA	GS-5792A	Main Estate Powerhouse
4	PERKINS GENSET-1500kVA	GS-5798	Main Estate Powerhouse
5	PERKINS GENSET-1650kVA	GS-5799	Main Estate Powerhouse
6	PERKINS GEN SET - 500KVA	GS-5776	Management Quarters

Source: HSE Office, OOPC Plc (December 2024)

Table 2.2a: Electricity Consumption

ELECTRICITY CONSUMPTION (KW)				
S/N	DEPT	2023	2024 Target (3% Reduction)	2024 Consumption
1	Rubber Factory	2,221,316	2,154,676.52	1,892,932
2	Rubber Estate	905,739	878,566.83	793,610
3	Rubber Office	22,994	22,304.18	26,152
TOTAL		3,150,049		2,712,694

Source: HSE Office, OOPC Plc (December 2024)

Table 2.2b: Electricity Consumption Based on Supply Source (2024)

S/N	DEPT	BEDC	GENSET	TURBINE
1	Rubber Factory	142,802	1,071,184	678,946
2	Rubber Estate	50,706	407,786	335,118
3	Rubber Office	2,088	13,140	10,924
Total		195,595	1,492,110	1,024,988

Source: HSE Office, OOPC Plc (December 2024)

2.2.2 Water Supply

The major sources of water on the estate are surface water and groundwater. There are three (2 Nos.) boreholes within the estate.

Irrigation and process water is sourced from perennial surface water while potable water is sourced from groundwater. Potable water from boreholes is distributed through a network of pipes connected to storage tanks located at strategic locations within the estate.

Table 2.3: Water Consumption at Rubber Estate

Location	Water Consumption (Liters)			
	2023	3% Reduction	2024	Remark
Rubber Factory	157,004	4,710	149,744	Achieved
Rubber Estate	5,731	172	5,559	Achieved
TOTAL	162,735	4,882	158,303	Achieved

Source: HSE Office, OOPC Plc (December 2024)

2.2.3 Communication

Communication in the estate is facilitated mainly by radio communication (Walkie-Talkie). There are also installations for direct Internet communication and the global system for mobile communication (GSM).

2.2.4 Fuel Supply

The major source of energy is petroleum fuel. A filling station is available for bulk storage and dispensing of AGO and PMS. An underground storage tank which services the filling station. The total fuel storage provision at the main estate includes 46,000 litres capacity underground tank for AGO, 42,000 litres and 31,650 litres underground tanks mainly for PMS.

Table 2.5: Fuel Storage

Type	Capacity	Qty	Type of Storage
AGO	46,000 Litres	1	Underground
PMS	42,000 Litres	1	Underground
	31,650 Litres	1	

Source: HSE Office, OOPC Plc (December 2024)

2.2.5 Fire Services

There is a fire station equipped to provide fire prevention and control services. The station is strategically located, adjacent to the filling station and proximal to the administration office. During dry season, water bowser is attached to some vehicle as an emergency preparedness in event of fire within the estate and plantation.



Plate 2.7a: Fire Fighting Truck at Main Estate



Plate 2.7b: Water Bowser Attached to an Hilux

2.2.6 Roads

There is a network of earth roads of about 326.7 km connecting all workplaces and facilities at the main estate.



Plate 2.8: Road Network at Rubber Estate

2.2.7 Stores

There are three (3 Nos.) stores on the estate for the storage of plantation tools, materials, agrochemicals, and fertilizer as presented in Table 2.6 below.

Table 2.6: Location of Stores on the Estate

S/N	STORES	LOCATION	CONTENTS
1	Main Store	Workshop, Main estate	General Merchandise (Plumbing, electrical, motor & heavy duty, stationery, PPEs, etc).
2	Rubber Store	Rubber Factory	General Merchandise (Spare parts for machines, chemicals, tools, and chemicals for rubber).
3	Agric Store	Plantation/Agric office	Chemicals, PPEs, Agric. tools, fertilizers, and general plantation equipment

Source: HSE Office, OOPC Plc (December 2024)

2.2.8 Workshop

There is a main workshop comprising different functional units or sections including Lathe Machine, Light vehicle, Tractor, Electrical, Changan, Lorry, Vulcanizer, Mechanical and Welding sections. These units undertake mechanical works, civil repairs, and maintenance works. The workshop is equipped with lifting and hoisting equipment of different capacities between 1.5-5tons.



Plate 2.9: Picture Showing the Facility Workshop

2.2.9 Rubber Workshop

There is a maintenance workshop, to support the factory operations. It comprises different functional units or sections including mechanical, auto-electrical, machine and welding sections. These units undertake factory mechanical works, electrical works, fabrication, and maintenance works.

2.2.10 Rubber Laboratory

The rubber laboratory undertakes dirt content analysis, in addition to process and product quality monitoring. It is fitted with equipment including ovens, Wallace rapid plastimeter, roll mill, mooney viscometer, ageing chamber, fume cupboard, scales and balances, and other quality control equipment for process efficiency and quality monitoring. The laboratory is an attachment to the rubber factory administration office located opposite the warehouse loading bay.



Plate 2.10: Static and Mobile Fume Cupboard

2.2.11 Weather Station

There is one (1Nos.) weather station located at the rubber estate. The weather station is equipped with rain gauge, thermometers and piche-evaporimeter to collect data on rainfall, temperatures, and sunshine.



Plate 2.11: Typical Weather Station on the Estate

2.2.12 Agro-Chemical Mixing Point

There is a designated point newly constructed for agro-chemical/pesticides mixing purposes. The facility is bunded to contain spills and secure with adequate safety signage installed. Necessary precautions are taken on the issuance and handling of pesticides. All workers involved in the handling and use of pesticides are kitted with appropriate personal protective equipment.



Plate 2.12: Agrochemical Mixing Point at Rubber Estate

2.2.13 Guesthouse

There is a guesthouse providing on-site accommodation and catering services for official guests and visitors to the estate.

2.2.14 Clinic

A modern clinic is located behind the administration block to provide medical services to workers and their families. It handles observation/monitoring and treatment of minor

ailments. The medical staff includes one (1No.) resident doctor, eight (8Nos.) nursing officers, three (3Nos.) pharmacy attendants, four (4Nos.) clinic attendants, three (3Nos.) card attendants and four (4Nos.) ambulance drivers. Given the distance of the rubber estate to the main clinic, a dispensary or sick bay is provided at the rubber estate to attend to patients in the interim. The company has retainer agreement with five (5Nos.) medical centers, all in Benin City as follows:

- Ihenyen Hospital (*General Medicine*)
- Total Health Care Hospital (*Surgery and General Medicine*)
- Gift Medical Centre (*Obstetrics/Gynecology & General Medicine*)
- Mayo Eye Clinic (*Ophthalmology/Eye*)
- Astriel Medicare (*General Medicine*)

The clinic has one (1 No.) ambulance at the main estate on stand-by for emergencies. As at the time of this audit the clinical practices and housekeep was satisfactory.



Plate 2.13: Main Estate Clinic Showing the Standby Ambulance

2.2.15 Office Accommodation

A number of buildings provide office accommodation for administration, technical and other support staff.

2.2.16 Residences

Accommodation is provided for workers and their families on the estate. Different types of residential accommodation are available for junior staff, intermediate and management staff and their dependents. The accommodated workers and their dependents are about 1,721 in about 940 dwellings at the estate. The housing type range from a single room to 2bedroom apartments.



Plate 2.14: Different Housing Types on the Estate

2.2.17 Recreation

The provisions that are available for recreation on the estate include a football field, tennis court, swimming pool, staff club, management clubhouse, multipurpose court and a golf course.



Plate 2.15: Recreational Facilities on the Estate

2.2.18 Transportation

Two categories of vehicles are provided for transportation namely light vehicles fleet and heavy-duty fleet. The light vehicles fleet comprises salon cars, 4-Wheel Drive jeeps, and mini-buses. The Administration department controls them. The agric department controls the heavy-duty fleet comprising Lorries, trailers, tractors, and buses.

There are also within the heavy-duty fleet, tippers (7tons and 10tons) and Fixed Bodies. The fixed bodies are long articulated carriers, with capacity of 150 persons, used for mass transportation of workers into and out of the main estate. Lorries with a capacity of about 100 persons are also used to transport workers.



Plate 2.16: Picture Showing Some Light Vehicles and Heavy-Duty Truck used within the Estate

2.2.19 Schools

There are two schools named Okomu Primary School and Okomu Staff School both located beside each other at the Main estate. The former is Government owned while the latter is owned and run by the company. The company provides accommodation for teachers in the Government owned school and also maintains the school. There are a total of 490 student and 6 teachers employed by state government at Okomu primary school while Okomu staff school have 487 students and 19 teachers all employed by the company. Both schools have 6 classrooms each and a school bus provided for pupils.



Plate 2.17: Okomu Oil Palm Company School and School Bus

2.2.20 Police Post

There are police posts located at the estate's entrance gate and at other locations, providing security services for the estate.

2.2.21 Livestock Pens

The livestock pens are located within the Boy's quarter's premises south of the "management quarters". The pens accommodate several small ruminants and non-ruminant animals including cattle, sheep, goats and pigs. The pens are very well confined with chain-link fence wire and controlled entry is observed with a disinfection process done by visitors to reduce the risk of stock contamination. New stocks are usually quarantined for two months before the introduction to the larger stocks. There are two 2(nos) veterinary doctors attached to the livestock pen.



Plate 2.18: Picture Showing Animals at the Pen within the Estate

2.2.22 Work Force/Staff Strength

The total number of workforces in the company are over 7,000. Two Hundred and Ninety-Nine (299) are permanent staff, twenty-one (21) are Industrial Trainees, six (6) are Superintendent, thirty (30) are Managers, Three Hundred and Eighty-Five (385) are Project/Service Contractors) and Six Thousand, Seven Hundred and Eighteen (6,718) are Contractors. Table 2.7 highlight distribution of workforce in the company.

Table 2.7: Staff Distribution in OOPC

Dept	Staff	Industrial trainees	Superintendents	Managers	Contractors	Other (Project/service contractors)
Palm/Oil mill	141	7	4	8	1129	89
Rubber/factory	41	0	1	3	4120	16
Others	117	14	1	19	1469	280
Total	299	21	6	30	6718	385

Source: OOPC Main Estate, December 2024

2.3 Organizational Structure

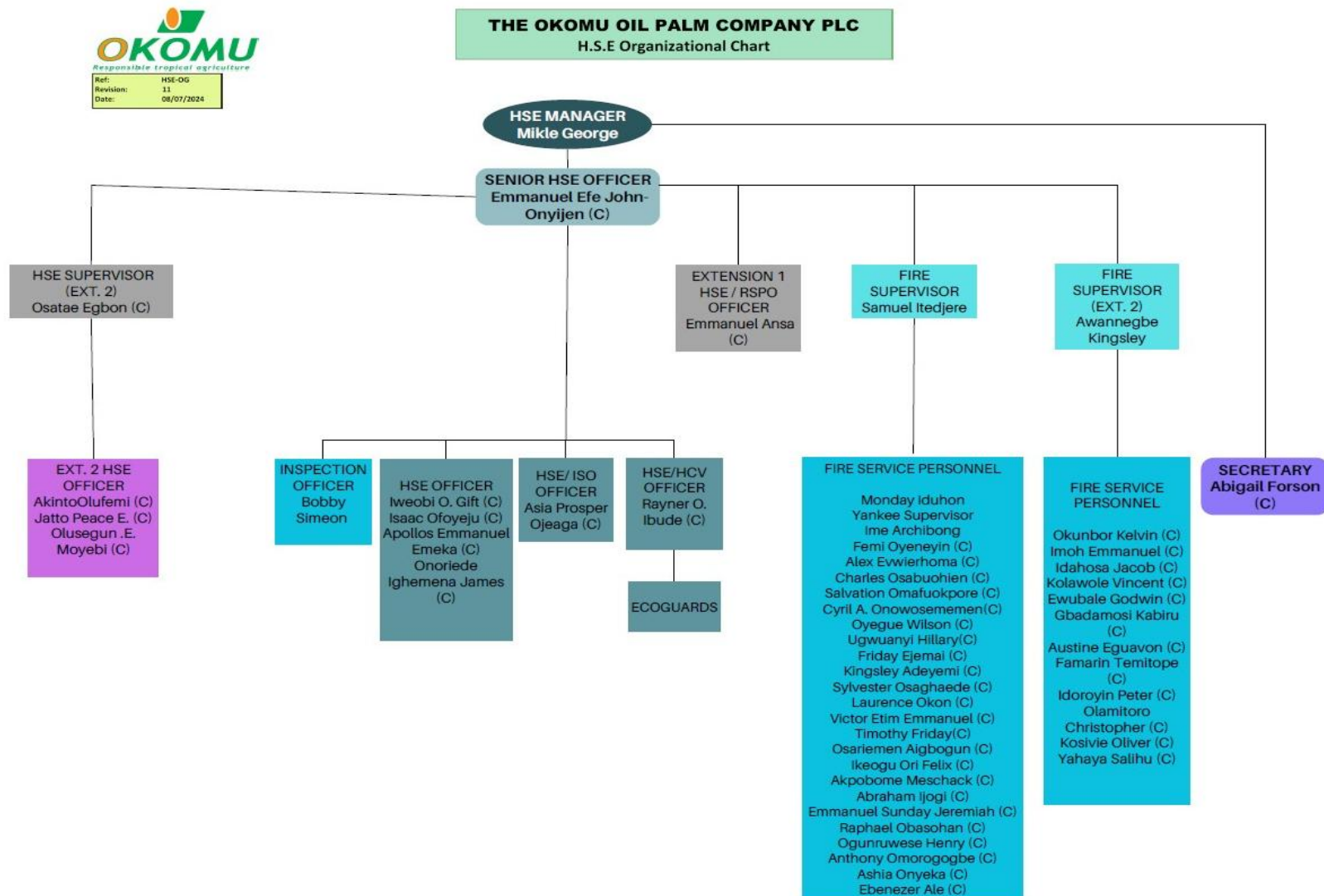


Figure 2.2: HSE Organogram

CHAPTER THREE

3.0 BASELINE ENVIRONMENTAL ASSESSMENT AND MANAGEMENT STUDY

The audit of the facility and the existing Environmental, Occupational Health, and Safety Management System was carried out using the combination of the IFC's Environmental, Health, and Safety Guidelines for "Perennial Plantation Crop Production" (IFC, March 30, 2016) and Vegetable Oil Production and Processing (IFC, February 12, 2015), the National Guidelines for Environmental Audit Report (EAR) in Nigeria, Nigeria Factories Act, CAP F1 LFN 2004 and Industry/Management Best Practices.

3.1 General - Rubber Plantation Management

ISSUE	GUIDELINES	CURRENT PRACTICE	REMARKS
Soil Conservation	Practice reduced and zero tillage (often known as "low till" or "n till") as well as direct seeding and planting, to minimize damage to soil structure, conserve soil organic matter, and reduce soil erosion.	Harrowing is done very 25 years with planting of cover crop.	This practice should always be adhered to when new planting commences.
	Minimize soil compaction, damage, or disturbance by using appropriate land preparation machinery at the right time of the year.	D8 machines are used instead of D9 dozer. In addition, heavy duty machines are not used when there is rainfall. 	This practice should be sustained.
	Use cover crops such as, Crotalaria, Canavalia, Mucuna or Tephrosia; intercropping along contours with legumes such as <i>Cajanus</i> , <i>Sesbania</i> , <i>Lupinus</i> , <i>Tritolium</i> , and creating multi species shelterbelts, and/or windbreaks to reduce evapotranspiration and soil loss through water erosion.	Interrow are ploughed and cover crops such as <i>Pueraria plaseoloides</i> and <i>Mucuna bracteata</i> are broadcasted / planted which grow vigorously and form a dense cover over the plantation. In addition, Vetiver (<i>Chrysopogon zizanioides</i>) is planted for soil erosion control, soil moisture retention, weed suppression and soil health improvement.	This practice should be sustained

Plate 3.1: D8 Machine



Plate 3.2: Soil Erosion Control and Enhancement Plants

Replenish soil organic matter by recycling crop residues, compost, and manures	During plantation upkeep operations, crop residues are left to decompose and restore the soil nutrients.	This practice should be sustained
Implement earthworks when weather conditions pose the lowest risk of causing environmental damage	Roads are constructed and/or maintained with a durable surface to minimize erosion, and these are usually done during dry season	No Action Required
Employ erosion control management practices (e.g., contour and strip planting, terracing, discontinuous trenching, intercropping with trees, and grass barriers) in sloping areas.	Erosion prevention and control are implemented through contour/panel and terrace planting.	No Action Required
Draw up mitigation plans for planting or harvest operations that must take place during unsuitable periods.	The company applies Good Agricultural Practice (GAP) to address this.	No Action Required
Use flow control wires and diversion canals to reduce erosion in areas with field drainage	There are some natural drains, and some constructed ones regularly maintained such as side/sedimentation pits. For the control of runoff, especially on the plantation roads, sedimentation pits are dug to reduce runoff and trap sediments in runoff water as could be found across the plantation field as depicted.	No Action Required.



Plate 3.3: Sedimentation and/or Side Pit on Roads

Restrict the width of roads to the minimum that will provide the means for efficient and safe transport.

The width of road grading is usually 3m to 10m to avoid erosion and allow for efficient and safe transport. This is the usual practice across the plantation group.

This practice should be sustained



Plate 3.4: Road Width within the Rubber Estate

• **Maintaining Soil Productivity**

Cultivate crops that are suited or adapted to the local climate and soil conditions and adopt good agronomic practices to optimize crop productivity

Collect meteorological data on precipitation, evapotranspiration, temperature, photosynthetically active radiation, and use information to inform and guide agronomic and silviculture management techniques

Use soil maps and soil survey results to determine crop suitability and appropriate soil management practices

Develop and implement a soil monitoring and management plan that includes soil and terrain

Okomu-OPC usually cultivates crops that are suitable for the area, climate, and soil. Good agricultural practices are practiced.

There is a weather station located at the Rubber estate. The weather station is equipped with facilities to collect data on rainfall, temperatures, wind and sunshine.

Soil maps are used, and soil surveys are done every 5-10 years.

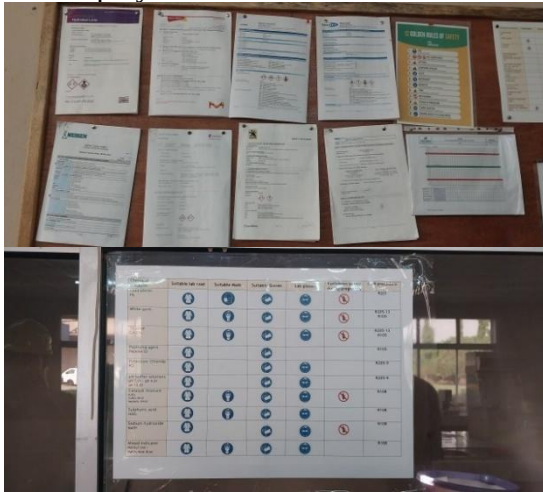
This is done through identification of slopes with the aid of soil maps.

No action required

Always ensure that soil survey is done for new plantation development.

Nutrient Management	mapping and erosion risk identification.		
	Conduct regular surveys to monitor soil structure and chemistry in order to identify areas where remedial action is required.	Soil survey is done every 5-10 years.	See Above
	Recycle and/or incorporate organic materials (e.g., crop residues, compost, and manures) to replenish soil organic matter and improve soil water-holding capacity.	Crop residues like felled rubber trees are left to decompose and restore the soil nutrients, especially during replanting.	This practice should be sustained
	Minimize the use of pesticides by implementing a pest and disease early warning system, by using biological pest and disease control methods, and by implementing control measures before outbreaks require large-scale control	The company has developed an integrated pesticide management programme that includes a routine monitoring system every two months to observe pest attacks. The program provides for encouraging the use of birds and discourages the use of highly persistent and highly toxic pesticides.	No Action Required.
	Use green manures, cover crops, or mulching techniques to maintain soil cover, reduce the loss of nutrients, replenish soil organic matter, and capture and/or conserve moisture	The main groundcover species are <i>Pureiria</i> and <i>Mucuna bracteata</i> , which grow vigorously and forms a dense cover over the plantation. Where gentle slopes occur within the plantation, the rubber trees have been planted in rows aligned with the contours, which provides an additional soil conservation measure.	No Action Required.
	Incorporate nitrogen-fixing legume crop plants and cover crops in the cropping cycle.	The main groundcover species are <i>Pureiria</i> and <i>Mucuna bracteata</i> , which are rich in Nitrogen. They are also known as nitrogen-fixing leguminous crops.	No Action Required.
	Draw up balanced fertilizer programs for each soil management unit based on the results of mapped fertility results, soil and leaf analysis, and crop assessment.	Leaf (Folia) analysis is carried out such that fertilizer application is based on plant requirement.	Improve this system

	Time the application of crop nutrients to maximize uptake and minimize nutrient runoff.	Fertilizer applications are done during the rainy season but not heavy rains.	This practice should be sustained
	Establish and respect setbacks from watercourses—including appropriate buffer zones, strips, or other “no-treatment” areas along water sources, rivers, streams, ponds, lakes, and ditches—to act as a filter for potential nutrient runoff from the land.	Buffer zones of about 50m to 150m along Riverbanks is created depending on the size of the River.	No Action Required
	Select and maintain fertilizer application equipment to ensure desired application rates are used and overbroadcasting of solid fertilizers and overspraying liquid fertilizers are minimized.	The application is by manual and is measured by cup. Fertilizer applicators and agrochemical sprayers are under strict supervision. This is after receiving appropriate training on handling, storage, and transportation of hazardous substances.	Regularly give refresher training as at when due.
	Implement nutrient planning and documentation, which includes the use of a fertilizer logbook to record the following information: - Dates of purchase, dates of use, amount of fertilizer and nutrient used (kg/ha), purpose of use, and crop growth stage. - Weather conditions before, during, and after application. - Methods used to minimize nutrient loss (e.g., incorporation into the soil, split applications, irrigation after application).	Records of application is kept in a notebook and the monthly record manual at Plantation department. Records of purchase dates is also kept at both plantation departments for both oil pal and rubber. Daily reports are made for the number of kilograms applied per tree and per field.	Record keeping should be taken care of to meet the reporting requirements of national and international standard organizations (SON, ISO and RSPO).
	Provide farm operators with training in nutrient management following published principles and agricultural practice manual	Fertilizer rates are determined by fertilizer experts. Fertilizer and chemical training are ongoing.	Intensify training on hazardous substance and hazardous waste management.
	Ensure that all personnel are trained in and use appropriate management procedures for the storage, handling, and application	Appropriate PPE such as nose guards, hand gloves, rain boots and raincoats are provided.	

	of all types of fertilizers, including organic wastes		
	Personal Protective Equipment (PPE) should be used according to the Safety Data Sheets (SDSs) of the product or to a risk assessment of the fertilizer product. SDS should be available at each management unit.	Safety Data Sheet (SDS's) are available and displayed.  Plate 3.5: SDS Displayed	This practice should be sustained and extended across board.
▪ Crop Residue and Solid Waste Management	Recycle residues and other organic materials by leaving the materials on site or through composting (and spreading).	Organic materials are left in the plantation field as manure.	No Action Required
	Consider the potential for harboring and spreading pests and diseases before implementing this practice. Disperse (or mulch) large vegetative structures (e.g., trunks, branches), unless there are compelling habitat and biodiversity benefits identified in the Biodiversity Management Plan.	The Plantation department takes this factor greatly into consideration. Done regularly with harvesting and pruning.	No Action Required
	Consider using crop residues for other beneficial purposes, such as animal feed, bedding, or thatching, when leaving residues in the field is neither practical nor appropriate.	Crop residues are left in the field as organic manure	No Action Required

• Water Management	Determine rain or water irrigation requirements of the crop based on internationally recognized guidelines while recognizing seasonal variations and regional norms. When irrigation is practiced, develop an appropriate irrigation plan, and schedule, and monitor consumption and compare regularly with these targets.	Sprinkler and sumisansui irrigation system are used in all the nurseries. The quantity of the water need per tree is given without waste. Water used for irrigation is from groundwater and surface water sources which are pumped from boreholes to overhead storage tanks for distribution to the nursery.	
	Maximize the retention of rainwater through appropriate “rain harvesting” techniques, which may include: Diverting water flow from roads and paths toward crops thus storing water in the soil and reducing the effect of short dry spells. Storing runoff from rainy periods for use during dry spells by using tanks, ponds, cisterns, and earth dams. Controlling weeds through the use of cover crops, mulching, or herbicides to encourage beneficial but low-water-use soil cover plants. Maintain protective vegetation in canals and drainage systems to reduce canal bank scouring and slow runoff.	There are some natural drains, and some constructed ones regularly maintained such as side/sedimentation pits. For the control of runoff especially on the plantation roads, sedimentation pits are dug to trap runoff water and to also check and control erosion. The main groundcover species are <i>Pueraria</i> and <i>Mucuna bracteata</i>, which grow vigorously and forms a dense cover over the plantation.	No Action Required

	Maintain a water management logbook that records time and quantity of rainfall evaporation and the , amount of irrigation applied, and soil moisture levels (%), in order to verify both that irrigation is being used according to crop need and to develop an understanding of long-term trends in water use. Reduce evaporation by avoiding irrigation during periods when evaporation is elevated (e.g., in periods of higher temperatures, reduced humidity, or high winds). Use trickle or drip irrigation techniques (if practical) or install “under canopy” rather than overhead sprinklers. Reduce evapotranspiration by using shelterbelts and windbreaks. Reduce seepage losses in supply channels by lining them or using closed pipes. Consider collecting runoff water (tail water) through catchments and pumps. Employ a cutback furrow irrigation technique, slowing or stopping irrigation well before the water reaches the end of the furrow and discharges to the environment. If herbicides are used, ensure they are applied at the appropriate time of year to control undesirable vegetation and reduce their water consumption most effectively.	Regular maintenance of irrigation system is being practiced with a logbook to estimate water use. Irrigation is usually done in the morning and evening time. Records are usually kept on the water consumption rates annually.	No Action Required
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• Pesticide Management	The following measures are recommended to prevent and control the contamination of water sources: Avoid over-irrigation, which may result in the leaching of nutrients and contaminants. Use harvesting methods (such as directional felling) or other appropriate measures to minimize the amount of debris deposited in streams. Establish and respect setbacks and buffer zones in riparian areas. Buffer widths should be based on the specific risk, land management regime, and slope of the area. Remove harvest debris from streams and consider the use of debris traps such as trash lines where possible.	Rubber tapping is done manually with bark debris and leaves that fall off from the tree deposited in the plantation field. Buffer zone of about 50m to 150m along Riverbanks is created depending on the size of the River.	No Action Required No Action Required
	Have you identified the main pest associated or affecting the crop? Do you apply early warning mechanism for pest and disease i.e. (pest and disease forecasting technique). What other control measures are in place other than dependency on pesticide use? In terms of biological control (birds, mites). How do you store, handle, or apply pesticides?	The main disease is the white root disease caused by a fungus (<i>Rigidoporus lignosus</i>). They cause damage to the plant root. The company monitors pest numbers in the plantations by carrying out LMO checks monthly. There is phyto-sanitary team in place monitoring pest out-break and by LMO checks monthly. Weed control, fertilizing and disease eradication plants. Pesticides are stored in a safe storage area, separate from other products. Application is done only when necessary and with trained workers that are provided with adequate PPE. The storage is secure and well-ventilated which meet safety	No Action Required No Action Required No Action Required Chemical Pavillion should be commissioned for use.

		requirements such as spill containment and safety signage.	
	Is there a pest management plan (PMP) that includes procedures for procurement, storage, handling, and ultimate destruction of all out-of-date stock?	Although, pesticides are moderately used and at the appropriate time usually at the beginning and toward the end of the rainy season. Procurement is based on need which erases any case of out-of-date stock.	
• Pesticide Storage	Do you store pesticides in a bonded container or in a sufficient space that will capture spill?	Pesticides are stored in sufficient space that can capture spill	No Action Required
	Verify if store is set away from water sources, residential and built-up areas as well as livestock and food storage areas.	Chemical store is not near any water sources, residential, food and livestock.	No Action Required
	Are there spill kits in place in case of accidental spillage? Do you comply with storage instructions on the product label.	Spill kits are provided at all hazardous substance storage area. In full compliance with storage on product label.	No Action Required
	How are spills cleaned?	Mop and collected back to the field	Appropriate spill kits are provided at all pesticide storage area.
	Do you have a register of all pesticide procured, records of when they were received, amount used and remaining in store.	Record available	
	Is there a SDS and is it appropriately located?	The company keeps an up-to-date inventory and safety data sheets (SDSs) are available and well displayed for all the chemicals in storage.	No Action Required
• Pesticide Handling	Do operators read, understand, and follow product label instructions for mixing, safe application, and disposal?	Pesticide handlers receive instructions on daily basis before going to the field.	This practice should be sustained
	Are personnel trained for critical operations such as mixing, transfers, filling of tanks and application?	Besides being given on the job instructions, pesticides handlers have also received formal training on health and safety considerations in pesticides handling and use. While pre-employment	Organize regular formal training on the hazards, precautions, and procedures for safe

		medical examination is mandatory for pesticides applicators as basis for employment. More so, periodic medical examinations are provided for them.	storage, handling and use of all potentially harmful materials relevant to each employee's task and work area.
	Are appropriate PPE worn during handling and application e.g., gloves, overalls, and eye protection	Necessary precautions are taken on the issuance and handling of pesticides. All workers involved in the handling and use of pesticides are kitted with appropriate personal protective equipment. The PPE provided include protective clothing, hand gloves, eye goggles, caps, respirators, and boots. Washing facilities are also provided.	Enforce the use of appropriate PPE's when handling hazardous substance particularly agrochemicals
	Mixing and filling of pesticide tank should be set away from watercourse or drains and if it is on concrete, then water should be collected in a separate sump and disposed as hazardous waste.	Mixing of pesticide is usually done on bunded concrete tank (see plate 3-8 below).	Mixing should be confined to the pesticide tank and this must be done with utmost caution.
	 Plate 3.6: Chemical Pavillion with restricted access		The design should include disposal of wastewater in an absorption trench with more safety signs.
• Pesticide Application	How is application done?	Pesticides are usually applied using knapsack sprayers. Sometimes ULV applications are done using ULV sprayers, following strictly manufacturers' technical instructions. Pesticide applicators receive special training in the use and application of pesticides.	No Action Required
	Do you do aerial application?	No aerial spraying is done	No Action Required

• Pesticide Disposal	How is un-used dilute pesticide, out of date, rinse water disposed?	The company only takes stock of what is required (agrochemicals) on an annual basis. The company has not experienced any stock of outdated pesticides in recent time.	Develop contingency plan for expired hazardous chemical management including disposal.		
	How are empty containers, lids, and foil seals treated?	Waste packaging from fertilizer is well controlled throughout the plantation. Empty fertilizer bags are collected and re-used for loose fruit collection. Empty plastic and metal pesticides containers are usually returned to the store (secure) waiting for evacuation by suppliers.	Ensure that agrochemical containers are properly rinsed (triple) and residual water applied to the plantation field.		
	Are there any agreements to how empty cans are taken off the plantation?	The company has a detailed waste management procedure in place where used containers are rinsed, holed and sent to agrochemical suppliers to evacuate and return to the manufacturers before the next supply. There is an agreement for this arrangement.	Establish that the empty agrochemical containers are returned to the manufacturers.		
		The types and quantities of agrochemical applied in plantation upkeep are presented in Table 3.1. Table 3.1: Types and Quantities of Agrochemical & Fertilizer Use (2023 & 2024)			
			</		

		1,400,000 1,200,000 1,000,000 800,000 600,000 400,000 200,000 0 Types and Quantities of Agrochemical & Fertilizer Use (2023 & 2024) <table><thead><tr><th></th><th>2023 (Ltr)</th><th>2024 (Ltr)</th><th>Rate of Application/Hectare (8,510.59 Ha)...</th><th>Rate of Application/Hectare (8,510.59 Ha)...</th></tr></thead><tbody><tr><td>■ Glyphosate</td><td>10,591.50</td><td>457</td><td>1.24</td><td>0.05</td></tr><tr><td>■ Delta force</td><td>2,000</td><td>0</td><td>0.24</td><td>0</td></tr><tr><td>■ MOP</td><td>1,268,800</td><td>832,940</td><td>149.08</td><td>97.87</td></tr></tbody></table>					2023 (Ltr)	2024 (Ltr)	Rate of Application/Hectare (8,510.59 Ha)...	Rate of Application/Hectare (8,510.59 Ha)...	■ Glyphosate	10,591.50	457	1.24	0.05	■ Delta force	2,000	0	0.24	0	■ MOP	1,268,800	832,940	149.08	97.87
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■ Delta force	2,000	0	0.24	0																					
■ MOP	1,268,800	832,940	149.08	97.87																					
● Fertilizer	How are fertilizers stored?	Fertilizers are stored in the main store on top of pallets. The store is well secured and always under lock. (see below)	No Action Required																						
	 Plate 3.7: Fertilizer Stockpiled on Pallets																								
	Are fertilizers kept with pesticides and machinery? e.g., fuels, ignition, or heat source.	Fertilizers are kept separately from agrochemicals.	No Action Required.																						
	Are fertilizers purchased minimally and stored or purchased in large quantities even though there might not be immediate use for them?	Fertilizers are purchased minimally with usage based on first in, first out (FIFO) principle.	No Action Required.																						
	Is fertilizer requirement known and applied as at when due?	Fertilizer requirement is known, and rate of application would appear economical in terms of requirement, quantity, timing, and methods.																							

Energy Use	Consider implementing training programs to make operators aware of energy efficient practices when using machinery.	There is no programme in place to make operators aware of energy efficient practices.	Create awareness (formal or informal) on energy efficient practices such as switching off engines when waiting to load and all electrical appliances including air conditioners when leaving the office and residences.
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3.2 Rubber Processing

ISSUE	GUIDELINES	CURRENT PRACTICE	REMARKS
ENVIROMENT- solid waste and by-products.	Reduce product losses through better production/storage control (e.g., monitor and adjust air humidity to prevent product losses caused by the formation of molds on edible materials).	The Company adopts best general industrial practices (GIP) for processing and product storage.	No Action Required
	Collect residues from the raw material preparation phase for conditioning (drying) and processing (grinding) to yield by-products (e.g., animal feed).	By-product such as good rubber, bad rubber are recycled, while wastewater (effluent) is biologically treated using the serial ponding system and applied in the plantation.	Practice should be sustained
	Return waste and residues to fields to assist in soil nutrient management; for example, EFBs from oil palm plantations with tree trimmings are a valuable soil amendment and/or can be composted with vegetable oil wastewater effluent	Waste water (effluent) is biologically treated using the serial ponding system and applied in the plantation.	Practice should be sustained.
	Use waste and residues for energy generation in the project plant's boiler(s). Note, however, that relatively high atmospheric emissions (such as particulate emissions (PM)) are possible when burning crop residues, and	Waste from the oil palm processing, such as EFB, Palm Kernel Shell and fiber are used as source of fuel in	Practice should be sustained.

	potential fire risks (e.g., from combustible dust) may arise from handling, storing, and processing crop residues; as such, expert advice on fuel characteristics and boiler design should be solicited when planning to use biofuels in this manner.	the boiler for steam generation. More so, about 25 cones are fixed in the boiler to filter ash and dust from the smoke generated before going out from the chimney.	
	Use uncontaminated sludge and effluent from on-site wastewater treatment as fertilizer in agricultural applications or as a supplemental boiler fuel. Recommendations for the management of EHS issues common to sludge and effluent are provided in the General EHS Guidelines and in the Water and Sanitation EHS Guidelines . Dispose of contaminated sludge from wastewater treatment at a sanitary landfill or by incineration. Incineration should only be conducted in permitted facilities operating under internationally recognized standards for pollution prevention and control	The effluent from the rubber factory is sent to the three serial ponds for biological treatment.	The treated wastewater should be channeled into the plantation field for irrigation
Water Consumption and Management	Replace water-based conveyor systems by mechanical systems (augers or conveyors).	Mechanical conveyor system is used at the rubber factory.	No Action Required
	Apply Cleaning-in-Place (CIP) procedures to help reduce chemical, water, and energy consumption in cleaning operations	Cleaning-in-Place procedure is done mostly.	No Action Required
	Use dry cleanup techniques before rinsing floors.	Dry clean up technique is practiced	No Action Required
	Manually clean vessels before rinsing to remove solids for recovery or disposal	This is done	No Action Required
	Vegetable oil processing wastewater generated during oil washing and neutralization may have a high content of organic material and, subsequently, a high biochemical oxygen demand (BOD) and chemical oxygen demand (COD). Wastewater may also have a high content of suspended solids, organic nitrogen, and oil and fat, and may contain pesticide residues from the treatment of the raw materials. Recommended measures to reduce contaminant loading include the following:	Wire mesh are installed at interval in the drainage channel to trap any processed rubber from escaping. Wastewater at rubber factory passes through decantation pit to recover any loose processed rubber and later channeled to the effluent ponds for further treatment by natural/biological method.	No Action Required. Treated wastewater should be channeled into the plantation field for irrigation.

	install spill collection trays to collect solids at appropriate places in the production line; use emulsion breaking techniques, (e.g., dissolved air flotation (DAF)), to segregate high BOD and COD oils from wastewater		
	Use grids to cover drains in the production area to prevent solid wastes and concentrated liquids from entering the wastewater stream.	Wire mesh are installed inside the drains at rubber factory.	No Action Required
	Select disinfection chemicals to match the cleaning operation being applied on the process equipment to the type of problem. Caustics are typically used for polymerized fat, and acids are used for lime deposit acids.	NAFDAC approved solvents are being used for cleaning at factory.	No Action Required

PROCESS WASTEWATER TREATMENT

	Techniques for treating industrial process wastewater in this sector include: grease traps, skimmers, or oil water separators for the removal of floatable solids; flow and load equalization; sedimentation for suspended solids reduction using clarifiers; biological treatment—typically anaerobic, followed by aerobic treatment—for the reduction of soluble organic matter (BOD); biological nutrient removal for reduction in nitrogen and phosphorus; chlorination of effluent when disinfection is required; and dewatering and disposal of residuals. In some instances, composting or land application of wastewater treatment residuals of acceptable quality may be possible. Additional engineering controls may be required to contain and neutralize nuisance odors.	Rubber Effluent is sent to the effluent serial ponds from rubber factory for anaerobic and aerobic treatment and/or natural/biological method. Results of laboratory analysis of rubber effluent is presented in Table 3.2 below.	
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Table 3.2: Laboratory Analysis Results for Critical Effluent Parameters (Rubber)

Quality Parameter	Treated Rubber Effluent (2023)	Treated Rubber Effluent (2024)	NESREA. Limits for Land Application
pH	7.18	7.03	5.5 - 9
Total Dissolved Solids (mg/l)	415.8	256.8	2100
Biochemical Oxygen Demand (BOD) (mg/l)	74	125	500
Chemical Oxygen Demand (COD) (mg/l)	112	154.3	Not Specified
Oil and Grease (mg/l)	2.4	<0.1	30

Chloride, (mg/L)	72.8	53.8	600
Total Hydrocarbon (mg/l)	<0.01	<0.01	Not Specified
Total Coliform Count (MNL/ml)	9	11.3	500

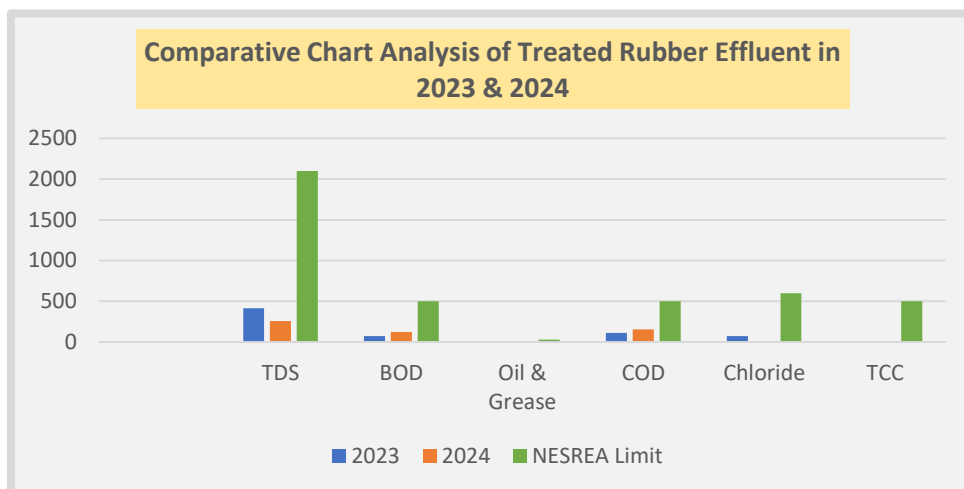


Figure 3.1: Comparative Analysis of Rubber Effluent

The critical effluent parameters for the treated effluent sample complied with the NESREA specified limits for land application purpose as presented in Table 3.2. It is, however, recommended that the effluent treatment system be maintained regularly for improved efficiency such as scooping the bottom layer. In addition, the monitoring well should be continuously sampled and analyzed to detect any possible infiltration into the groundwater system

ENERGY CONSUMPTION AND MANAGEMENT

Increase efficiency of air removal in sterilization vessels to improve heat transfer.	Not Applicable	No Action Required
Identify and implement opportunities for process heat exchange, e.g., optimized oil-oil heat exchangers in continuous deodorization.	Not Applicable	No Action Required
Reduce stripping steam consumption by improving process efficiency, e.g., improve stripping tray design. Where possible, consider technologies such as dry ice condensing systems that significantly lower energy consumption.	Not Applicable	No Action Required

Where feasible, use anaerobic digestion for wastewater treatment to capture methane for power production and use, a process that improves energy efficiency and reduces greenhouse gas emissions.

Open anaerobic treatment (not enclosed) is employed.

Adopt the technology to capture methane for power production i.e. biomethanation of the POME.

ATMOSPHERIC EMISSIONS (PARTICULATE MATTER & VOC)

Recommended management techniques include:
Process improvements, for example:

- Optimize recovery of solvents by distilling the oil from the extractor.
- Back-vent to the solvent delivery tanks during bulk storage tank filling.
- Improve air collection systems.
- Implement leak prevention systems.

Solvent extraction is not used. However, the ambient air quality was determined in-situ during the audit for critical locations (see Appendix A).

In general, the emission sources and air emission potential of oil mill complex and other critical work areas is presented in Table 3.3 below:

Table 3.3: Emission Sources and Air Emission Potential

Sources	Location	Air Emission
Point Source	Powerhouse, Rubber Factory, Dumpsite	NOx, SO ₂ , CO, PM, VOCs, CH ₄ , dioxin
Fugitive	Nursery, earth roads, unpaved ground	PM, NOx, SOx, CO
Mobile Sources	Tractors, Machinery	NOx, SO ₂ , CO, PM, VOCs
Greenhouse Gases	Rubber Effluent Pond, Powerhouse, Rubber Factory, Dumpsite	CO, CO ₂ , CH ₄ ,

Periodically monitor the emission levels of all the work areas.

The results of in-situ air quality determinations conducted on the facility show that the concentration of noxious gases was detected within the recommended range and therefore does not pose any threat to the environment. The particulate matter at all the monitored locations was also found to be below the Limits.

RECOMMENDED TECHNIQUES TO MANAGE DUST AND ODOR

	Ensure proper maintenance of cleaning, screening, and crushing equipment—including in any ventilation and air handling systems—to reduce emissions of fugitive dust and avoid the use of compressed air or steam for cleaning.	Equipment are maintained optimally and factory well ventilated.	
GREEN HOUSE GAS EMISSIONS			
	The high nutrient loading of wastewater can be a source of methane (CH₄) when treated or disposed of anaerobically. It can also be a source of nitrous oxide (N₂O) emissions associated with the degradation of nitrogen components in the wastewater (e.g., urea, nitrate, and protein). Recommended measures to prevent and control non-fossil-fuel-related GHG emissions include: • Avoid open anaerobic conditions for wastewater treatment by ensuring a regular program of operational maintenance in the wastewater treatment system. • Consider biological methods of wastewater treatment, such as anaerobic digestion and methane capture; use of waste effluent for irrigation; co-composting of by-products, where appropriate (e.g., oil palm empty fruit bunches with palm oil mill effluent nutrient waste or olive mill waste residue with wastewater); and detoxification by nitrogen fixation.	A biological method of wastewater treatment is being used where open anaerobic wastewater treatment is employed.	Biological methods of wastewater treatment, such as anaerobic digestion and methane capture should be considered.
OCCUPATIONAL HEALTH AND SAFETY			
PHYSICAL HAZARDS	Physical hazards in vegetable oil production and processing facilities are similar to those present in other industry sectors and include the potential for falls caused by slippery floors and stairs; injuries caused by unprotected machinery or moving parts; hazards associated with potential collisions with internal transport, such as trucks; and accidental contact with conveyor systems, such as those used in crushing plants and in the removal of spent earth. The General EHS Guidelines provide guidance on the prevention and control of physical hazards.	The risk assessment of the rubber factory gives a guideline for the prevention and control of physical hazard. However, some of the operations involve both single and multiple exposures to physical hazards with potential for accident or injury or illness due to repetitive exposure to mechanical action or work activity. The most common physical hazards derived from rubber	

processing are presented in Table 3.4 below.

Table 3.4: Physical Hazards Associated with Palm Oil Processing

Workplace	Physical Hazards Sources
Rubber Factory	Rotating & Moving Equipment, Noise, Vibration, Electrical, Hot Work, Working Environment Temp, Ergonomics, Working Heights, Floors, Stairs.
Workshop	Rotating & Moving Equipment, Noise, Vibration, Electrical, Welding Work, Working Environment Temp, Ergonomics, Eye Hazards,
Stores	Working Environment Temp, Illumination, Eye Hazards.
Offices	Working Environment Temp, Ergonomics, Illumination.
Transport	Industrial Vehicles & Site Traffic

CONFINED SPACE ENTRY

Grain silos present a significant risk of death from asphyxia. Extremely toxic nitrogen oxides begin to accumulate in the head space of the silo within hours of its filling. Tank cars may also represent asphyxia risks if, for example, a tanker is flushed with nitrogen prior to loading. Recommendations for the management of occupational health and safety (OHS) risks associated with confined spaces are provided in the **General EHS Guidelines**

The relevant confined spaces include boiler fire chamber, process and product storage tanks. Details of the procedure for working in confined spaces are provided in working in confined space procedure (GP26).

CHEMICAL HAZARD

Operators in vegetable oil facilities may be exposed to hazardous substances, including inhalation of hexane or other solvents used for extraction; inhalation of toxic chemicals (e.g., sodium methylate can cause burns on the skin and lung tissue if inhaled); eye or skin exposure to acids or bases; inhalation of dust from the transportation of raw materials (e.g., seeds and beans to the crushing plant); inhalation of dust from meal treatment and shipment; inhalation of dust from bleaching earth, filter aid, and nickel catalyst; and inhalation of aflatoxins present in raw materials. Additional recommendations include;

Physical extraction is used instead of chemical extraction. The only place where chemicals are used is in the quality control laboratory and adequate provision is made for filters masks. However, some of the operations in the plantation and rubber factory involve the use of chemicals and hazardous substances with potential for accident, injury, or

- In oil extraction areas, ensure that there is adequate air circulation to reduce the concentration of solvents.

illness due to repetitive exposure to these chemical uses. The most common chemical hazards derived from palm oil processing is presented in Table 3.5 below.

Table 3.5: Chemical Hazards Associated with Palm Oil Processing

Workplace	Chemical Hazards Sources
Laboratory	Air Quality, Fire & Explosion, Corrosive, Oxidizing & Reactive Chemicals.
Rubber Factory	Air Quality, Fire & Explosion, Corrosive, Oxidizing & Reactive Chemicals.
Workshop	Air Quality, Fire & Explosion, Corrosive.
Stores	Air Quality, Fire & Explosion, Corrosive, Oxidizing & Reactive Chemicals.

Provide ventilation, especially at workstations devoted to raw-material handling, milling, handling of bleaching earth, and use of solvents

The ambient temperature is normal for open space workstations because the rubber factory is of open design. On the other hand, indoor temperatures are controlled artificially to make for worker's comfort.

No Action Required

ELECTRICAL HAZARDS

Risks of fire and explosion occur at different stages of vegetable oil production and processing and can lead to loss of property, as well as possible injury or fatalities among project workers. General fire safety management should be handled according to the **General EHS Guidelines**. Sector-specific risks are related to the combustibility of vegetable oil and the high volumes of combustible dust present both in grain and oil-seeds handling and in storage facilities. The control and removal of this dust and the control or removal of potential ignition sources are key to eliminating the explosion hazard. The storage of grains and seeds represents a combustion risk, owing to the potential for self-heating and ignition. Silo safety for these products, as well as for oil

Dust is removed from air through cyclones and housekeeping is done to keep the environment dust-free. However, provisions are made for firefighting equipment including fire hose reels, fire trucks, fire extinguishers, sand buckets, and stand-by water tankers.

No Action Required

	storage, is critical. Vegetable oil facilities also present the risk of explosions resulting from the volatilization of solvent dissolved in the oil (e.g., hexane), along with the risk of fire from spent bleaching earth with a high iodine-value oil, high ambient temperature, and high circulation-draft of air.		
COMBUSTIBLE DUST AND SILO SAFETY			
	Use recognized international standards in design and operation. Classify areas according to respective hazard classes following practices and requirements found in recognized international standards and deploy intrinsically safe electrical circuits and anti-explosion electrical devices (including lighting).	See the confined space entry above.	No Action Required
	Ensure that emergency plans and procedures are developed and understood by staff. Install suitable detection equipment in silos, such as temperature sensor cables and gas detectors. Spark/heat detectors should be connected to an extinguishing system installed in transport systems (belt conveyors, dust extraction systems, etc.) to reduce the risk of ignition. Establish a suitable extinguishing operation (e.g., water, foam, inert gas, powder) based on the silo construction and bulk material stored. The silo should be prepared with connections or openings suitable for the planned method and silo construction, e.g., pipe systems and connections should be located at the top of the silo wall if the roof is not considered sufficiently strong to withstand an explosion	There is an emergency plan and procedure that is well understood by all workers. In addition, smoke detectors are available at key location.	
PROCESSING RISK			
	Ensure regular and proper maintenance of equipment to avoid leaks.	Maintenance is done regularly	No Action Requires
	Establish procedures for startup, shutdown, and maintenance, and train personnel to identify air leaks and react to the outbreak of fires	This is in practice such as log-out-tag-out (LOTO)	
NOISE			
	Operators in palm oil plants are also exposed to noise from internal transport, conveyors, boilers, pumps, fans, and various steam and air leaks.	Ear mufflers and plugs are provided in high noise areas with warning signs	No Action Requires

	The General EHS Guidelines provide guidance on the prevention and control of noise impacts.	conspicuously installed in critical work areas.	
COMMUNITY HEALTH AND SAFETY			
	Community health and safety impacts during the operation phase of palm oil processing are common to most industry sectors—including those related to traffic safety during transport of raw materials and finished products—and are discussed in the General EHS Guidelines . Industry-specific issues that could affect the community or the public at large may include the potential presence of pathogens and contaminants in processed oil (e.g., pesticide residues).	Process water is monitored for contamination. Pesticide residue tests are also carried out on product. There is a comprehensive transport policy.	No Action Required
FOOD SAFETY IMPACT AND MANAGEMENT			
	Food safety is an industry-specific risk relevant to palm oil processing. For example, a product recall caused by contaminated or adulterated products found in commerce that is attributable to a specific company can damage a viable business. If a company can trace its products back to specific lot numbers, then a recall is a matter of removing all non-conforming products associated with the specific lot numbers. With a food safety management system in place, the company can protect itself against product adulteration, contamination, and the impacts of product recalls. Palm oil processing should therefore be performed according to internationally recognized food safety standards consistent with the principles of Hazard Analysis Critical Control Points (HACCP), Food and Agriculture Organization (FAO)/World Health Organization (WHO) <i>Codex Alimentarius</i> , and <i>ISO 22000</i>	Traceability and Recall systems available based on (Non-Conformity of ISO 9001-QMS). EUDR .	No Action Required

	<i>Recommended product safety principles include:</i> - Fully institutionalize HACCP prerequisites, including sanitation, good management practices, implementation of integrated pest and vector management programs, and maximization control through mechanical means (e.g., traps and mesh on doors and windows), chemical control, allergen control, and the establishment of a customer complaints mechanism. - All personnel should receive training to ensure they are aware of potential microbiological contamination and growth during processing, material handling, storage, and maintenance (e.g., salmonella contamination) - Food grade-quality fresh bleaching earth should be used for processing food and feed-grade products to avoid risks to public health from food and feed contamination	This is in place and it is fully operational Training is conducted regularly for all workers Not Applicable	No Action Required
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3.3 EXISTING ENVIRONMENTAL MANAGEMENT SYSTEM

The International Standard Organisation (ISO) 14001 defines an Environmental Management System (EMS) as that of a company's overall management arrangement that includes the organizational structure, planning activities, responsibilities, practices, procedure, process and resources for development, implementing, reviewing, achieving and maintaining the environmental policy of the company.

In evaluating the EMS, the under listed ISO 14001- 2015 requirements were audited:

- ❖ Health, Safety and Environmental Policy
- ❖ Organizational Structure for Implementing EMS
- ❖ Environmental Unit/Committee
- ❖ Environmental Aspects and Impacts
- ❖ Environmental Objectives and Targets
- ❖ Environmental Training and Awareness Programme
- ❖ Housekeeping Culture
- ❖ Waste Reduction Strategy
- ❖ Environmental Management Plan (EMP)

3.3.1 Organizational Structure for Implementing EMS

The company has put in place an effective Environmental Management system (EMS) to ensure consistent functioning of the estate. The EMS includes the following:

- An Environmental management committee.
- Environmental Monitoring.
- Personnel Training.
- Regular Environmental audits and Correction measures.
- Documentation–Standards Operation Procedures, Environmental Management Plan and other records

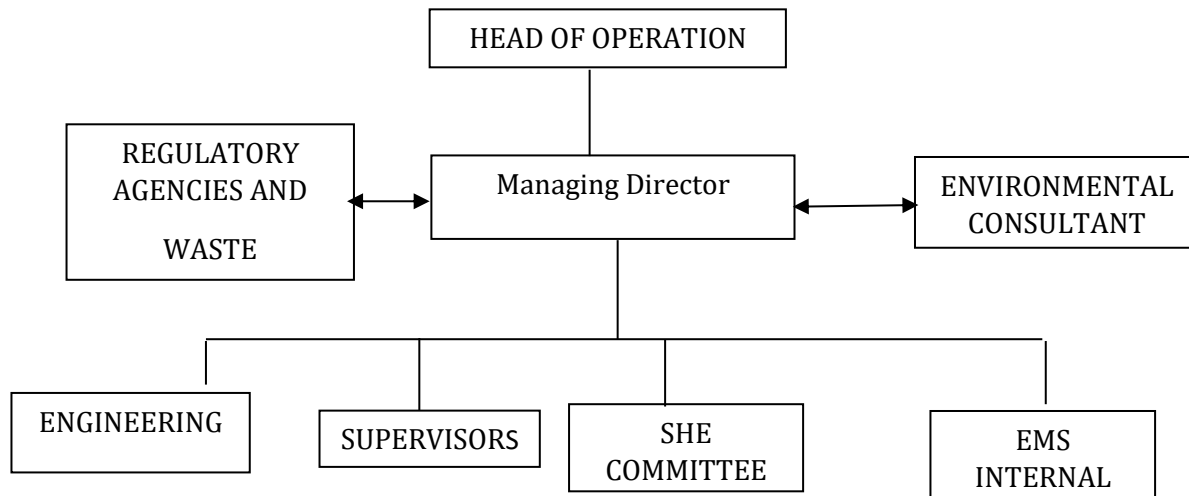


Figure. 3.2: Organogram for EMS Implementation

3.3.2 Health, Safety and Environment (HSE Department/HSE Committee)

Apart from having an Environmental Management Plan, the company also has a permanent organizational set up charged with the task of ensuring its effective implementation of mitigation measures and to conduct environmental monitoring. The major duties and responsibilities of HSE department with HSE Committee are as given below:

- To implement the environmental management plan.
- To assure regulatory compliance with all relevant rules and regulations.
- To ensure regular operation and maintenance of pollution control devices.
- To minimize environmental impact of operations as by strict adherence to the EMP.
- To initiate environmental monitoring as per approved schedule.
- Review and interpretation of monitored results and corrective measures in case

monitored results are above the specified limit.

- Maintain documentation of good environmental practices and applicable environmental laws for reference.
- Maintain environmental related records.
- Coordination with regulatory agencies and external consultants
- Maintenance of log of public complaints and the action taken.

3.3.3 Sanitation and Housekeeping

Issues	Indicator	Current Practice/Status	Comments
Sanitation	Health, Safety and Environment (HSE) department in place	The Company has established and is operating a full-fledge HSE department. Housekeeping and Sanitation is good.	Conformed This practice should be sustained
Housekeeping		Housekeeping was good across board but fair at Rubber Quarters.	Housekeeping at Rubber Quarters should be improved on.

3.3.4 Environmental Sustainability and Planning

Issues	Indicator	Current Practice/Status	Comments
Institutional workplace environment policy	Institutional environmental sustainability policy	A formal Environmental and other Policies duly signed by the Managing Director is available.	Conformed to national environmental legislation
Structures to address environmental issues	Environmental committee	Environmental Committee in place (see Figure 2.1).	The committee should be empowered by continuous training that will enable it overseeing environmental responsibility on the estate.
Strategic plan and Service Charter	Commitments	Yes	Conformed to legislation
Compliance with the Environmental Impact Assessment and Environmental Audit	Bi-annual environmental audit reports for Edo State and every 3 years for NESREA, EIA reports for new projects, EMPs	The Company is up to date on the environmental audit of its facility and processes. Previous Environmental Audit Report was submitted to the Federal Controller office in Benin and Edo State Ministry of	An EIA is not critical because the plantation was acquired before the EIA act. Environmental Audit (EAu) is required in this regard

Issues	Indicator	Current Practice/Status	Comments
		Environment and Sustainability.	

3.3.5 Pollution Control

Issues	Indicator	Current Practice/Status	Comments
Water Pollution & Control Measures	Initiatives to prevent, protect and monitor water sources.	Quarterly laboratory analysis of all water sources is in place.	The result of laboratory analysis obtained during this audit show that the groundwater quality for year 2024 is good and free from pollution except pH with a mean average ranging from 5.04 – 5.41, which was slightly acidic and below the FMEnv and WHO (2004) drinking water guideline of pH 6.5-8.5 except at the estate. Sample was also collected from surface water for laboratory analysis. The 2024 analysis results show that the results of the physical and chemical analyses including Total Hydrocarbon and Salinity of the samples are good. The mean TDS, BOD, COD, Dissolved Oxygen, pesticide, and other critical parameter values for surface water were within the NESREA/FMEnv limits except the pH. Also, the Rubber effluent monitoring was sampled. The rubber effluent had all its critical parameter values well within the specified limits. A copy of compliance monitoring report showing all results for all the environmental components or receptors can be traced in Appendix B.

Issues	Indicator	Current Practice/Status	Comments
Air Pollution & Control Measures	Initiatives to reduce Air pollution	Quarterly monitoring of source and ambient air quality has been put in place.	The measurements carried out at the facilities during the environmental audit show that the Concentrations of the gases are within the FMEV Limit. The result has shown that parameters such as Suspended Particulate Matter (SPM) ranges between 184 - 247 $\mu\text{g}/\text{m}^3$; Carbon dioxide, 407 – 446ppm; Carbon monoxide, 1ppm; Hydrocarbon, <0.1%; and Nitrogen dioxide, <0.1
Noise Pollution & Control Measures	Initiatives to reduce Noise	Soundproofing of generators and provision of ear protective device.	The noise level conforms to the NESREA factory area limit of 85 dB (A) for 8-hour exposure at all the location. The levels range from 52.3dB(A) – 71.0 dB(A). (See Appendix A).
Fuel Storage	Pollution prevention measure	There are five (5Nos.) surface tanks at the rubber factory for fuel storage to store petroleum product (PMS & AGO) with containment to control soil pollution.	Conformed
Powerhouse	Appropriate designs for primary and secondary containments	There are designs for primary and secondary containments.	The factory powerhouse generator exhaust pipe should be directed vertically to aid proper dispersion and reduced local concentration.
General Pollution Control Measure	Pollution Abatement Provisions	In-House Pollution Monitoring The HSE department undertakes pollution monitoring as part of its oversight functions.	Conformed This practice should be sustained
		Potential for Accidental Spill Control/Management The potential for accidental spills does exist and there are adequate measures in place to	A number of pollution abatement measures have been put in place which include. • Provision of oil retention trays

Issues	Indicator	Current Practice/Status	Comments
		control accidental spills across board.	- Construction of containment bunds around hazardous substances - Provision of enough waste bins
		On-site/Off-Site Contingency Plan There is a formal Emergency Response/Contingency Action Plans manual in place. The manual has taken into account both on-site and off-site emergency response and contingency plans for environmental sensitive activities and operations.	
		Pollution Complaints No complaints relating to pollution have been received from the host communities in recent time.	No Action Required

3.3.6 Waste Management

There is a comprehensive and detailed waste management plan in place which covers description of activities and waste handling up to waste disposal. The wide range of waste found on the estate is classified into solid waste, liquid waste and gaseous emissions.

Issues	Indicator	Current Practice/Status	Comments
Solid Waste Handling	Initiatives to segregate, reducing, reusing, and recycling of waste	Storage: At all the points of waste generation, waste bins/drums are provided for the immediate storage of different solid waste (see Plate 3.8 below). Collection and Transfer: Containers are located at designated places to collect waste. Wastes from the storage bins and drums are emptied into the waste collection containers, waiting for them to be transferred to the dumpsite. Disposal: The solid waste collected is transported by means of a tractor and disposed at the solid waste dumpsite. (See plate 3.9).	The current practice of solid waste handling is good but needs improvement. Red - Household Waste Only Green - Plastic & Cellophane only Blue - Aluminum Only Black - Glass & Broken Bottles Only Yellow – E-waste Only

Issues	Indicator	Current Practice/Status	Comments
	 Plate 3.8: Colour Coded Bins for Solid Waste Storage		
Liquid Waste Handling	Appropriate designs to collect wastewater and storm water	Domestic Wastewater: Domestic liquid waste is channeled into soak away pits attached to every building at residences and offices. Storm water: Rainstorm water is collected and channeled out into the plantation. Septic Systems Domestic sanitary sewage is channeled into septic systems attached to residential buildings and offices. The septic systems are good in terms of their location and construction.	This practice of liquid waste handling and management is good and should be sustained.
Gaseous Waste Management	Better maintenance of heavy machinery and equipment.	Maintenance of heavy machinery and equipment is done as contained in the maintenance schedule.	No Action Required

3.3.7 Waste Management Interventions

Issues	Indicator	Current Practice/Status	Comments
Waste Segregation	Initiatives to segregate, reducing, reusing, and recycling of waste	Most waste generated on the estate is organic in nature which is recycled in the field. Sorting is also done at the point of waste generation for domestic solid waste and at the solid waste dumpsite.	The current practice of waste recycling in the plantation field is good and should be sustained. However, more efforts should be geared toward waste reduction and waste reuse to accomplish the 3R's principle of waste management (Reduce, Reuse and Recycle)
Waste Reduction			
Waste Reuse			
Waste Recycling			

Issues	Indicator	Current Practice/Status	Comments
Waste Generation	Modes of waste handling (generation, transportation and disposal)	Solid waste generated are collected in colour coded bins and transported by bucket mounted tractor to the solid waste dumpsite.	The mode of waste transportation is good but can still be improved upon by avoiding flight tipping as much as practically possible.
Waste Disposal	Government Approved Solid Waste Dumpsite	The Company operates an in-house solid waste dumpsite which is compartmentalized for different waste streams including domestic solid waste (see Plate 3.9 below).	The Company has a valid permit from Edo State Ministry of Environment and Sustainability to operate the in-house solid waste dumpsite.



Plate 3.9: Edo State Ministry of Environment and Sustainability Approved Dumpsite

3.3.8 Climate Change (Adaptation & Mitigation)

Issues	Indicator	Current Practice/Status	Comments															
Energy Saving Initiatives	Initiatives to Conserve energy	Petroleum hydrocarbon is the main source of energy on the estate. The record of fuel and lubricant consumption has been kept.	This is good and commendable, but target needs to be set for reduction.															
	<table><tr><td colspan="3">Table 3.6: Fuel & Lubricant Consumption in 2023 & 2024</td></tr><tr><td>ITEM</td><td>2023</td><td>2024</td></tr><tr><td>Petrol</td><td>555,851.61</td><td>560,155.12</td></tr><tr><td>Diesel</td><td>2,354,134.42</td><td>2,812,138.87</td></tr><tr><td>Lubricant</td><td>11,177</td><td>12,125</td></tr></table>			Table 3.6: Fuel & Lubricant Consumption in 2023 & 2024			ITEM	2023	2024	Petrol	555,851.61	560,155.12	Diesel	2,354,134.42	2,812,138.87	Lubricant	11,177	12,125
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	Source: HSE Department, OOPC Plc (December 2024)																	

Issues	Indicator	Current Practice/Status	Comments												
	Fuel and Lubricants Consumption for 2023 & 2024 <table border="1"><caption>Data for Figure 3.3: Fuel and Lubricants Consumption in 2023 & 2024</caption><thead><tr><th>Category</th><th>2023</th><th>2024</th></tr></thead><tbody><tr><td>Petrol</td><td>~750,000.00</td><td>~800,000.00</td></tr><tr><td>Diesel</td><td>~2,500,000.00</td><td>~2,800,000.00</td></tr><tr><td>Lubricant</td><td>~100,000.00</td><td>~150,000.00</td></tr></tbody></table> Figure 3.3: Fuel and Lubricants Consumption in 2023 & 2024		Category	2023	2024	Petrol	~750,000.00	~800,000.00	Diesel	~2,500,000.00	~2,800,000.00	Lubricant	~100,000.00	~150,000.00	
Category	2023	2024													
Petrol	~750,000.00	~800,000.00													
Diesel	~2,500,000.00	~2,800,000.00													
Lubricant	~100,000.00	~150,000.00													
Soil Conservation	Initiatives to reduce evapotranspiration and soil loss through water erosion, which may include: • Use flow control wires and diversion canals to reduce erosion in areas with field drainage.	There are some natural drains and some constructed ones maintained regularly such as side/sedimentation pits. For the control of runoff, especially on the plantation roads, sedimentation pits are dug to reduce runoff and trap sediments in runoff water as could be found across the plantation field. Plate 3.10: Sedimentation pit within the Rubber plantation.	Some of the rainwater retention initiatives being adopted by the plantation estate is commendable.												
Measures to Control Greenhouse Gases	• Sources of on-farm GHG emissions and establishment of a GHG management plan that includes methods of mitigating emissions and a monitoring program.	The emission sources and air emission potential of the plantation estate are presented in Table 3.7 below. Table 3.7: Emission Sources on the Plantation Estate <table><tr><th>Sources</th><th>Location</th><th>Air Emission</th></tr><tr><td>Point Source</td><td>Powerhouse, dumpsite, effluent pond</td><td>NO_x, SO₂, CO, CO₂ Particulate Matter, VOCs, H₂S, CH₄, Dioxin</td></tr><tr><td>Fugitive</td><td>Earth roads, unpaved ground</td><td>PM, NO_x, SO_x, CO</td></tr></table>	Sources	Location	Air Emission	Point Source	Powerhouse, dumpsite, effluent pond	NO _x , SO ₂ , CO, CO ₂ Particulate Matter, VOCs, H ₂ S, CH ₄ , Dioxin	Fugitive	Earth roads, unpaved ground	PM, NO _x , SO _x , CO				
Sources	Location	Air Emission													
Point Source	Powerhouse, dumpsite, effluent pond	NO _x , SO ₂ , CO, CO ₂ Particulate Matter, VOCs, H ₂ S, CH ₄ , Dioxin													
Fugitive	Earth roads, unpaved ground	PM, NO _x , SO _x , CO													

Issues	Indicator	Current Practice/Status			Comments
		Mobile Sources	Tractors, Machinery	NOx, SO ₂ , CO, VOCs and Particulate Matter,	
		Greenhouse Gases	Tractors, Machinery	CO, CO ₂ , CH ₄ ,	
		However, the ambient air quality was recently determined in-situ for critical locations during this audit as presented in Appendix A.			
	Initiatives to reduce fossil energy use by adopting energy-efficient production and management practices.	No programme in place yet.			Management should consider switching to other source of energy for their farm machineries.

3.3.9 Promoting Environmental Protection through Partnerships with Stakeholders

Issues	Indicator	Current Practice/Status	Comments
Environmental projects and activities undertaken through partnerships with stakeholders	Projects and activities undertaken jointly. MoUs Joint management plans	There are environmental projects and activities that have been undertaken jointly with stakeholders, particularly an MoU with ONP and projects done by OOPC Plc for the host communities (CSR).	This is Good and Commendable.
Corporate Social Responsibility (CSR) on Environment	CSR initiatives in place	The company has a ‘Host Community Policy’ and has undertaken several community development projects to demonstrate its spirit of partnership and goodwill to the host communities. Some of the CSR undertaken in 2023 and 2024 are; - Road maintenance - Educational support such as stipends to teachers and scholarship awards. - Electricity Project (Provision and installation of power Generating set) - Women empowerment - Construction and upgrading of schools and community town halls. - Provision and repair of semi-industrial boreholes.	This practice is good and does conform to best management practices.
Partnerships with FMEEnv on Monitoring and inspections to ensure compliance with environment legislation	Areas of partnerships with FMEEnv. on Monitoring and inspections to ensure compliance with environment legislation	There is a partnership in place with both the State and Federal ministry of environment especially in the area of Environmental Compliance Monitoring. (ECM)	This practice should be sustained

3.3.10 Environmental and Ecological Enhancements

Issues	Indicator	Current Practice/Status	Comments
Wetlands, River banks, lakeshores, and seashore management	Rehabilitation initiatives	Not applicable.	No Action Required
Conservation of biological diversity and Environmental significant areas	Conservation initiatives	Conservation areas known as HCVs (959.47 hectares) have been established within the estate.	Good and commendable
Environmental restoration	Degraded lands secured, restored and conserved	No degraded lands on the estate.	Good

3.3.11 Environmental Education and Awareness

Issues	Indicator	Current Practice/Status	Comments
Behaviour changes towards the environment	Proof of positive behaviour change	Safety committee being coordinated by HSE department is charged with the responsibility of creating awareness on the plantation estate.	There is great environmental awareness among the workers and communities. This was apparent during the audit exercise.
Participation in environmental events with communities and schools	Evidence of Participation in environmental events.	HSE week is conducted every year (annually) on the estate.	Include Occupational Health and Environment in the awareness campaign with schools and communities engaged in the implementation
Sensitization of staff and public on Environmental sustainability relevant to the institutional mandate.	Sensitized staff on environmental sustainability through IEC materials	There are information, Education, and Communication (IEC) board on environment, occupational health and safety on the estate.	This is commendable and should be sustained.
Recognition of environmental champions	Evidence of appreciation of environmental sustainability champions	Environmental sustainability champions are being awarded	This is commendable and should be sustained.

3.3.12 Health & Safety Issues

3.3.12.1 Health Issues

Issues	Indicator	Current Practice/Status	Comments
Occupational Illnesses	Analysis of Occupational Illnesses Analysis of Industrial Accidents and Fatalities	Occupational illnesses are documented on a daily basis and also analyzed. So also, are records of industrial incidents/near misses and comparative statistical analysis available for accidents, incidents and fatalities.	This practice is good and commendable.
Health Screening & Monitoring	Accidents and Diseases Monitoring	The plantation estate operates on-site medical services for workers. Both on-site and off-site accidents records are kept and reported to the appropriate regulatory authorities.	Pre-employment medical examinations are conducted for workers that handle hazardous substances such as agrochemical sprayers. Periodic monitoring of their health is also carried out (every 6 months).

MONTHLY STATISTICS OF PREVALENT AILMENTS – RUBBER ESTATE (2023)

AILMENTS / DISEASES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	APPROX. AVG.
GIT/ABDOMINAL PROBLEMS	66	88	55	52	43	49	21	38	28	41	111	72	664	55
MALARIA	206	388	361	323	341	384	1385	217	153	227	230	197	4412	368
BACTERIAL INFECTIONS	21	42	31	50	25	13	5	30	23	30	42	27	339	28
VIRAL INFECTIONS	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FUNGAL INFECTIONS	0	0	0	0	0	0	1	0	2	0	2	3	8	1
SKIN INFECTIONS	37	80	42	43	26	49	28	29	3	6	10	4	357	30
EYE PROBLEM	11	19	3	9	10	10	2	24	4	48	19	12	171	14
EAR PROBLEM	0	7	3	9	5	1	1	5	4	2	1	5	43	4
WORKPLACE INJURIES	2	2	1	2	0	1	1	1	1	3	2	1	17	1
HOME ACCIDENTS /INJURY	14	24	18	22	15	8	5	6	4	10	12	10	148	12
ROAD TRANSPORT ACCIDENTS (RTA)	0	0	0	1	1	0	0	0	0	4	0	0	6	1
NON-INDUSTRIAL MUSCULO - SKELETAL PROBLEMS	83	163	122	88	73	66	34	50	42	160	234	152	1267	106
DENTAL DISEASES	2	2	0	3	2	2	2	0	3	4	5	6	31	3
HYPERTENSIVE DISEASES	2	6	2	1	0	1	0	1	3	4	4	1	25	2
DIABETES	0	2	1	0	0	0	0	0	0	0	0	0	3	1
SURGICAL PATIENTS	0	3	3	0	1	0	0	1	1	1	0	2	12	1
RESPIRATORY PROBLEMS	56	55	31	26	16	18	9	20	18	33	57	59	398	33
OTHERS	0	6	0	3	0	0	0	1	21	34	27	21	113	9

Fig 3.4a: Medical Records of Illness for year 2023 (Jan- Dec).

MONTHLY STATISTICS OF PREVALENT AILMENTS – RUBBER ESTATE (2024)

AILMENTS / DISEASES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	APPROX. AVG.
GIT/ABDOMINAL PROBLEMS	43	33	74	87	53	62	55	54	90	71	92	53	767	64
MALARIA	115	144	213	220	156	274	386	368	410	388	409	330	3413	284
BACTERIAL INFECTIONS	19	13	26	41	20	39	28	35	48	36	51	68	424	35
VIRAL INFECTIONS	0	7	29	20	3	0	1	0	0	0	0	0	60	5
FUNGAL INFECTIONS	0	0	0	1	1	0	5	8	6	3	3	0	27	2
SKIN INFECTIONS	6	8	13	18	11	6	14	30	70	13	72	17	278	23
EYE PROBLEM	4	8	12	13	7	10	10	20	12	10	28	20	154	13
EAR PROBLEM	0	0	7	6	6	5	3	5	10	4	11	6	63	5
WORKPLACE INJURIES	0	1	5	1	3	0	0	0	1	0	3	1	15	11
HOME ACCIDENTS /INJURY	6	4	10	15	6	13	14	17	19	13	0	21	138	2
ROAD TRANSPORT ACCIDENTS (RTA)	1	0	1	4	0	0	3	2	0	2	0	4	17	1
NON-INDUSTRIAL MUSCULO - SKELETAL PROBLEMS	87	72	137	179	93	152	109	151	199	181	210	126	1696	141
DENTAL DISEASES	2	0	4	5	3	7	1	4	4	7	7	6	50	4
HYPERTENSIVE DISEASES	0	1	0	0	0	1	1	3	1	1	0	0	8	1
DIABETES	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SURGICAL PATIENTS	0	0	1	1	1	0	9	2	1	4	4	5	28	2
RESPIRATORY PROBLEMS	25	29	45	23	23	51	26	16	27	26	70	53	414	35
OTHERS	15	10	29	16	8	19	16	11	1	37	21	35	218	18

Fig 3.4b: Medical Records of Illness for year 2024 (Jan- Dec).

3.3.12.2 Safety Issues

Some of the operations in the plantation field, rubber factory, stores, workshop and office involve both single and multiple exposures to physical hazards with potential for accident or injury or illness due to repetitive exposure to mechanical action or work activity as presented below.

Issues	Indicator	Current Practice/Status	Comments
Occupational Hazards	Physical Hazards	Appropriate personal protective equipment (PPE) is provided.	This is good and commendable.
	Chemical Hazards	Adequate provisions are put in place such as appropriate personal protective equipment (PPE) provided for workers.	
	Biological hazards	There are no activities or processes that require the use of biological agents and there have been no reported health cases that are linked to the suspected presence of biological agents at workplaces.	
	Radiological Hazards	There are no activities involving occupational and/or natural exposure to ionizing radiation.	
Risk Assessment	Initiatives to conduct a comprehensive risk assessment	Risk assessment and analysis for all jobs and tasks have been conducted in recent time.	This is good and commendable.

Issues	Indicator	Current Practice/Status	Comments
Work Procedures	Initiatives to document work procedure	Work procedures were said to be documented for every job and task but were neither displayed nor sighted during the audit.	This is good but needs to be improved on.
PPE	Commitment	As part of the prevention and control measures for the identified hazards, some PPE have been provided for workers. The PPE issued to workers appear adequate. The level of use of PPE by workers is high. The enforcement level by management is high and proper use of PPE has been communicated to workers. Some of the PPE provided to workers include helmet, aprons (overall), safety boots, eye goggles, hand gloves, earmuffs and nose masks etc.	The level of compliance to PPE usage is remarkably high and should be sustained.
Safety Education	Initiatives on safety Education	Safety education is evident on the plantation estate	The level of safety education is good but need to be improved on.
Signage	Initiatives to Signage Production especially traffic safety	There is several signage on the estate and are strategically posted.	Display more signages at the rubber factories and maintain faded ones
Fire Drills	HSE department in place	There is a full-fledged HSE department in place and there are records showing that fire drills have been conducted in recent time.	This should be sustained
Fire Safety (Prevention & Control Measures)	Risk of Fire and Explosion	All the offices have fire detectors for fire surveillance. Stand-by water tankers and fire extinguishers are the provisions made for firefighting on the estate.	This should be sustained
	Initiatives on Fire Fighting Equipment Systems	There is a security patrol team for fire detection and control. The provision for fire control/fighting include: • Trained fire fighters • Fire extinguishers • Sand buckets • Fire hydrants • Stand-by Water Tankers • Fire Fighting Procedure	This should be sustained
	Initiatives on Emergency Response Plan for Fire	There is Emergency Response Procedure in place so also is emergency response plan for fire for all facilities (see Appendix C).	This should be sustained

Issues	Indicator	Current Practice/Status	Comments
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Plate 3.11: Samples of Safety Signages within the Estate

3.4 Conformance to Legislation Issues

3.4.1 Environmental, Health and Safety Laws and Regulations

Issues	Indicator	Current Practice/Status	Comments
Establishment of HSE Department	HSE department in place	There is a full-fledged HSE department in place.	Conformed to national environmental legislation
Submissions to Regulatory Bodies	Commitment	The status of submissions to regulatory bodies is summarized in Table 3.8 below.	
	Table 3.8: Status of Submissions to Regulatory Bodies		
	Requirement	Status	
		Submitted	Available but Not Submitted
	Environmental Audit Report	X	
	SDS	X	
	Emergency Response Plans	X	
	Contingency Action Plans	X	
	Record of Fire Drills	X	
	Accidents, Incidents and Near Misses	X	
	Accident Investigation Reports	X	
Environmental and other Policies	X		

3.4.2 Environmental, Health & Safety Permits

Issues	Indicator	Current Practice/Status	Comments
Environmental and Other Policies	Commitment	The Company has well written and articulated environmental and other policies, duly signed by the Managing Director.	Good and Commendable
Permits/Licenses/ Approvals	Initiatives to Obtain applicable Permits/License/ Approvals	The Company has obtained some permits, licenses and approvals to cover certain processes and operations. However, quite a few permits remain outstanding as presented in Table 3.9 below	

Table 3.9: Permits and Licenses Obtained

OPERATIONS/PROCESSES	Requirement (Permit/License/ Approval)	Status: Obtained/Not Obtained	Date Obtained	Expiry Date
Solid Waste Dumpsite	Permit	Expired	Processing certificate	
Storage of Petroleum Products	License	Obtained	2024	March 2027
Discharge Outfall (Effluent Ponds and Lagoon)	Permit	Obtained	2022	December 2024
Food Handlers Test	Certificate	Obtained	2024	January 2025
Clinic	License	Obtained	December 2023	December 2024
Factory Registration	Certificate	Paid, Awaiting Certificate	June 2023	June 2025
Fire Safety	Certificate	Obtained	2024	August 2026
Registration of Product with NAFDAC where applicable	Certificate	Expired	Awaiting renewal	
Verification of Weights and Measures	Certificate	Obtained	Awaiting certificate	August 2025
Lifting, hoisting, and pressure equipment	Certificate	Obtained	February 2024	February 2025
Pressure Testing of Fuel Storage Tanks	Certificate	Obtained	February 2021	February 2026
EIA Permits Rubber Factory	EIS/Permit	Obtained	February 2020	NA
EAu Permits: a. Rubber Estate EAu Certificate	Permit	Ongoing (NESREA)	Ongoing	NA

Electrical Supply	License	Obtained	10/03/1998	NA
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3.5 Community and Industrial Relations

Issues	Indicator	Current Practice/Status	Comments
Employment	Initiative	The company employs workers including expatriates and Nigerians at management, senior and junior cadres. Both genders are employed.	Good and Commendable.
Child Labour	Initiatives to prepare Child Labour Policy	The company does not give employment to underage workers at all cadre and there is a policy document in place which forbids child labour.	Good and Commendable.
Employment Opportunities	Commitment	The company does not discriminate against its employment policy. However, priority is given to employing suitably qualified workers from the host communities.	Good and Commendable.
Welfare	Commitment	The Company operates with due respect to the Nigerian Industrial Labour laws. The workers have freedom to belong and participate in labour union activities and workers belong to the Agricultural and Allied Workers Union of Nigeria (AAWUN). This allows for collective bargaining, honesty and communication in both directions. The Company offers competitive wages and welfare packages (salaries plus allowances and bonuses) for all categories of staff as stipulated by RSPO Guidelines.	Conformed to national environmental legislation.

3.6 Statutory Compliance Status of OOPC Rubber Estate with The Factories ACT CAP 126 LFN, CAP F1 LFN 2004

REFERENCE	REQUIREMENTS	COMPLIANCE STATUS	REMARKS
Part II Health			
1a	Daily removal of dirt and refuse from floors, benches of workrooms, staircases and passages	C	
1b	Cleaning of the floor of every workroom at least once every week	C	
1c	Whitewashing /colour washing or washing with hot water and soap of all inside walls, partitions, all ceilings or top of rooms, all walls, sides and tops of passages and staircases at least once in every twelve months or the repainting of re-varnishing of same at least once in every period of five years.	C	

REFERENCE	REQUIREMENTS	COMPLIANCE STATUS	REMARKS
2 ₁	Avoidance of overcrowding while work is going on so as not to cause risk or injury to the health of the persons employed therein.	C	
2 ₂	Provision of at least a space of 400 cubic feet for every person employed to avoid overcrowding.	C	
2 ₃	Workroom not less than 9ft height, measured from the floor to the lowest point of the ceiling or roofing material.	C	
3 ₁	Securing and maintaining the circulation of fresh air in each workroom/adequate ventilation	C	
4	Provision and maintenance of sufficient and suitable lighting whether natural or artificial in every part of a factory in which persons are working	C	
5	Provision and maintenance of separate sanitary convenience for each sex	C	
Part III Safety (General Provisions)			
6	Securely fenced fly wheel or every moving part of any prime mover or every part of any electric generator, motor or rotary converter unless otherwise not necessary.	C	
7	Provision and maintenance of efficient devices or appliances in every workroom by which the power can promptly be cut off.	C	
8	Provision of an efficient starting and stopping appliance or control for every power-driven machine	C	
9	Protective device for an operator of a dangerous machinery during examination, lubrication or adjustment who should be a male, 18 years and above and has been sufficiently trained, with another person instructed on the steps to be taken in case of emergency standing by.	C	
10	Securely covered or fenced fixed vessel, structure, sump or pit of which the edge is level with or less than 91cm above the ground and which contains any scalding, corrosive or poisonous liquid with a warning notice in English and any other Nigerian language displayed there-on.	C	
11	No traversing part of any self-acting machine and no material carried thereon shall be allowed into a space where persons are or pass through except when the machine is stopped with the traversing part on the outward run.	C	
12	No person shall be employed at any process or machine liable to cause bodily injury without sufficient training or under	C	

REFERENCE	REQUIREMENTS	COMPLIANCE STATUS	REMARKS
	adequate supervision by a person who has a thorough knowledge and experience.		
13	Maintenance and thorough examination, at least once in every six months of every hoist or lift which shall be of good mechanical construction, sound material and adequate strength	C	
14	Indication of safe working load(s) on every lifting machine except a jib crane which shall have either an automatic indicator or a table indication safe working load.	C	
15	No overloading of any lifting machine beyond the safe working load as indicated except for the purpose of a test.	C	
16	Register of chains, ropes or lifting tackle and other lifting machines kept in the company.	C	
17	Safe means of access and safe place of employment.	C	
18	Provision of an adequate means of egress for person entering or working inside any chamber, tank, vat, pit or other confined place and the notification of the Director of factories before the commencement of work & provision of suitable breathing and reviving apparatus.	C	
19	Taking of adequate precautions with respect to explosive or inflammable dust, gas, vapour or substance.	C	
20	Every steam boiler shall be of good construction, sound materials, adequate strength and free from patent defect and shall have suitable safety valve, stop value, steam pressure gauge, and at least one water gauge. Also, all precautionary steps shall be taken before repairs or maintenance.	C	
21	Thorough examination of every steam boiler and all its fitting and attachment at least once in every 14 months and also after extensive repairs	C	
22	No new steam boiler shall be taken into use in a factory unless a certificate has been obtained from an authorized boiler inspector and a copy of the report sent to the inspector of the district.	C	
23	Every steam receiver and steam containers shall be of good construction, sound materials, and adequate strength and free from patent defect and shall be properly maintained.	C	
24	For every air receiver with the same conditions as applicable to every steam receiver.	C	

REFERENCE	REQUIREMENTS	COMPLIANCE STATUS	REMARKS
25	Prevention of fire by installation of fire-detecting devices for alerting occupants and suitable means of extinguishing fires.	C	Adequate number of fire extinguishers are positioned at strategic points.
26	Highly inflammable substance kept in a fire-resisting store or in a safe place outside any building and free from means of escape (exit).	C	
27	Employment of adequately trained fire fighters.	C	
28	Provision of emergency fire exists, which shall be properly maintained, from obstruction and easily accessible.	C	
29	All emergencies exist shall be open outwards except in the case of sliding door.	NFC	
30	Enclosure of every hoist way or lift way inside a building with fire-resisting materials including the doors and the top only by some materials easily broken by fire or be provided with a vent at the top.	NA	
31	Conspicuously marked notice on all emergency exists painted in red/green letters of an adequate size and in English and appropriate Nigeria Languages.	C	
32	Effective steps to ensure that all employed persons are familiar with emergency exists and routine to be followed in case of fire.	C	
Part IV Welfare			
33	Provision and maintenance of an adequate supply of drinking water at suitable points and accessible to all employed persons	C	
34	Provision and maintenance of an adequate and suitable facilities for washing which shall be conveniently accessible.	C	
35	Provision of adequate and suitable accommodation for clothing not worn during working hours (cloak room and lockers).	C	
36	Provision and maintenance of a readily accessible first-aid box or cupboard of the prescribed standard for every one hundred and fifty persons.	C	
Part V Special provisions			
37	Provision of exhaust appliances for fumes, dust or other impurity likely to be injurious or offensive to be employed	C	

REFERENCE	REQUIREMENTS	COMPLIANCE STATUS	REMARKS
	persons and the provision of personal protective equipment for employed persons		
38	No partaking of food or drink in any room where any poisonous or injurious substance giving rise to dust or fume is present	C	
Part VI Notification			
39	Notification of the inspector of factories of the district by the occupier of the factory of any accident which either causes loss of life or disability to any person for more than 3 days	C	

Note: C=Complied with, NC= Not complied with; NFC=Not fully complied, NA=Not applicable.

Table 3.10: STATUTORY COMPLIANCE STATUS WITH FME 1991 REGULATIONS

Regulation S.I.8 of 1991	Remedial Action				Status
SI	INSTALLATION OF ANTI-POLLUTION EQUIPMENT				C
S2 ₂	STORM/EFFLUENT MONITORING				C
S3,	TREATMENT OF EFFLUENT AND SEWAGE				C
S3 ₂	MONITORING RESULTS TO NESREA				C
EN.P	ENVIRONMENTAL POLICY				C
SH.P	SAFETY AND HEALTH POLICY & EMERGENCY RESPONSE MEASURES				C
Regulation S.I.9 of 1991	Remedial Action				Status
SI	RELEASE OF HAZARDOUS OR TOXIC SUBSTANCE INTO THE AIR, LAND OR WATER	C	S10	STORAGE TREATMENT AND TRANSPORTATION OF HARMFUL TOXIC WASTE	NA
S2a	POLLUTION MONITORING UNIT	C	S11	GENERATOR'S LIABILITY	C
S2b/c	POLLUTION CONTROL / ACCREDITED CONSULTANT	C	SB	STRATEGIES FOR WASTE REDUCTION	C
S3	RESULT SENT TO NESREA, FME _{env} QUARTERLY	C	S15,	DISCHARGE OF EFFLUENT BEYOND PERMISSIBLE LIMIT	C
S4	UNUSUAL DISCHARGE	NA	S15 ₂	OIL DISCHARGE IN ANY FORM	C
S5a	LIST OF CHEMICALS TO FME	C	S15 ₃	DISCHARGE PERMIT	C
S5b	CHEMICAL STORAGE	C	S16	SOLID WASTE DISPOSAL IN MUNICIPAL LANDFILL	C
S5c	WHERE CHEMICAL OBTAINED	C	S17	RELEASE OF GAS MATTER	NA
S7	CONTINGENCY/EMERGENCY RESPONSE PLAN	C	S18	AESTHETIC/SANITARY CONDITION	C
S8,	MACHINERY COMBATING POLLUTION	C	S19	SAFETY OF WORKERS	C
ss,	POLLUTION RESPONSE EQUIPMENT	C	S21	ENVIRONMENTAL AUDIT REPORT (EAR)	C

Note: C- complied, NA- Not Applicable, NFC- Not Fully Complied

CHAPTER FOUR

4.0 AUDIT FINDINGS AND ITS EVALUATION

4.1 INTRODUCTION

The audit findings as well as evaluation of impacts of Okomu OPC Plc Rubber Estate on the environment are presented in this chapter. This section presents evaluation of housekeeping practice in the facility, waste management, material balance, description of environmental effects and impact evaluation.

4.2 Inspection of Rubber Estate Units

4.2.1 Rubber Workshop

There is a maintenance workshop, to support the factory operations and located opposite the rubber factory. It comprises different functional units or sections including mechanical, auto-electrical, machine and welding sections. These units undertake factory mechanical works, electrical works, fabrication, and maintenance works. This is in addition to the central workshop located at the main estate comprising different functional units or sections including Lathe Machine, Light vehicle, Tractor, Electrical, Changan, Lorry, Vulcanizer, Mechanical and Welding sections. These units undertake mechanical works, civil repairs, and maintenance works. The workshop is equipped with lifting and hoisting equipment of different capacities between 1.5-5tons.



Plate 4.1: Picture Showing the Facility Workshop

Remark: The housekeeping was good, and equipment arranged in a proper way as to allow for easy identification for use.

4.2.2 Rubber Laboratory

The rubber laboratory undertakes dirt content analysis, in addition to process and product quality monitoring. It is fitted with equipment including ovens, Wallace rapid plastimeter, roll mill, mooney viscometer, ageing chamber, fume cupboard, scales and balances, and other quality control equipment for process efficiency and quality monitoring. The laboratory is an attachment to the rubber factory administration office located opposite the warehouse loading bay.



Plate 4.2: Emergency Shower/Eye Wash and Fume Cupboard

Remark: Adequate safety provisions are in place, Safety Data Sheet are displayed in the laboratory, while chemicals for analysis are requested based on need. There is also provision for an emergency shower/eye wash section. The house keeping is very good at the laboratory.

4.2.3 Weather Station

There is a weather station located at the rubber estate. The weather stations are equipped with rain gauge, thermometers and piche-evaporimeter to collect data on rainfall, temperatures, and sunshine.

4.2.4 Guesthouse

There is a guesthouse providing on-site accommodation and catering services for official guests and visitors to the estate. It is fully secured with controlled access, while provision is made for recreational activities like swimming, basketball, lawn tennis etc.





Plate 4.3: Guesthouse Facilities

Remark: The housekeeping is good; safety and waste management measures are put in place and measures to ensure continuous improvement in guest comfort is also in place through the provision of a “suggestion box”. Emergency call lines are strategically placed in the guest house.

4.2.5 Clinic

A modern clinic is located behind the administration block to provide medical services to workers and their families. It handles observation/monitoring and treatment of minor ailments. The medical staff includes one (1No.) resident doctor, eight (8Nos.) nursing officers, three (3Nos.) pharmacy attendants, four (4Nos.) clinic attendants, three (3Nos.) card attendants and four (4Nos.) ambulance drivers.

Given the distance of the rubber estate to the main clinic, a dispensary or sick bay is provided at the rubber estate to attend to patients in the interim.

The company has retainer agreement with five (5Nos.) medical centers, all in Benin City as follows:

- Ihenyen Hospital (*General Medicine*)
- Total Health Care Hospital (*Surgery and General Medicine*)
- Gift Medical Centre (*Obstetrics/Gynecology & General Medicine*)
- Mayo Eye Clinic (*Ophthalmology/Eye*)
- Astriel Medicare (*General Medicine*)

The clinic has one (1 No.) ambulance at the main estate on stand-by for emergencies. As at the time of this audit the clinical practices and housekeep was satisfactory.



Plate 4.3: Main Estate Clinic Showing the Standby Ambulance

Remark: At the clinic, drugs are properly stored including those that needs to be kept at a certain temperature. The general housekeeping and coordination is good and administration procedures are seamless.

4.2.6 Office Accommodation

A number of buildings provide office accommodation for administration, technical and other support staff.

4.2.7 Residences

Accommodation is provided for workers and their families on the estate. Different types of residential accommodation are available for junior staff, intermediate and management staff. The housing type ranges from a single room to 2bedroom apartments.



Plate 4.4a: Some Newly Constructed Buildings at the estate

Remark: As at audit time, additional buildings are being constructed while old ones are undergoing renovations. The buildings are constructed with environmentally friendly and good quality materials to achieve maximum comfort for workers and guests.

This is commendable, however at the rubber quarters, there are several broken water pipes and controls that need to be replaced. The inspection chamber of the overhead water storage tank point bordering the rubber agric office appears to be caving in. Repair or reinforcement is recommended.



Plate 4.4b: Caved in Inspection Chamber

4.2.8 Recreation

The provisions that are available for recreation on the estate include a football field, tennis court, staff club, management clubhouse, multipurpose court and a golf course.

4.2.9 Transportation

Two categories of vehicles are provided for transportation, namely light vehicles fleet and heavy-duty fleet. The light vehicles fleet comprise salon cars, 4-Wheel Drive jeeps, and mini-buses. The Administration department controls them. The agric department controls the heavy-duty fleet comprising Lorries, trailers, tractors, and buses.

There are also within the heavy-duty fleet, tippers (7tons and 10tons) and Fixed Bodies. The fixed bodies are long articulated carriers, with a capacity of 150 persons, used for mass transportation of workers into and out of the main estate. Lorries with capacity of about 100 persons are also used to transport workers.





Plate 4.5: Picture Showing Some Light Vehicles and Heavy-Duty Truck used within the Estate

Remark: Place oil retention trays under parked trucks to prevent oil drips from polluting the soil.

4.2.10 Schools

There are two schools named Okomu Primary School and Okomu Staff School both located beside each other at the Main estate. The former is owned by the government while the latter is owned and run by the company. The company provides accommodation for teachers in the Government owned school and maintains the school. There are a total of 490 students and 6 teachers employed by the state government at Okomu primary school while Okomu staff school have 487 students and 19 teachers all employed by the company. Both schools have 6 classrooms in each.



Plate 4.6: Okomu Oil Palm Company School and School Bus

4.2.11 Police Post

There are police posts located at the estate's entrance gate and at other locations, providing security services for the estate.

4.2.12 Livestock Pens

The livestock pens are located within the Boy's quarter's premises south of the "management quarters". The pens accommodate several small ruminants and non-

ruminant animals including cattle, sheep, goats and pigs. The pens are very well confined with chain-link fence wire and controlled entry is observed with a disinfection process done by visitors to reduce the risk of stock contamination. New stocks are usually quarantined for two months before the introduction to the larger stocks. There are two (2) veterinary doctors attached to the livestock pen.



Plate 4.7: Picture Showing Animals at the Pen within the Estate

Remark: There is inadequate signage at the facility especially at the entry where disinfection of visitor's boots, or footwear takes place.

4.2.13 Rubber Factory

The factory processes the cup lumps received from the plantation into rubber bales. The rubber cup lumps are EUDR certified.

Remark: The walkway lines designated for pedestrians and vehicles are fading off and due to remark. There were inadequate and several non-legible signage at the factory premises, especially at the counter-weight area of the factory, while a broken down rubber lump bucket mounted conveyor was observed within the factory processing. Findings revealed it had been there for a while and should be moved to the workshop.



Plate 4.8: Broken Down Rubber Cup Lump Bucket Conveyor (HD 1609)

4.3 Description of Environmental Effects Related to Operational Activities

The Environmental effects of Okomu OPC Plc - Rubber Estate were evaluated by collecting samples and carrying out measurements followed by detailed analysis. The description as well as methodology used is as follows:

4.3.1 Methodology for Sample Collection

In-situ determination of the gases was carried out using portable gas analyzers. The ambient air was monitored using LAND Duo multi-gas emission analyzer and Industrial Scientific iTX 5 to determine the concentration of carbon monoxide (CO), Sulphur dioxide (SO₂), oxygen, ammonia and hydrogen sulphide (H₂S), Nitrogen oxides, NO₂/NO_x. Handheld Aerosol Monitor Model 1055 was used for the measurement of Suspended Particulate Matter, while Quest Model 2500 Sound Level Meter was used to measure the noise level. Only the maximum results obtained were presented.

4.3.2 Sampling Locations

Monitoring of ambient air quality, noise level assessment and water analysis was carried out at geo-referenced locations.

The sampling locations were within the spatial boundaries of the estate. The sampling points with their coordinates are presented in **Table 4.1**.

Table 4.1: Co-ordinate Points of Sampling Locations

Table 4.1: Co-ordinate Point of Sampling Locations				
Sample Points	Location	Coordinates		Environmental Component Monitored
Borehole Water				
Point 1	Rubber Quarters (OKM _{RQ})	N06°21.30.0’	E005°11.18.0’	Groundwater Quality
Point 2	IITA Quarters (OKM _{IITA}) - Control	N06°24’ 49.3’’	E005°12’57.4’’	Groundwater Quality
Monitoring Wells				
Point 3	Rubber Effluent Monitoring Well – OKM _{REMW}	N06° 24’13.2’’	E005° 12’46.0’’	Groundwater Monitoring
Wastewater/Effluent				
Point 4	Rubber Effluent – Raw- OKM _{RER}	N06°21’22.9’’	E005°11’04.3’’	Wastewater/Effluent
Point 5	Rubber Effluent – Treated – OKM _{RET}	N06°21’21.4’’	E005°11’09.7’’	Wastewater/Effluent
Surface Water				
Point 6	Okomu River Inlet - OKM ₁ (Control)	N06°23’14.6’’	E005°16’47.2’’	Surface Water Quality
Point 7	Palm-Rubber boundary stream outlet (OKM ₇)	N06°20’19.1’’	E005°11’23.3’’	Surface Water Quality
Air Quality & Noise Measurements				
Point 8	Rubber Quarters	N06°21.30.0’	E005°11.18.0’	Air Quality & Noise
Point 9	Rubber Factory Hall	N06 °21’25.4’’	E005 °11’04.6’’	Air Quality & Noise
Point 10	Rubber Powerhouse	N06°21’ 23.8’’	E005°11’07.3’’	Air Quality & Noise
Point 11	IITA (Control)	N06°24’84.7’’	E005°12’848’’	Air Quality & Noise

Source: Okomu OPC Plc Rubber Estate Environmental Audit (December 2024)

4.4 Result and Discussion

4.4.1 Air Quality Measurement

Air Quality is an indication of the healthiness of the air based on the quantity of polluting gases and particulates (liquid droplets or tiny solid particles suspended in air) it contains. Air is considered safe when it contains no harmful chemicals and only low levels of other chemicals that become harmful in higher concentrations to humans, other animals, plants, or their ecosystems. The small number of emissions released from Okomu OPC Plc - Rubber Estate pose no health or environmental risk to nearby communities. The air quality values recorded during the exercise were within regulatory limits except for Suspended Particulate matter at the rubber quarters.

The temperature and humidity are also conducive for smooth operation. The SPM fell within the limit except at the rubber quarters, while the noise level measured for the pre-

breaker section of the rubber factory was also above the limit. The TVOC is at acceptable levels within the premises. Research indicates that levels between 0.3 to 0.5mg/m³ are considered low and acceptable, while levels between 1 to 3mg/m³ are regarded as a high concern.

The air quality measurement of Okomu OPC Plc - Rubber Estate facility is seen in Table 4.2a whereas Table 4.2b shows the Noise level measurements.

Table 4.2a: Result of the Air Quality Monitoring (2024)

Location	IITA	Rubber Factory Hall	Rubber Quarters	Rubber Powerhouse	NESREA Limit
Coordinate	N06°24'84.7"	N06°21'25.4"	N06°21' 30.0"	N06°21' 23.8"	
	E005°12'848"	E005°11'04.6"	E005°11'18.0"	E005°11'07.3"	
Noise, dB(A)	54.7	82.9	71.0	70.3	60-85
Humidity (%)	51.09	54.46	69.49	65.75	Ambient
Temperature (°C)	20.01	20.49	24.82	23.85	Ambient
SPM (µg/m ³)	210	247	351	184	250
Carbon monoxide, ppm	<1	1	1	1	10-20
Carbon dioxide, ppm	425	407	413	446	Not Specified
Hydrogen sulphide, ppm	<0.1	<0.1	<0.1	<0.1	Not Specified
Hydrocarbon, %	<0.1	<0.1	<0.1	<0.1	Not Specified
Oxygen, %	20.9	20.9	20.9	20.9	Not Specified
Sulphur dioxide, ppm	<0.01	<0.01	<0.01	<0.01	0.18
Nitrogen dioxide, ppm	<0.01	<0.01	<0.01	<0.01	0.20
TVOC, mg/m ³	0.015	0.010	0.014	0.006	-

Source: Environmental Laboratories Limited (Results Analysis Extract)

National Environmental (Air Quality Control) regulation, S.I. 64 of 2014, Schedule V(30min Exposure)

Table 4.2b: Result of the Noise level measurement

S/N	RUBBER FACTORY	Noise Level, dB(A)
i.	Rubber factory hall	82.9
ii.	Slab Cutter	85.0
iii.	Pre-breaker	86.5
iv.	Pelletizer	81.4
v.	Dryer	84.8
vi.	Bailing Section	80.5
vii.	Boiler	71.6
viii.	Workshop	57.1
ix.	Admin office	49.7
x.	Rubber Factory Office Maintenance	74.8
NESREA. Limit for Factory Area (8hrs Exposure)		85

4.4.2 Water Analysis Determination

The groundwater, surface water, wastewater (effluent) and effluent monitoring well at the Rubber Estate was collected for analysis. Table 4.3 – 4.6 shows result of water samples monitored respectively.

Table 4.3: Laboratory Analysis Result of Groundwater Samples

Parameter/Unit	Method APHA 2022	OKM _{RQ}	OKM _{IITA} (Control)	NIS554: 2015
Appearance	Visual	Clear and colourless		Clear and Colourless
Odour	Sensory	Unobjectionable		Unobjectionable
pH @ 25.0°C	4500-HB	4.81	4.40	6.5 – 8.5
Temperature, °C	2550 -B	28.2	28.7	Ambient
Conductivity, µS/cm	2500-B	24	24	1000
Total Dissolved solids, mg/L	2120-C	12	12	500
Total Suspended Solids, mg/L	2130-B	2	3	-
Total Solids, mg/L	2540-D	14	15	-
Colour, Pt-Co	2540-C	7.0	5.0	15
Turbidity, NTU	2540B	<0.01	1.25	5
Total Hardness, mg/L	2340-C	4	3	150
Total Alkalinity, mg/L	2320-B	4	4	-
Total acidity, mg/L	2310-B	70	60	-
Calcium, mg/L	3500-B	1.2	1.2	-
Magnesium, mg/L	3500-B	0.24	<0.01	20
Chloride, mg/L	4500-B	5.0	6.0	250
Nitrate, mg/L	4500-NO ₃ -E	<0.01	<0.01	50
Nitrite, mg/L	4500-NO ₂ -B	<0.01	<0.01	0.2
Sulphate, mg/L	4500-SO ₄ -E	<0.1	<0.1	100
Phosphate, mg/L	4500-E	<0.01	<0.01	-
Iron (total), mg/L	3500-B	<0.01	<0.01	0.3
Fluoride, mg/L	4500-F ⁻ C	<0.1	<0.1	1.5
Lead, mg/L	3500 –Pb-B	<0.001	<0.001	0.01
Arsenic, mg/L	3500 –As-B	<0.001	<0.001	0.01
Manganese, mg/L	3500 –Mn-B	<0.001	<0.001	0.2
Copper, mg/L	3500 –Cu-B	<0.001	<0.001	1.0
Cadmium, mg/L	3500 –Cd-B	<0.001	<0.001	0.003
Hydrogen Sulphide, mg/L	4500-S ² -H	<0.01	<0.01	0.05
Total coliform count, CFU/100 mL	9225-D	0	0	10
Faecal coliform, E.coli),	9222-D	0	0	0
Salmonella/Shigella sp.,	9260-E	0	0	0
Staphylococcus sp. ,	AOAC 995.12	0	0	0
Pseudomonas aureus,	9213-E	0	0	0
Total plate count,	9215-B	6	5	10²

Source: Environmental Laboratories Limited, IPAN:00155; Laboratory Analysis Result (EAuR 2024)

Table 4.4: Laboratory Analysis Result of Surface Water Samples

PARAMETER/UNIT	METHOD, APHA 2022	OKM ₁ (Control)	OKM ₇	FME _{Env.}
Appearance	Visual	Clear & Colourless		Clear & Colourless
Odour	Sensory	Unobjectionable		Unobjectionable
pH @ 25°C	4500-B	5.81	5.02	6-9
Temperature, °C	2550-B	27.5	29.4	Ambient
Conductivity, µS/cm	2510-B	34	12	2000
Total Dissolved solids, mg/L	2540-D	17	6	1000
Colour, Pt-Co	2120-C	3	1	7.0
Turbidity, NTU	2130-B	<0.01	<0.01	10
Total Suspended Solids, mg/L	2540-C	<1	<1	30
Total Solids, mg/L	2540-B	17	6	-
Total Hardness, mg/L	2340-C	8	2	-
Total Alkalinity, mg/L	2320-B	8	4	-
Total acidity, mg/L	2310-B	40	30	-
Calcium, mg/L as Ca	3500-B	1.6	<0.1	-
Magnesium, mg/L as Mg	3500-B	0.97	0.48	-
Salinity as Chloride, mg/L	4500-B	5.0	3.0	200
Nitrate, mg/L	4500-NO ₃ ⁻ -B	<0.01	<0.01	50
Nitrite, mg/L	4500-NO ₂ ⁻ -B	<0.01	<0.01	0.3
Sulphate, mg/L	4500-E	<0.1	<0.1	250
Phosphate, mg/L	4500-C	0.07	0.01	-
Iron (total), mg/L	3500-B	<0.01	<0.01	20
Lead, mg/L	3500 -Pb-B	<0.001	<0.001	<1.0
Copper, mg/L	3500 -Cu-B	<0.001	<0.001	<1.0
Manganese, mg/L	3500 -Mn-B	<0.001	<0.001	0.10
Cadmium, mg/L	3500 -Cd-B	<0.001	<0.001	<1.0
Nickel, mg/L	3500 -Ni-B	<0.001	<0.001	<1.0
Cobalt, mg/L	3500 -Co-B	<0.001	<0.001	<1.0
Arsenic, mg/L	3500 -As-B	<0.001	<0.001	<1.0
Chemical oxygen demand, mg/L	5220-D	4.2	4.5	80
Biochemical oxygen demand, mg/L	5210-B	<0.1	1.8	30
Dissolved Oxygen, mg/L	4500-G	6.0	7.6	>2.0
Total Hydrocarbon, mg/L	Spectrophotometry	<0.1	<0.1	-
Pesticides, mg/L	Screening	<0.01	<0.01	-
Total coliform count, MPN/mL	APHA 9225-D	6	14	10 ²
Faecal coliform (E.coli), CFU/mL	APHA 9222-D	0	0	-
Total plate count, CFU/mL	APHA 9215-B	108	130	10 ⁴

Source: Environmental Laboratories Limited, IPAN:00155; Laboratory Analysis Result (EAuR 2024)

Table 4.5: Laboratory Analysis Result of the Rubber Effluent Monitoring Well sample

PARAMETER/UNIT	METHOD APHA 2022	OKM _{REM} W	FME _{env} Limit
Appearance	Visual	Colourless with tiny Particles	Clear & colourless
Odour	Sensory	Unobjectionable	Unobjectionable
pH @ 25°C	4500-HB	7.17	6-9
Temperature, °C	2550B	30.5	Ambient
Conductivity, µS/cm	2510-B	86	2000
Total dissolved solids, mg/L	2540-D	43	1000
Colour, Pt-Co	2120-C	8.0	7.0
Turbidity, NTU	2130-B	<1	10
Total Suspended Solids, mg/L	2540-C	1	30
Total solids, mg/L	2540B	44	-
Total Hardness, mg/L	2340-C	8	-
Total Alkalinity, mg/L	2320-B	24	-
Total acidity, mg/L	2310-B	50	-
Calcium, mg/L as Ca	3500-B	3.2	-
Magnesium, mg/L as Mg	3500-B	<0.01	-
Chloride, mg/L	4500-B	8.0	200
Nitrate, mg/L	4500-NO ₃ ⁻ -E	0.86	50
Nitrite, mg/L	4500-NO ₂ ⁻ -B	<0.01	0.3
Sulphate, mg/L	4500-SO ₄ ⁻ -E	<0.1	250
Phosphate, mg/L	4500-E	0.08	-
Dissolved oxygen, mg/L	4500-OC	7.5	>2.0
Chemical oxygen demand, mg/L	5220-D	125	80
Biochemical oxygen demand, mg/L	5210-B	81	30
Iron (total), mg/L	3500-B	0.14	10
Lead, mg/L	3500 -Pb-B	<0.001	<1.0
Copper, mg/L	3500 -Cu-B	<0.001	<1.0
Manganese, mg/L	3500 -Mn-B	<0.001	0.10
Cadmium, mg/L	3500 -Cd-B	<0.001	<1.0
Nickel, mg/L	3500 -Ni-B	<0.001	<1.0
Cobalt, mg/L	3500 -Co-B	<0.001	<1.0
Arsenic, mg/L	3500 -As-B	<0.001	<1.0
Oil & grease, mg/L	5520-B	<0.1	10
Total Hydrocarbon, mg/L	6200-C	<0.01	<0.01
Total coliform count, MPN/100 mL	9225-D	36	10 ²
Faecal coliform (E.coli), CFU/100mL	9222-D	0	-
Total plate count, CFU/mL	9215-B	1.23 x 10 ³	10 ⁴

Source: Environmental Laboratories Limited, IPAN:00155; Laboratory Analysis Result (EAuR 2024)

Table 4.6: Laboratory Analysis Result of Effluent Samples

PARAMETER/UNIT	METHOD APHA, 2022	OKM _{RER}	OKM _{RET}	FMEnv/ NESREA Limit (Land Application)
Appearance	Visual	Light brown with particles		
Odour	Sensory	Objectionable		-
pH @ 25°C	4500-HB	6.70	6.79	6 – 9/5.5 - 9
Temperature, °C	2550B	30.0	30.0	-
Conductivity, µS/cm	2510-B	440	768	-
Colour, Pt-Co (apparent)	2120-C	160	350	-
Turbidity, NTU	2130-B	38	95	-
Total dissolved solids, mg/L	2540-D	220	384	2000/2100
Total suspended solids, mg/L	2540-C	30	90	25/30
Total solids, mg/L	2540B	250	474	-
Total Hardness, mg/L	2340-C	20	28	-
Total Alkalinity, mg/L	2320-B	156	140	-
Total acidity, mg/L	2310-B	120	200	-
Calcium, mg/L as Ca	3500-B	1.6	9.6	-
Magnesium, mg/L Mg	3500-B	<0.01	0.97	-
Chloride mg/L	4500-B	8	6	600/600
Nitrate, mg/L	4500-NO ₃ ⁻ -E	1.22	0.87	-
Nitrite, mg/L	4500-NO ₂ ⁻ -B	0.35	0.04	-
Sulphate, mg/L	4500-SO ₄ -E	20.0	10.0	1000/1000
Phosphate, mg/L	4500-E	1.84	0.90	10/-
Iron (total), mg/L	3500-B	0.18	0.13	-
Lead, mg/L	3500-Pb-B	<0.001	<0.001	-
Copper, mg/L	3500-Cu-B	<0.001	<0.001	-
Manganese, mg/L	3500-Mn-B	<0.001	<0.001	-
Cadmium, mg/L	3500 -Cd-B	<0.001	<0.001	-
Nickel, mg/L	3500-Ni-B	<0.001	<0.001	-
Cobalt, mg/L	3500 -Co-B	<0.001	<0.001	-
Arsenic, mg/L	3500-As-B	<0.001	<0.001	-
Oil & grease, mg/L	5520-B	4	<1	20/30
Total Hydrocarbon, mg/L	6200-C	<0.01	<0.01	-
Dissolved oxygen, mg/L	4500-OC	5.0	6.8	-
Chemical oxygen demand, mg/L	5220-D	185	108	-
Biochemical oxygen demand, mg/L	5210-B	120	70	50/500
Total coliform count, MPN/100 mL	9225-D	20	24	500/-
Faecal coliform (E.coli), CFU/mL	9222-D	0	0	-
Total plate count, CFU/mL	9215-B	3.2 x 10 ³	2.56 x 10 ³	-

Source: Environmental Laboratories Limited, IPAN:00155; Laboratory Analysis Result (EAuR 2024)

4.5 Impact Analysis of Air & Water investigations

4.5.1 Noise Impact Evaluation

Noise cannot be exempted in facilities; however, it can be reasonably managed and abated in accordance with regulations. At Okomu OPC Plc - Rubber Estate, twelve (12) locations were taken for noise measurement, and eleven (11) locations were within the 85dB (A) 8 hours factory area exposure limit of National Environmental Standards and Regulations Enforcement Agency (NESREA). Observed critical area of noise pollution was abated using appropriate Personal Protective Equipment (PPE).

Noise is considered as a form of pollution when its sound intensity is significantly high, or higher than stipulated regulatory limits. Sound intensities are measured in decibels (dB). For example, the intensity at the threshold of hearing is 0 dB, the intensity of whispering is typically about 10dB, and the intensity of rustling leaves reaches almost 20dB. Sound intensities are arranged on a logarithmic scale, which means that an increase of 10dB corresponds to an increase in intensity by a factor of 10. Thus, rustling leaves are about 10 times louder than whispering.

Continuous exposure to noise pollution can cause hearing loss, stress, high blood pressure, sleep loss, distraction, and lost productivity. Solutions to noise pollution include adding insulation and soundproofing to doors, walls, and ceilings; using ear protection, particularly in industrial working areas; planting vegetation to absorb and screen out noise pollution; and zoning urban areas to maintain separation between residential areas and zones of excessive noise.

In the event of any critical noise impact, workers and staff within this area are expected to make use of earmuffs during operational hours.

4.5.2 Air Quality Evaluation

Air quality assessment is crucial in all facilities. It is important that air quality be closely monitored at Estate to meet regulatory standards. One of the greatest challenges caused by air pollution is climate change resulting in global warming which is an increase in the earth's temperatures due to the build-up of certain atmospheric gases such as carbon dioxide, methane, water vapor etc.

There was no major air pollutant concern in Rubber Estate except Suspended Particulate Matter (SPM) which exceeded its 250 $\mu\text{g}/\text{m}^3$ NESREA Limit at the Rubber quarters.

4.5.3 Water Quality Evaluation

For the groundwater samples, laboratory results revealed that the pH of the samples ranges from 4.40 – 4.81. All samples pH were slightly acidic which was below the limit (6.5 – 8.5).

Surface water samples laboratory results revealed that the pH of the samples ranges from 5.02 – 5.81. All samples pH were slightly acidic which was below the limit (6.5 – 8.5) while other parameters were within their respective limits.

Monitoring well sample laboratory result revealed that the pH (7.17) was within the limit (6.5 – 8.5), appearance was colorless with tiny particles and odor unobjectionable. Turbidity, COD and BOD fell within their respective limits.

Evaluation of the Performance of the Effluent Lagoon

Water Treatment would be evaluated for possible operational improvement. As part of Good Manufacturing Practice (GMP), the company has an effluent serial pond to treat the raw effluent to desired quality characteristics prior to discharge and reuse on the plantation.

In evaluating the performance of the effluent pond, data from six critical effluent parameters namely: pH, Total Dissolved Solids (TDS), Chloride (Cl), Sulphate (SO₄), Chemical Oxygen Demand (COD) and Biochemical Oxygen Demand (BOD) were obtained to determine operational efficiency.

$$\text{Actual Removal (\%)} = \frac{(\text{Raw water load} - \text{Treated water load}) \times 100}{\text{Raw water load}}$$

Raw water load

Table 4.7: Summary of Data Showing Operational Efficiencies of the Rubber Effluent Pond

Parameters	Raw Water (mg/l)	Treated Water (mg/l)	Removal %	NESREA Limit (Land Application)	Remark
pH	6.70	6.79	Adjusted and within the limit	5.5 – 9	Very Good
Total Dissolved Solids	220	384	74.55	2,100	Very Good
Chloride (Cl)	8	6	25	600	Very Good
Sulphate (SO ₄)	20	10	50	1000	Very Good
Chemical oxygen demand, mg/L	185	108	41.62	Not specified	Very Good
Biochemical oxygen demand, mg/L	120	70	41.67	500	Very Good

The effluent pond removal efficiencies in Table 4.7 showed a linear progressive performance and most of the results were within acceptable limits.

4.6 Comparison of the previous and current result

The environmental indices compared in this audit are the results gotten from the previous report (2020) and the result gotten in this year (2024). The gaseous emissions, noise levels as well as water quality (groundwater and effluent) were all compared.

Table 4.8: Comparison of Noise Level Measurement for 2020 and 2024

S/N	Location	Noise Value dB(A)	
		2020	2024
1	Rubber factory hall	70.3	82.9
2	Slab Cutter	68.4	85.0
3	Pre-breaker	69.3	86.5
4	Pelletizer	67.6	81.4
5	Dryer	77.6	84.8
6	Bailing Section	70.4	80.5
7	Boiler	NA	71.6
8	Workshop	NA	57.1
9	Admin office	NA	49.7
10	Rubber Factory Office Maintenance	NA	74.8
11	Rubber Quarters	NA	71.0
12	Rubber factory powerhouse	NA	70.3
NESREA 8hr. Exposure Limit Residential/Factory Area		85 dB	

Source: Okomu OPC Plc – Main Estate EAuR 2020 and 2024

Discussion

The previous and current results of the noise level at the Rubber Estate showed difference in values, most locations within the facility recorded higher noise level in 2024 compared to the previous audit (2020). However, all the sections were within the NESREA Limit of 85 dB(A) for 8 Hours factory area exposure except at the pre-breaker section of the factory.

Table 4.9: Comparison of Gaseous Parameter Measurement for 2020 and 2024

S/N	SECTIONS	MEASURED PARAMETERS											
		SPM ($\mu\text{g}/\text{m}^3$)		CO (ppm)		CO ₂ (ppm)		NO ₂ (ppm)		SO ₂ (ppm)		TVOC (mg/m^3)	
		2020	2024	2020	2024	2020	2024	2020	2024	2020	2024	2020	2024
1	Rubber Factory Hall	150	247	<1.0	1	380	407	<0.01	<0.01	<0.01	<0.01	<0.01	0.010
2	Rubber Quarters	NA	351	NA	1	NA	413	NA	<0.01	NA	<0.01	NA	0.014
3	Rubber factory powerhouse	NA	184	NA	1	NA	446	NA	<0.01	NA	<0.01	NA	0.006
4	IITA	NA	210	NA	<1	NA	425	NA	<0.01	NA	<0.01	NA	0.015
National Environmental (Air Quality Control) regulation, S.I. 64 of 2014, Schedule V(30min Exposure)		250		-		-		0.20		0.18		-	

Source: Okomu OPC Plc – Rubber Estate EAuR, 2020 and 2024

Discussion

The table above shows the comparison of the previous audit (2020) and the current audit (2024) result of the gaseous emission. From Table 4.9, it was observed that the results were within the regulatory limit for both the previous audit and current audit except the Suspended Particulate Matter (SPM) that exceeded the limit at the rubber quarters as highlighted.

Table 4.10: Comparison of Groundwater Laboratory Analytical Result 2020 and 2024

Parameter/Unit	Method APHA 2022	OKM _{ITA}		OKM _{RQ}		NIS554: 2015
		2020	2024	2020	2024	
Appearance	Visual	Colourless with Particles	Clear and colourless	Colourless with Particles	Clear and colourless	Clear and Colourless
pH @ 25.0°C	4500-HB	5.78	4.40	6.21	4.40	6.5 – 8.5
Temperature, °C	2550 -B	26.8	28.7	29.8	28.7	Ambient
Conductivity, µS/cm	2500-B	24.9	24	18.49	24	1000
Total Dissolved solids, mg/L	2120-C	12.3	12	9.24	12	500
Total Suspended Solids, mg/L	2130-B	5	3	1	3	-
Total Solids, mg/L	2540-D	17.3	15	10.2	15	-
Colour, Pt-Co	2540-C	1	5.0	3	5.0	15
Turbidity, NTU	2540B	0.2	1.25	0.2	1.25	5
Total Hardness, mg/L	2340-C	7.4	3	4	3	150
Total Alkalinity, mg/L	2320-B	20	4	20	4	-
Total acidity, mg/L	2310-B	20	60	40	60	-
Calcium, mg/L	3500-B	1.6	1.2	1	1.2	-
Magnesium, mg/L	3500-B	0.8	<0.01	0.37	<0.01	20
Chloride, mg/L	4500-B	1.8	6.0	1.6	6.0	250
Nitrate, mg/L	4500-NO ₃ -E	0.1	<0.01	<0.1	<0.01	50
Nitrite, mg/L	4500-NO ₂ -B	<0.01	<0.01	<0.01	<0.01	0.2
Sulphate, mg/L	4500-SO ₄ -E	1.5	<0.1	1.4	<0.1	100
Phosphate, mg/L	4500-E	<0.01	<0.01	0.06	<0.01	-
Iron (total), mg/L	3500-B	<0.01	<0.01	0.02	<0.01	0.3
Fluoride, mg/L	4500-F ⁻ C	<0.1	<0.1	<0.1	<0.1	1.5
Lead, mg/L	3500 -Pb-B	<0.001	<0.001	<0.001	<0.001	0.01
Arsenic, mg/L	3500 -As-B	<0.001	<0.001	<0.001	<0.001	0.01
Manganese, mg/L	3500 -Mn-B	<0.001	<0.001	<0.001	<0.001	0.2
Copper, mg/L	3500 -Cu-B	<0.001	<0.001	<0.001	<0.001	1.0
Cadmium, mg/L	3500 -Cd-B	<0.001	<0.001	<0.001	<0.001	0.03
Hydrogen Sulphide, mg/L	4500-S ²⁻ H	<0.01	<0.01	<0.01	<0.01	0.05
Total coliform count, CFU/100 mL	9225-D	0	0	0	0	10
Faecal coliform, E.coli),	9222-D	0	0	0	0	0
Salmonella/Shigella sp.,	9260-E	0	0	0	0	0
Staphylococcus sp. ,	AOAC 995.12	0	0	13	0	0
Pseudomonas aureus,	9213-E	0	0	0	0	0
Total plate count,	9215-B	21	5	32	5	10²

Source: Okomu OPC Plc – Main Estate EAuR, 2020 and 2024

Discussion

The previous and current results of the groundwater quality at Okomu OPC Plc – Rubber Estate showed difference in values, some parameter recorded higher values in the current audit (2024) compared to the previous audit (2020) and vice versa. Values obtained during the previous audit (2020) and the current audit (2024) were in conformity to the stipulated limit of NIS 554: 2015 for drinking water except pH which was (slightly acidic) below the limit in all locations.

Table 4.11: Part Laboratory Result of Critical Effluent Parameters Compared

Quality Parameter	Treated Effluent (2020 Audit)	Treated Effluent (2024 Audit)	NESREA Limits for Land Application
pH	6.78	6.79	5.5-9
Total Dissolved Solids (mg/l)	853	384	2100
Biochemical Oxygen Demand (BOD) (mg/l)	75	70	500
Chemical Oxygen Demand (COD) (mg/l)	96	108	-
Oil and Grease (mg/l)	2.5	<1	30
Chloride (mg/l)	90	6	600
Sulphate (mg/l)	8	10	1000
Total Coliform Count (MNL/ml)	4	24	Not Specified

Source: Okomu OPC Plc – Main Estate EAuR, 2020 and 2024

Discussion

The previous and current results of the critical effluent parameters at Okomu OPC Plc – Rubber Estate showed difference in values, most parameter recorded improvement in values such as TDS, BOD, Chloride and oil/grease. Values obtained during the previous audit (2020) and the current audit (2024) were in conformity to the stipulated NESREA limits for land applications.

4.7 Identification, Qualification and Characterization of Wastes

There are detailed and well-articulated waste management plans to cover description of activities and waste handling by the company. More so, the company's waste management practices were observed during this audit and its present environmental management system (EMS) was ascertained.

4.7.1 Waste Classification

The wide range of waste generated on the estate is classified into solid waste, liquid waste and gaseous emissions.

4.7.2 Waste Generation and Sources

The largest amount of solid waste is generated from the plantation field which is mostly organic in nature, but the residential area generates the liquid waste, while the bulk of the gaseous emission will come from the rubber factory, powerhouse and effluent pond. The waste profile is presented in Table 4.12.

4.7.3 Solid Waste Handling

Storage: At all points of waste generation, color coded waste bins are provided for the immediate storage of solid waste. Sorting and segregation of solid waste start from the point of generation.

Collection and Transfer: Waste collection and transfer include the provision of a truck to collect and transport the collected waste to the solid waste dumpsite. The company has a valid permit from the Edo State Ministry of Environment and Sustainability to operate the solid waste dumpsite.

Disposal: The solid waste collected is transported and disposed of at the approved solid waste dumpsite.

4.7.4 Liquid Waste Handling

Wastewater: Wastewater (domestic) is channeled into soak-away pits of varying dimensions attached to every building. The dimension of the soak-away depends on the size of the building. Process wastewater (effluent) is channeled into the effluent pond for aerobic and anaerobic treatment before been further used on the plantation.

Storm water: Rainstorm water is collected in channels and led into natural drainage lines and vegetation.



Plate 4.9: Color Coded Bins and Effluent Serial Pond at the Rubber Estate

Table 4.12: Waste Profile of Okomu OPC Plc – Rubber Estate

Project Phase	Waste Characterization		
	Solid	Liquid	Gaseous
Land Preparation	• Soil and vegetation • Shrubs • Food Waste • Spoilt farm equipment • Organic materials	• Engine oil • Spent oil	• Fugitive Dust • Suspended Particulate • Carbon dioxide • Carbon monoxide • Greenhouse Gases
Planting	• Dust • Polythene bags • Food Waste • Paper	• Spent Oil	• Fugitive Dust • Suspended Particulate • Carbon dioxide • Carbon monoxide • Greenhouse Gases
Field Maintenance	• Dust • Agrochemical containers • Fertilizer bags • Used drums and buckets	• Wastewater • Spent Oil	• Fugitive Dust • Suspended Particulate • Carbon dioxide • Carbon monoxide
Harvesting	• Papers/plastics/glass • Scrap office equipment • Spout • Used drums and buckets	• Wastewater • Spent Oil	• Carbon dioxide • Carbon monoxide • Fumes
Offices	• Papers • Hardware and scraps • Plastics • Metals	• Wastewater	• Carbon dioxide
Stores	• Papers, • Plastics • Nylon • Wood • Hand gloves & Nose masks	• Wastewater	• Carbon dioxide • Chemical fumes • Fumes/Vapour
Powerhouse	• Plastics • Empty cans • Electric cables	• Wastewater • Spilled Oil • Spent Oil	• Suspended Particulate • Carbon dioxide • Carbon monoxide • Greenhouse Gases

Source: HSE Department, OOPC Plc (2024)

4.7.5 Waste Re-use/Recycling

As much as possible, waste is minimized and a place is designated for keeping all reusable/recyclable waste such as scrap metals, while essentially organic waste is recycled in the plantation field and spent oil sold to accredited vendors for reuse/recycling.

4.7.6 Waste Manifest and Tracking

A manifest system has been established. Records of waste generated and disposed is kept.

4.7.7 Waste Treatment

Waste treatment on the estate is as presented in Table 4.13 below:

Table 4.13: Okomu OPC Plc - Rubber Estate Waste Treatment System

Types of Waste	Management System
Domestic Waste	Composting at the Approved Solid Waste Dumpsite within the estate
Medical Waste	Incinerated in the Boiler
E-waste	Evacuated by selling to accredited vendors in the state
Hazardous waste mainly empty agrochemical containers	Evacuated by agrochemical suppliers as part of the contract agreement
Batteries	Sold to accredited vendors
Metal Scraps	Sold to accredited vendors
Spent Oil	Sold to accredited vendors

4.8 Life Cycle Analysis

Life cycle analysis (LCA) is a method used to evaluate the environmental impact of a product through its life cycle encompassing extraction and processing of the raw materials, manufacturing, distribution, use, recycling, and final disposal.

Since a comprehensive analysis is impossible, we decided, explicitly or implicitly considered to use the techniques of Life-cycle assessment to assess all environmental impacts associated with all the stages of rubber estate from plantation maintenance through harvesting, rubber processing, waste generation, and disposal or recycling. These techniques help avoid a narrow outlook on environmental concerns by assisting in:

- Compiling an inventory of relevant energy and material inputs and environmental releases.
- Evaluating the potential impacts associated with identified inputs and releases; interpreting the results to help make a more informed decision.

4.9 Material Input, Output and Balance

Table 4.14 contains materials that are used on the plantation estate. The unit of the materials is well inserted. They are merely in liters (Ltrs), kilograms (kgs) and metric tons (MT) such as the output. For understanding, the materials have been entered into columns, from 1 to 5 in addition to the one identified as unit. Column 1 means materials available in the store, column 2 connotes materials required for the year. Column 3 is the material that is being ordered to make up for the required one. The difference between column 2 and 5 is the stock difference (balance- column 4) which was not used on the plantation estate. Column 5 indicates material taken from the store and used on the plantation field. Column 6 is the rubber output.

Table 4.14: Material Balance at Okomu OPC Plc – Rubber Estate

Material	Material Control						
	Unit	(1)	(2)	(3)	(4)	(5)	(6)
		Stock (Current)	Required	Order	Stock Difference (Physical Use- Required)	Physical Use (Stock Current + Order)	Output
Agrochemicals	Liters	0	457	457	0	457	9,096.6 Tons (Dry)
Fertilizer	kg	0	832,940	832,940	0	832,940	
Cup lumps	16,473.10 Tons Processed (Wet)						
AGO	Liters	0	2,812,138.87	2,812,138.87	0	2,812,138.87	
PMS	Liters	0	560,155.12	560,155.12	0	560,155.12	149,744
Lubricants	Liters	0	12,125.00	12,125.00	0	12,125.00	
Rubber Processing Water Usage	m³						182,139.25
Effluent Discharged	m³						182,139.25

Source: HSE Department, OOPC Plc (2024)

CHAPTER FIVE

Impact Evaluation

5.1 Introduction

The primary intention of this Environmental Audit Report is to systematically identify, analyze and evaluate the impacts of the rubber plantation and rubber factory at Okomu OPC Plc – Rubber Estate and develop an environmental action plan to correct the environmental effects of activities of the estate.

In this section of the report, therefore, we present concise information on the current impacts that have been so identified, which have been classified into environmental and social impacts.

This chapter presents an overview of the impact assessment methodology as well as results of impacts identified followed by detailed qualitative and quantitative impact analyses with respect to groundwater, surface water, noise measurements and air quality using national and international acceptable methodology.

5.2 Significant Negative Impacts

In this section, only activity-receptor relationships resulting in impact significance are presented and discussed. In the analysis, the environmental receptors are considered collectively as they relate to facility operations.

5.2.1 Evaluation of Identified Impacts of Plantation Operation

5.2.1.1 Weeding

In mature rubber plantation, unwanted weeds are removed from the ground cover by manual clearing with cutlass. There is then the problem of disposal of removed weeds which are therefore allowed to gradually decay or rot. Many invertebrate faunae may be killed during or after weeding. Weeding removes the cover for wildlife such as amphibians, snakes and small mammals. Plants that have not produced (TBM) and the plant already produced (TM) should be free of weeds such as reed, Mekanina, Eupatorium, etc. so that plants can grow well.

5.2.1.2 Vegetation and Spoil Disposal

Soil accumulated during harrowing and stumping, and felled vegetation will have to be removed and deposited somewhere. Accumulation of soil spoils, if not removed, may alter water drainage pattern and reduce landscape beauty. Disposal of the vegetation and soil spoils will give opportunity for employment in the communities.

5.2.1.3 Ploughing, Grading, and Leveling of Tracks and Roads

There is the possibility of initiation of erosion because the topsoil in the affected areas is loose and coarse-grained.

5.2.1.4 Increased Transportation and use of Heavy Machinery during Land Preparation

Wildlife presence in the affected area may be reduced due to unusual and frequent high-level noise from tractor-drawn ploughs and harrows and chain saws. During the rainy season, access to earth roads/tracks may be rendered inaccessible due to the activity of these vehicles.

5.2.1.5 Herbicides, Fungicides and Insecticides Application.

The estate uses agrochemicals to control weeds and pests. However, the possibility of carriage of residue from the plantation field to any surface water is extremely remote. An Integrated Pest Management system is used i.e Monitoring stage (plots are being visited with list of pests against the threshold) when it reaches its threshold control method such as physical methods (picking, destroying of larvae). At this stage, if the physical method does not work the biological method is used (light trapping) before the use of chemical method if needed. Therefore, chemical method is the last method used when all other method is not working which is most rare.

5.2.1.6 Fertilizer Application

To increase productivity of rubber latex per unit area, fertilizers are applied at various stages. Basic fertilizer is applied at the time of planting, fertilizing program on an ongoing basis in rubber is done with a balanced dose of twice a year.

5.2.1.7 Rubber Effluent Disposal

The discharge of the raw and untreated effluent to the open land area although undesirable, has beneficial impact on the adjoining soils.

a.) Soil Nutrient Enrichment: a recent study has revealed that the levels of both essential macro and micronutrient elements needed for plant growth and development were increased following the open discharge of effluent in the soil. Specifically, there were notable increases in the levels of exchangeable cations of potassium and magnesium, and corresponding elevation in the values of available phosphorus, organic carbon and total nitrogen content of the soils containing POME. Also, the amount of iron, zinc, manganese, and copper increase in these soils. Proper and

effective management of the soil could lead to an increase in crop yield and productivity.

- b.) **Hydrocarbon and Oil/Grease Contaminants:** The increase in the amount of these contaminants in the soil could have adverse effect in the functionality and productivity capacity of the soils. Relatively high levels of THC and Oil/Grease in the soil receiving effluent can reduce the microbial activity of the soil thereby making potentially available nutrients unavailable for plant uptake.

5.2.1.8 Processing of Cup lumps

During tapping and processing of latex grade natural rubber, requires manpower. The processing of cup lumps from the plantation can be regarded as a 6 – stage operation. This consists of bulking, coagulation, size reduction, drying, bailing and packaging/palletizing. The tapping and processing provide employment for workers.

5.2.1.9 Decommissioning and Abandonment

- Permanent and casual workers will be laid off resulting in loss of employment and income, although severance payment will also be made to permanent workers. But this can itself give rise to strained relations between workers/community and the company.
- The plantation will no longer be regularly and properly maintained including no weeding, no pest control, no maintenance of roads and tracks, no processing of rubber lumps. There will be great economic loss for the company and shareholders and the nation. The plantation will become densely populated by weeds, pests and many invertebrates' fauna and small to medium size wildlife.
- The land area might need to be restored back to its original state, and this includes felling the trees as well as planting trees. This will mean a great economic loss for the company in addition to the already incurred losses.
- Removal of equipment and ancillary facilities such as chemicals, ploughs, tractors, harrows, trucks and other farm machinery will generate excessive noise and a potential for accident.
- Return of land area to State Government which can generate conflicts between the affected communities and the local authority.

5.2.3 Significant Impact Producing Activities

The significant impact producing activities (IPAs) are as follow:

- Weeding in young plantation and manual removal of unwanted weeds with cutlass in mature planting.
- Chemical fertilizer applications may affect groundwater as a result of runoffs and leaching.
- Tapping of rubber trees.
- Use of diesel machinery and powered generators for electricity generation.
- Transportation of rubber cup lumps from the fields to the rubber factory for processing.
- Laying off workers/Severance Payment
- Lack of care of the rubber plantation

5.2.4 Cumulative Impacts

Cumulative impacts are changes to the environment that are caused by an activity in combination with other past, present and future human activities. (GSI, 2003). The concept of cumulative effects is an important one. It holds that, while impacts may be small individually, the overall impact of all environmental changes affecting the receptors taken together can be significant. When a resource is nearing its tolerance threshold, a small change can push it over. The objective of the cumulative impact assessment is to identify those environmental and/or socio-economic aspects that may not on their own constitute a significant impact but when combined with impacts from past, present or reasonably foreseeable future activities associated with this and/or other projects, result in a larger and more significant impact[s].

- **Project Specific Cumulative Effects' Assessment**

This section evaluates the cumulative effects of the individual impacts evaluated in the preceding sections.

- **Land Based Traffic**

It is envisioned that land-based traffic will also increase because of the estate operations and activities. Land based traffic is eminent to allow the rubber lumps that are harvested in the plantation to be transported for processing at the factory. However, the operations at the estate have a negligible impact on traffic after considering all measures put in place by the management to mitigate the problem. No additional cumulative transportation impacts have been identified in recent times.

- **Public Services**

There is no impact on public services under the present operations of the estate. The operations and activities of the estate have not introduced any additional long-term population or employment into the area, and thus, have not resulted in any additional demand for police or fire services or the need for new or altered facilities. No damage to roadways has been recorded except which would be considered normal wear and tear and it is basically within the company's land concession. Therefore, the operation of the estate has resulted in negligible impact on public utilities.

- **Employment Opportunities**

There have been some beneficial impacts that are cumulative that are in the employment sector. The plantation estate has employed enormous number of workers – all Nigerian. Positive cumulative social benefits include gainful employment and tax being paid to government coffer.

5.2.5 Known Overall Impacts of Rubber Cultivation and Management

These include:

- Loss of resources of lowland rainforest and land for indigenous people
- Transformation of the forest into a monoculture farm
- Many insects and insect pests flourish in rubber plantation due to absence of natural enemies.
- Loss/disappearance/displacement of many wildlife species.
- Employment and income generation will be enhanced.
- Pollution of the soil and groundwater by pesticides and excessive use of fertilizers.
- Buildup of dry and decaying organic matter under plantation posing a fire hazard.
- Rapid spread of unwanted weeds.

5.3 Public Health Impact (PHI) of Okomu OPC Plc Rubber Estate Operations

The public health impact assessment of the estate is a rapid appraisal of the likely health impacts the estate operation might have on the totality of the environment. The assessment will consist simply of a summary table and a conclusion. The summary table shall list the intermediate factors and their likely impacts with minimal qualification.

5.3.1 Identifying Intermediate Factors that Impact on Health

Many operations that are not intended to affect health directly have indirect effects on health and wellbeing, often these indirect effects have not been recognized. Operation may affect things such as employment, income, air quality or housing, which in turn affect health. These factors which are not health indicators but do influence health are referred to as intermediate factors. (They may also be called determinants of health).

Some of the identified intermediate factors of the estate activities and/or operations are:

- Air Quality
- Water Quality and Hydrology
- Noise and Vibration
- Health and Safety
- Traffic and transport
- Waste Management
- Workers' Welfare
- Social cohesion
- Corporate Image

Table 5.1: Summary of Public Health Impacts of Okomu OPC Plc – Rubber Estate Operations

Intermediate Factor	Affected Group	Health Impact	Mitigation measures put in place
Air quality Dust and gaseous emissions from land preparation and vehicular emission lead to high suspended particulates in the atmosphere.	All	- Allergy - Eye irritation - Nose irritation - Respiratory Tract Infections	- Low-emission/high efficiency engines are used. - Regular maintenance of vehicles to ensure optimal performance - Movement of men and materials are properly coordinated to optimize vehicle use and resultant emissions. - Dust and particulate barriers are used during operation. - No burning on site (i.e. zero burning).
Noise and vibration Noise emissions generated by heavy duty vehicles and workers activities	All	- Hearing impairment, hypertension, annoyance, sleep disturbance of site workers. - Hand-Arm Vibration Syndrome (HAVS)	- Noise attenuation measures such as acoustic mufflers are fixed on large engines and equipment. - Hearing protection is provided and usage enforced for workers on site. - Plantation operations are carried out during daytime only.
Water Quality and Hydrology Increased receiving water body turbidity from runoff and from the plantation.	All	- Illnesses including Typhoid, Cholera, Dysentery, Hepatitis	- Adequate buffer zones between surface water and planting areas have been established. - Re-fueling and maintenance of heavy construction vehicles at the site are done at specified areas and temporary storage of oily waste. - Nutrients (such as fertilizer and soil conditioner) application is minimally done.
Solid Waste - Solid waste constituting an aesthetic nuisance - Sewage nuisance	All	Improper solid waste handling can lead to the following: - Creating conditions favorable to the survival and growth of	Waste is contained and removed regularly.

Table 5.1: Summary of Public Health Impacts of Okomu OPC Plc – Rubber Estate Operations

Intermediate Factor	Affected Group	Health Impact	Mitigation measures put in place
		microbial pathogens - Causing infectious and chronic diseases especially the waste workers.	
Hostility Land acquisition and take-over conflicts between the communities and the company.	Workers and communities	- Youth restiveness - Persistence conflicts between community and company - Hostages	- Grievance and conflict resolution mechanism has been instituted. - Company employs as much local labour as possible.
Waste Management - Accumulated waste could lead to contamination of soil/groundwater and breeding grounds for vectors and rodents	All	Health hazards associated with poor waste management include: - Skin and blood infections result from direct contact with waste. - Different diseases such as intestinal infections that result from poor waste management. - Genetic mutilation - Reduction in aquatic food supply - Disruption of food chain	- Okomu OPC Plc has a waste management plan and waste storage bins at designated areas for collection of waste to solid waste dumpsite.
Sewage - Faecal aesthetic issues for the project area. - Spillage of septic liquor	Workers	- Cholera - Dysentery - Infectious and chronic diseases	- Onsite toilets are made available for use
Socio-economics - Promiscuity - Sexual harassment - Youth Militancy - Unemployment - Grievances	All	- Sexually transmitted diseases (STDs) - HIV/AIDS - Population explosion	Okomu OPC Plc has been operating cordially with the host communities through regular engagement with the communities.

Table 5.1: Summary of Public Health Impacts of Okomu OPC Plc – Rubber Estate Operations

Intermediate Factor	Affected Group	Health Impact	Mitigation measures put in place
Workers' Welfare Especially when workers leave the organization and/or layoff.	Workers	- Depression - Hypertension - Workers' restiveness	Okomu OPC Plc always ensures that workers receive their full benefits when leaving the organization.
Corporate Image The negative corporate image arising from day-to-day activities of the organization,	Company/All	- Annoyance - Depression	Okomu OPC Plc always ensures that its day-to-day activities and operations do not portray bad image about the organization to the general public and therefore has been operating according to the best industry standards and practice.

5.3.2 Conclusion

The main negative impacts are health and safety. However, mitigation measures have been put in place for health and safety through the provision of appropriate PPE. Similarly, there is a buffer zone (50-250m) between planting areas and surface water body with minimal application of fertilizer and agrochemicals to avoid eutrophication.

As a result of the above provisions and measures, the net public health impact of the estate operations is positive.

5.4 Socio-economic and Social Impact Analysis

A quick appraisal on socio-economic of the twelve (12) communities, namely; Agbado, Ajebamidele, Awuri, Gbelebu, Inikorogha, Madagbayo, Makilolo, Maroghionba, Mallim, Obagie, Safarogbo and Udo, four (4) camps, namely, Obazuwa, Taye, Thousand Odoola, and Utesi was carried out in December 2020 taking cognizance of the comprehensive Social Impact Analysis (SIA) that was carried out in 2018. It appears that the operations of the company have an overall positive social impact on the host community. However, the company places utmost attention to the interest of the host community in its corporate social responsibility which is based on community requests.

CHAPTER SIX

6.1 Summary of Audit Findings and Recommendation

Focal Area	Audit Area	Indicators	Status	Recommendation for Improvement
1. Environmental Sustainability Planning.	Institutional workplace environment policy	Institutional environmental sustainability policy	Environmental and/or any other policies duly signed by Managing Director are in place	Always operate according to the policies of the company.
	Structures to address environmental issues	Environmental committee in place	Environmental committee is in existence which cut across all department.	No Action Required
	Strategic plan and Service Charter	Commitments	There are many charters developed by Socfin Group (Parent Company) such as Aid Charter.	Develop more charter to include special role for women in Host Community Development Agenda.
	Compliance with the Environmental Impact Assessment and Environmental Audit	Environmental audit reports for existing projects. EIA reports for new projects, Environmental Management Plans (EMPs)	An EIA was conducted for the rubber estate and approval issued by the FMEnv. Environmental Audit Reports (EAur) and Environmental Compliance Monitoring (ECM) reports have been regularly submitted to both Federal Controller's office and Edo State Ministry of Environment and Sustainability in Benin City.	No Action Required
	Housekeeping and Sanitation	Health, Safety and Environment (HSE) department in place	Housekeeping is good at workplaces, but improvement can be done especially at the rubber quarters.	Improve housekeeping and sanitation at the rubber quarters.
2. Pollution Control	Water Pollution & Control Measures	Initiatives to prevent, protect and monitor water sources.	The results of laboratory analysis show the groundwater quality is good and free from pollution at all sources. The values are within national drinking water quality standard for groundwater except pH which was acidic with value ranging from 4.40 to 4.81.	The pH of borehole water should be raised to acceptable standards for drinking water (6.5-8.5) as recommended by WHO/FMEnv. Conduct periodic water quality monitoring on groundwater and surface water within the estate.

Focal Area	Audit Area	Indicators	Status	Recommendation for Improvement
	Waste Management Interventions	Initiatives to segregate, reducing, reusing, and recycling of waste	Most waste generated on the estate is organic in nature which is recycled in the field. More so, sorting is done at the point of waste generation and at the solid waste dumpsite.	Ensure there is access control at the solid waste dumpsite. And waste segregation awareness sustained
		Modes of waste handling (generation, transportation and disposal)	Solid waste generated is collected in colour coded bins and transported by bucket mounted tractor to solid waste dumpsite.	Ensure waste manifest is up to date.
	Air pollution control measures	Initiatives to reduce Air pollution	The ambient air quality was determined in-situ during the audit for critical locations and the results show that the concentrations of gases and particulate matter monitored were within the Limit.	Sustain the quarterly air quality monitoring on the estate.
	Noise pollution control	Initiatives to reduce Noise pollution	Maintenance is regularly done on all the machinery	Carry out a periodic noise measurement on all noise generating equipment before and after maintenance.
3. Climate change	Climate change adaptation and mitigation	Energy saving initiatives	Energy consumption trends were established and target to achieve efficient energy use was set and target achieved but not across board (rubber office).	Provide an effective plan to achieve the set target. Such as developing an Energy Policy, staff education /awareness, use of alternative source of energy. Set a long-term goal with short term monitoring target. For example, OOPC plans to reduce energy consumption by 30% by the year 2030 with at least 7.5% yearly reduction till 2030.
		Rainwater harvesting	Conservation plot and sediment trap pits serve this purpose as a water retention medium	No Action Required
		Measures to control greenhouse gases	The rubber trees and HCV areas serve as carbon sink on the estate considering the vast mass of the estate.	No Action Required

Focal Area	Audit Area	Indicators	Status	Recommendation for Improvement
4. Promoting Environmental protection and conservation through partnerships with stakeholders	Environmental projects and activities undertaken through partnership with stakeholders	Projects and activities undertaken jointly, MoUs Joint management plans	The estate has yet to participate in any environmental project and activities through partnership with any stakeholders except CSR to Host Communities.	It is desirable to develop a MoU with the host communities.
	Corporate social responsibility (CSR) on environment	CSR initiatives in place	CSR is done based on Host Community needs assessment and request where social commitments and obligations to the host communities are done.	This practice should be sustained
	Partnerships with FMEnv on Monitoring and inspections to ensure compliance with environment legislation	Areas of partnerships with FMEnv on Monitoring and inspections to ensure compliance with environment legislation	There is a partnership with NESREA, FMEnv and Edo State Ministry of Environment and Sustainability in environmental compliance monitoring. A quarterly environmental monitoring exercise is carried out and a report submitted to the agencies.	This practice should be sustained
5. Environmental Ecological Enhancement	Wetlands, River banks, lakeshores, and seashore management	Rehabilitation initiatives	No wetland and surface water are planted.	This practice should be sustained.
	Conservation of biological diversity and Environmental significant areas	Conservation initiatives	Conservation Area (959.47 Hectares) has been established within the plantation field. The company security apparatus in conjunction with an HSE officer/Eco-guards designated to protect the conservation areas against internal and external threats.	This practice should be sustained
	Environmental restoration	Degraded lands secured, restored and conserved	No degraded lands on the estate.	No Action Required
6. Training	Workers' Refresher Training	Workers' Competence	The company has established an in-house training structure with documented curriculum that can be	This practice should be sustained.

Focal Area	Audit Area	Indicators	Status	Recommendation for Improvement
			reviewed regularly across most workplaces	
7. Education and Awareness	Behaviour changes towards the environment	Proof of positive behaviour change	Workers are aware of their environmental responsibilities.	Conduct regular training on HSE for workers.
	Participation in environmental events with communities and schools	Evidence of Participation in environmental events	None	Organise annual Health, Safety and Environment (HSE) week or day to create awareness among workers, in addition to programmes done on the world environment day.
	Sensitization of staff and public on Environmental sustainability relevant to the institutional mandate	Sensitized staff on environmental sustainability through Informative, Educative and Communication (IEC) materials	There are many Informative, Educative, and Communication (IEC) Material on site.	Prepare more environmental signage and posters at critical work areas to sensitize workers on environmental protection as a collective responsibility.
	Recognition of environmental champions	Evidence of appreciation of environmental sustainability champions	Co-sponsoring many environmental activities in the state especially the World Environmental Day.	Always partner and associate with bodies concern with environmental related issues such as workshop, symposium and conference.
	Compliance with safety rules within the plantation	Evidence of compliance with safety and traffic laws	The company has speed limit and traffic safety sign	Educate workers on the importance of signage especially the message, interpretation and compliance.

CHAPTER SEVEN

REMARKS AND RECOMMENDATIONS

7.1 Recommendation

This audit was carried out to determine the level of compliance of the company with regulatory standards as well as evaluating existing Environmental Management System in the company. This was done to ensure continuous improvement. The Audit revealed the company's level of compliance, environmental and safety practices; and the management's commitment to implementing sound environmental practices.

In view of the information and observations available in the previous sections of this Environmental Audit Report, it is hereby recommended as follows:

- ❖ The aesthetic and sanitary conditions of the factory were highly commendable and should be sustained, while improvement should be made at the rubber quarters.
- ❖ Create awareness on energy efficient practices such as switching off engines when waiting to load and all electrical appliances including air conditioners when leaving the office and residences.
- ❖ The use of Personal Protective Equipment (PPE) provided for workers was highly commendable and should be sustained.
- ❖ Organize more HSE drills and training for staff on the aspect of health, safety, and environment.
- ❖ Organise the annual HSE Week where lectures would be delivered by external experts on HSE issues.
- ❖ Regular service of production machines, equipment, and generators to reduce potential pollution that may emanate from the machine's emission.
- ❖ OOPC Plc to further improve in her energy consumption by considering switching to cleaner fuel engine such as the use of Biogas for electricity generation.
- ❖ Set target for fuel and lubricant consumption reduction.

- ❖ The effluent treatment system (serial pond) be maintained regularly for improved efficiency such as scooping the bottom layer. In addition, the monitoring well should be continuously sampled and analyzed to detect any possible infiltration into the groundwater system.
- ❖ Monitor on monthly basis the quality of the rubber effluent serial pond.
- ❖ Display documented work procedure for job and task.
- ❖ Display more signages at the rubber factory and maintain faded ones.
- ❖ Forbid workers from taking underage children to help them in plantation work.
- ❖ Ensure functionality and continuous servicing of the installed fire alarm system and other fire-fighting devices.
- ❖ Establish energy conservation policy for all workplace.
- ❖ The use of appropriate PPEs by workers in every section should be enforced and monitored.
- ❖ Display more safety posters in the facility both indoor and outdoor.
- ❖ Install safety signage at the counterweight section of the rubber factory hall.
- ❖ Ensure all walkways/gangways in and out are clearly marked and cleared of obstructions.
- ❖ Initiate renewal of expired permits/licenses.

7.2 Environmental Monitoring Programme

An environmental monitoring programme is required to set out the means to determine whether the project operates in line with the environmental quality standards established by the NESREA. For this project, the monitoring programme covers several parameters including meteorology, ambient air quality, surface water quality, groundwater quality, effluent quality and noise levels. The monitoring programme is scheduled in Table 7.1 below.

Table 7.1: Proposed Schedule of Environmental Monitoring

Parameter	Variables	Period
Meteorology	Rainfall, temperatures and relative humidity, Wind Speed and Wind direction, Sunshine Hours	Daily
Surface water quality	pH, Sediment load, NO ₃ , Heavy metals, Oil and Grease	Quarterly
Groundwater quality	pH, BOD, COD, microbiology	Quarterly
Ambient Air Quality	CO ₂ , CO, NO _x , SO _x , VOC, Particulates	Quarterly
Noise Levels	Noise generating Facilities	Quarterly
Health	Occupational diseases and/or medical statistics	6 Months

7.3 Revised Environmental Action Plans – 2024 (EAPs)

ISSUE/RECOMMENDATION	PRIORITY	FORMER TARGET	REMARKS	
			STATUS	NEW TARGET
Compliance with Legislation and Best Management Practices Submit all records relating to the environment to Regulatory Bodies. Prompt acquisition and renewal of Permits, Certificates, Licenses, etc.	High High	Continuous Continuous	Continuous Continuous	Continuous Continuous
Waste Management System Ensure that there is no mix-up of hazardous and/or empty agrochemical containers with general/domestic Replace all damaged waste storage bins across board. The effluent treatment system (serial pond) be maintained regularly for improved efficiency such as scooping the bottom layer. Conduct in-house monthly monitoring of the rubber effluent critical parameters and maintain records.	High High High High	Continuous Continuous Continuous Continuous	Continuous Continuous Continuous Continuous	Continuous Continuous Continuous Continuous
Housekeeping and Sanitation Eliminate all unauthorized refuse dumps at workplaces and residences. Improve housekeeping at the rubber quarters.	High High	Continuous New	Continuous New	Continuous Immediately

ISSUE/RECOMMENDATION	PRIORITY	FORMER TARGET	REMARKS	
			STATUS	NEW TARGET
Relocate broken down cup lump bucket conveyor within the factory to the workshop.	High	New	Not done	Immediately
Regularly clear drainage at the rubber factory	High	New	Not done	Always
Plantation Management				
Periodically evaluate plantation water consumption rate	High	Periodically	Continuous	Periodically
Health:				
Intensify Health Education Program	High	Continuous	Continuous	Always
Conduct periodic medical examination for all Pesticide Handlers	High			Every 6 Months
Provide bigger changing room for workers, detached from the toilets at the rubber factory	High	New	New	December 2025
Pollution:				
Conduct routine monitoring of water sources to sustain quality of drinking water	High	Always	Continuous	Every Quarter
Conduct routine monitoring of noise levels and air quality at critical workplaces	High	Always	Continuous	Every Quarter
Regular service of production machines, equipment, and generators to reduce potential pollution that may emanate from the machine's emission.	High	Always	Continuous	Continuous
Wastewater Treatment				
Monitor on monthly basis the effluent quality from the effluent treatment pond and maintain records.	High	Monthly		Monthly
Energy:				
Establish energy conservation policy for all workplace	Medium	December 2021	Not Done	Third Quarter 2025

ISSUE/RECOMMENDATION	PRIORITY	FORMER TARGET	REMARKS	
			STATUS	NEW TARGET
Workplace Safety: Promote safety education in enforcing the use of PPE Remark walkways and gangways within the factory.	High High	Always Always	Continuous Continuous	Always June 2025
Training Communication and Reporting: Establish and document curriculum for formal in-house training Run induction courses to cover General Safety, First Aid and Company Policies	High Medium	July 2022 Always	Done Continuous	Always Always
Community Development Ensure records are maintained on all communications with the public, especially local communities.	High	Always	Continuous	Always
Industrial Labour Relation Forbid workers from taking underage children to help them in plantation work.	High	Continuous	Continuous	Continuous
Signage Produce more safety warnings at and along effluent pond. Constantly maintain all the muster points and should be devoid of any obstruction Place a precautionary signage at the counterweight section of the rubber factory. Display more signages at the factory hall.	High Medium Medium	July 2021 Continuous Continuous	Continuous Continuous	June 2025 Continuously Continuous

References

1. IFC – Draft EHS General Guidelines for Perennial Crop Production (March 2016)
2. World Bank Environmental Health and Safety Guidelines (Pesticide Handling and Application, and Occupational Health and Safety).
3. Federal Ministry of Environment (Regulatory Checklist for Ministerial Environmental Compliance Monitoring and Enforcement).
4. Federal Ministry of Environment List of Banned Pesticides and Chemicals
5. National Guidelines for Environmental Audit Report (EAuR) in Nigeria.
6. Environmental Compliance Monitoring (ECM) Report of 2024
7. Okomu OPC Plc – Extension One Estate Environmental Audit Report (2021).
8. NESREA – National Guideline for Environmental Audit in Nigeria, revised 2024.

APPENDIX A – LABORATORY RESULT OF AIR QUALITY AND NOISE LEVEL RESULTS



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Analyst's Certificate

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No: 2411131

Name of Sample	MAIN ESTATE Air quality	Project: 1
Client	Foremost Development Services Limited	
	For: OKOMU Oil Palm Company PLC, Benin City, Edo State.	
Sampling Date	13 November 2024	Quarter: 4 th

Methodology:

Sampling and measurement of ambient air quality and noise level were carried out using portable analyzers. Gaseous components of the air were monitored using combination of gas monitors (Industrial Scientific iTX and 7-in-1 air quality monitor) to measure the concentration of carbon monoxide (CO), Sulphur dioxide (SO₂), hydrogen sulphide (H₂S), nitrogen dioxide (NO₂), Total volatile organic compounds and carbon dioxide (CO₂). Handheld Aerosol Monitor PPM1055 was used for the measurement of suspended particulate matter while noise level was determined using digital sound level meter within and around the facility.

Result

The result of on-site measurements carried out on the ambient air at the facility is presented in Table 1. Table 2 contains the result of noise level assessment at critical locations.

Comments

Based on the result of air and noise quality measurements conducted around the facility,

- The concentration of gases fell within the Standard at all the locations;
- The particulate matter exceeded the limit at rubber quarters;
- The noise level fell within the limit at most of the locations.

I, the undersigned Public Analyst, OYEDIRAN, L.O. (IPAN NO. 00155®), make this certification, as witnessed my hand this 14th day of November 2024.



Table 1: Result of air quality measurement and noise level within the Rubber Estate.

Location	IITA	Rubber Factory Hall	Rubber Quarters	Rubber Powerhouse	FMEnv. Limit
Coordinate	N06°24'84.7"	N06°21'25.4"	N06°21' 30.0"	N06°21' 23.8"	
	E005°12'848"	E005°11'04.6"	E005°11'18.0"	E005°11'07.3"	
Elevation (m)				55	
Noise, dB(A)	54.7	52.3	71.0	70.3	90
Humidity (%)	51.09	54.46	69.49	65.75	250
Temperature (°C)	20.01	20.49	24.82	23.85	Ambient
SPM (µg/m³)	210	247	351	184	Ambient
Carbon monoxide, ppm	<1	1	1	1	10-20
Carbon dioxide, ppm	425	407	413	446	-
Hydrogen sulphide, ppm	<0.1	<0.1	<0.1	<0.1	-
Hydrocarbon, %	<0.1	<0.1	<0.1	<0.1	-
Oxygen, %	20.9	20.9	20.9	20.9	21.0
Sulphur dioxide, ppm	<0.01	<0.01	<0.01	<0.01	0.01
Nitrogen dioxide, ppm	<0.01	<0.01	<0.01	<0.01	0.04 - 0.06
TVOC, mg/m³	0.015	0.010	0.014	0.006	

TVOC = Total Volatile organic compounds; SPM = Suspended particulate matter.



Table 2: Result of noise quality assessment at the Main Estate

S/N	RUBBER FACTORY	Noise Level, dB(A)
i.	Rubber factory hall	82.9
ii.	Slab Cutter	85.0
iii.	Pre-breaker	86.5
iv.	Pelletizer	81.4
v.	Dryer	84.8
vi.	Bailing Section	80.5
vii.	Boiler	71.6
viii.	Workshop	57.1
ix.	Admin office	49.7
x.	Rubber Factory Office Maintenance	74.8
NESREA Standard (8-hour)		85



APPENDIX B – LABORATORY RESULT OF EFFLUENT/MONITORING
WELL SAMPLE



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No:241m928

Name of Sample:	Effluent samples	Project 1: Rubber Estate
Client:	Foremost Development Services Limited For: OKOMU Nig. Plc Benin City, Edo State.	
Submission Date:	19 November, 2024	Lab No.: EL/W/2411/38144 – 38146, 38148

Methodology

Samples of effluents collected from the site were analyzed using Standard methods for the examination of water and wastewater (APHA 24th Edition, 2022). The parameters examined are as contained in the result Table.

Sampling Locations

S/N	Sample ID	Sample description	Coordinate	
1.	OKM _{RER}	Rubber Effluent – Raw	N06°21'22.9"	E005°11'04.3"
2.	OKM _{RET}	Rubber Effluent – Treated	N06°21'21.4"	E005°11'09.7"

Result of Analysis

The result of analysis conducted on the sample is presented in Table 1.

Comments:

The results of analyses conducted on the samples show that:

- The parameters conform to their respective limits.

I, the undersigned Public Analyst, OYEDIRAN, L.O. (IPAN NO. 00155®), make this certification, as witnessed my hand this 27th day of November 2024.

Table 1: Result of Analysis of effluent samples

PARAMETER/UNIT	METHOD APHA, 2022	OKM _{RER}	OKM _{RET}	FME _{Env} / NESREA Limit (Land Application)
Appearance	Visual	Light brown with particles		
Odour	Sensory			-
pH @ 25°C	4500-HB	6.70	6.79	6 – 9/5.5 - 9
Temperature, °C	2550B	30.0	30.0	-
Conductivity, µS/cm	2510-B	440	768	-
Colour, Pt-Co (apparent)	2120-C	160	350	-
Turbidity, NTU	2130-B	38	95	-
Total dissolved solids, mg/L	2540-D	220	384	2000/2100
Total suspended solids, mg/L	2540-C	30	90	-
Total solids, mg/L	2540B	250	474	-
Total Hardness, mg/L	2340-C	20	28	-
Total Alkalinity, mg/L	2320-B	156	140	-
Total acidity, mg/L	2310-B	120	200	-
Calcium, mg/L as Ca	3500-B	1.6	9.6	-
Magnesium, mg/L Mg	3500-B	<0.01	0.97	-
Chloride mg/L	4500-B	8	6	600/600
Nitrate, mg/L	4500-NO ₃ -E	1.22	0.87	-
Nitrite, mg/L	4500-NO ₂ -B	0.35	0.04	-
Sulphate, mg/L	4500-SO ₄ -E	20.0	10.0	1000/1000
Phosphate, mg/L	4500-E	1.84	0.90	10/-
Iron (total), mg/L	3500-B	0.18	0.13	-
Lead, mg/L	3500-Pb-B	<0.001	<0.001	-
Copper, mg/L	3500-Cu-B	<0.001	<0.001	-
Manganese, mg/L	3500-Mn-B	<0.001	<0.001	-
Cadmium, mg/L	3500 -Cd-B	<0.001	<0.001	-
Nickel, mg/L	3500-Ni-B	<0.001	<0.001	-
Cobalt, mg/L	3500 -Co-B	<0.001	<0.001	-
Arsenic, mg/L	3500-As-B	<0.001	<0.001	-
Oil & grease, mg/L	5520-B	4	<1	20/30
Total Hydrocarbon, mg/L	6200-C	<0.01	<0.01	-
Dissolved oxygen, mg/L	4500-OC	5.0	6.8	-
Chemical oxygen demand, mg/L	5220-D	185	108	-
Biochemical oxygen demand, mg/L	5210-B	120	70	50/500
Total coliform count, MPN/100 mL	9225-D	20	24	500/-
Faecal coliform (E.coli), CFU/mL	9222-D	0	0	-
Total plate count, CFU/mL	9215-B	3.2 x 10 ³	2.56 x 10 ³	-





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No: 2411928

Name of Sample:	Effluent Monitoring well	Project:	Rubber Estate
Client:	Foremost Development Services Limited, Akute, Lagos state.		
	For: OKOMU Oil Palm Company PLC, Benin City, Edo State.		
Submission Date:	19 November, 2024	Lab No.:	EL/W/2411/38143, 38147

Methodology:

Samples of water collected from the monitoring wells were analyzed using Standard methods for the examination of water and wastewater (APHA, 24th Edition 2022). The parameters examined are as contained in the result Table.

Sampling Location

S/N	Code	Description of Location	Coordinates	
			N	E
1	OKM _{REMW}	Rubber Effluent Monitoring Well	N06°21.377'	E005°11.298'

Result of Analysis

The result of analysis conducted on the samples is presented in Table 1.

Comment

Based on the results of analyses conducted on the samples, the colour of the Effluent Monitoring Well differ from the Standard. All other parameters are, however, within their respective limits.

I, the undersigned Public Analyst, OYEDIRAN, L.O. (IPAN NO. 00155®), make this certification, as witnessed my hand this 27th day of November, 2024.

Table 1: Result of Analysis of water from the monitoring wells

PARAMETER/UNIT	METHOD APHA 2022	OKM _{REM} W	FMEnv Limit
Appearance	Visual	Colourless with tiny Particles	Clear & colourless
Odour	Sensory	Unobjectionable	Unobjectionable
pH @ 25°C	4500-HB	7.17	6-9
Temperature, °C	2550B	30.5	Ambient
Conductivity, µS/cm	2510-B	86	2000
Total dissolved solids, mg/L	2540-D	43	1000
Colour, Pt-Co	2120-C	8.0	7.0
Turbidity, NTU	2130-B	<1	10
Total Suspended Solids, mg/L	2540-C	1	30
Total solids, mg/L	2540B	44	-
Total Hardness, mg/L	2340-C	8	-
Total Alkalinity, mg/L	2320-B	24	-
Total acidity, mg/L	2310-B	50	-
Calcium, mg/L as Ca	3500-B	3.2	-
Magnesium, mg/L as Mg	3500-B	<0.01	-
Chloride, mg/L	4500-B	8.0	200
Nitrate, mg/L	4500-NO ₃ -E	0.86	50
Nitrite, mg/L	4500-NO ₂ -B	<0.01	0.3
Sulphate, mg/L	4500-SO ₄ -E	<0.1	250
Phosphate, mg/L	4500-E	0.08	-
Dissolved oxygen, mg/L	4500-OC	7.5	>2.0
Chemical oxygen demand, mg/L	5220-D	125	80
Biochemical oxygen demand, mg/L	5210-B	81	30
Iron (total), mg/L	3500-B	0.14	10
Lead, mg/L	3500 -Pb-B	<0.001	<1.0
Copper, mg/L	3500 -Cu-B	<0.001	<1.0
Manganese, mg/L	3500 -Mn-B	<0.001	0.10
Cadmium, mg/L	3500 -Cd-B	<0.001	<1.0
Nickel, mg/L	3500 -Ni-B	<0.001	<1.0
Cobalt, mg/L	3500 -Co-B	<0.001	<1.0
Arsenic, mg/L	3500 -As-B	<0.001	<1.0
Oil & grease, mg/L	5520-B	<0.1	10
Total Hydrocarbon, mg/L	6200-C	<0.01	<0.01
Total coliform count, MPN/100 mL	9225-D	36	10 ²
Faecal coliform (E.coli), CFU/100mL	9222-D	0	-
Total plate count, CFU/mL	9215-B	1.23 x 10 ³	10 ⁴



**APPENDIX C – EMERGENCY RESPONSE PLAN AND FEW POLICIES OF THE
COMPANY**

	Document title	Revision: 2
	OKOMU OIL PALM COMPANY PLC	Date: 21/08/19
	EMERGENCY RESPONSE/CONTINGENCY PLAN	Page 1 of 1

EMERGENCY RESPONSE/CONTINGENCY PLAN FOR FIRE, SECURITY THREATS, MEDICAL, CHEMICAL SPILL, AND ELECTRIC SHOCK

1.0 Purpose/Scope

This procedure defines the framework for preparing for and responding to emergencies involving fire, security threats, chemical spill, medical emergency and electric shock.

2.0 Workplace/Activities Affected

All workplace and departments

3.0 Definitions

- 3.1 Fire and Chemical spill are defined as materials which when released into the environment, or because of their properties and the way they are used, could cause harm to workers, from fires and explosions. Dangerous substances include petrol (PMS), liquefied natural gas (LPG), paints, chemicals and solvents.
- 3.2 Security threat is defined as any incident or confrontation that jeopardizes property and lives, which includes, but not limited to: militants and civil unrest.
- 3.3 Emergency Response-actions taken by personnel within the work area in an effort to mitigate the impact of an incident on the public and the environment.
- 3.4 TOC-Tactical Operations Centre; a communication Centre that coordinate all crisis activities.
- 3.5 Electric shock is defined as a sudden discharge of electricity through a part of the human body.

4.0 Exclusions

None

5.0 Procedures

In the circumstances:

5.1 For fire and security threats;

- The Person who has observed any danger must alert employees by sounding appropriate alarms. The alarm must be heard, seen or otherwise perceived by everyone in the workplace.
- The person must notify security/TOC on the emergency numbers posted in various locations in the work place, inform TOC of the situation fire/incident. If it's a fire, inform TOC of the location, injuries, potential fire hazards and risk (oil drums, paints, banga product, rubber, chemicals and gas bottles etc). TOC will brief fire service. If it is an incident, inform TOC of the type of incident, location description of suspect(s) type of weapon (if it involves a weapon) and any injuries at the scene.
- TOC will dispatch the appropriate authority to the scene, along with medical staff, if safe to do so, at the time.
- HSE representatives, will assist with evacuation of the worker(s) from the building.
- All workers must report to their muster point.
- HSE representatives will assist personnel with special needs or disabilities who may need help evacuating and assign one or more people, including backup personnel, to help them.
- Staff should ensure all windows and doors are closed, and all electrical appliances are switched off and unplugged before evacuating the building
- HSE representatives will do a head count to verify if anyone is missing, with the assistance of a contractor for their workers, if any are in that department.
- HSE representatives should ensure that no body returns to the factory/building until it is cleared by the appropriate authority.

5.2 For chemical spill:

For small spill:

- First person to observe a spill must use the appropriate spill kit to control the spill.

For large spill:

- The first person to observe the spill must contact their supervisor, who will notify HSE to dispatch the Spill Response team, to see a perimeter to contain the spill.
- The supervisor must notify TOC, for emergency assistance (if needed).
- HSE will notify The Federal Ministry of Environment.
- The Federal Ministry of Environment will assist in the disposal of waste and,
- Decontaminate the area and affected place.

5.3 For medical emergency;

- The person who has observed any emergency must notify TOC on the emergency numbers posted in various locations in the work place, inform TOC of the type of Emergency.
- TOC will notify and dispatch medical staff and ambulance to the scene.

5.4 For electric shock;

- First person to observe a shock situation should turn off the source of electricity, if possible, if not, notify the Estate department and contact TOC to dispatch the appropriate authority.
- Keep the shocked person warm, lying down, and still until the ambulance arrives.

6 Emergency numbers

0813 463 1183 (TOC) – 24hrs

7 Record of Approval

Task	Name/signature	Job title
Approved by	Graham Hefer	Managing Director

MANAGING DIRECTOR
Date
00PC
21 AUG 2019
DR. G. HEFER

	Document title	Revision: 2
	OKOMU OIL PALM COMPANY PLC	Date: 06/04/2021
	ENVIRONMENTAL POLICY	Page 1 of 1

1.0 Policy Statement

Okomu Oil Palm Company (OOPC) recognizes the value, importance and necessity of sustainably managing its operations such that the present needs of society are met without compromising the ability of future generations to meet their own needs and enjoy the same resources we have today.

2.0 Scope

This policy applies to all employees contractors (including temporary contractors and third party staff) of OOPC.

3.0 Guidelines

OOPC is committed to minimizing the environmental impact of its operations and in implementing this policy will:

- Comply with all applicable environmental management laws and obligations; and other environmental requirements to which OOPC Subscribes.
- Implement and maintain an Environmental Management System across its global operations, conforming to the requirements of ISO 14001, as well as other relevant external certifications criteria and OOPC Standard Operating Procedures and Best Practices.
- Achieve continuous environmental improvement with objectives and targets so as to minimize our environmental footprint.
- Minimize or prevent land, air and water pollution through reduced use of chemical resource conservation, waste reduction, recycling and reuse and proper waste disposal in every area of activity.
- Prevent soil erosion and degradation through adoption of best practice in agricultural management.
- Minimize impacts on biodiversity across all aspects of our operations.
- Communicate and promote this Environmental Policy with the aim of ensuring that both employees (at all levels and functions of the organization) and business partners (including suppliers, contractors, joint venture partners and smallholders) are aware of the environmental impacts of OOPC activities as well as their individual obligations.
- Educate and train employees on environmental aspects, impacts, risks and opportunities peculiar to their jobs and related issues; and encourage their participation and cooperation to minimize adverse impact and protect the environment.
- Support our joint venture partners and smallholders to adopt and implement our environmental commitments.
- Periodically review this Environmental Policy to ensure it remains relevant and applicable to our business.
- Implementation of our GHG Emission Reduction Policy.
- HSE Manager shall ensure this policy is implemented

4.0 Record of Approval

Task	Name/signature	Job title
Approved by	Dr. Graham Hefer	Managing Director



	Document title	Revision: 3
	OKOMU OIL PALM COMPANY PLC	Date: 08/07/22
	WORKPLACE HEALTH AND SAFETY POLICY	Page 1 of 1

1.0 Policy Statement

Okomu Oil Palm Company is committed to providing a safe and healthy working environment for our workers and stakeholders. We believe that all incidents and occupational illnesses are preventable, and we will work relentlessly to improve our safety performance towards zero incidents. This requires us to work towards ensuring that we take all practicable steps to protect people involved in OOPC operations from harm. Our goal is to send everyone home safely every day.

2.0 Scope

This policy applies to all employees contractors (including temporary contractors and third party staff) of OOPC.

3.0 Guidelines

This policy can be done by:

- The ongoing implementation of our Integrated Management System Policy.
- Development and implementation of Minimum Standards for Safety, Environment and Process Safety.
- Ongoing development of the global IMS reporting platform and the continued development of an open reporting culture, which includes but not limited to protection of workers from reprisals when reporting incidents, hazards, risks and opportunities.
- Seeking continuous improvement to health and safety performance through setting annual objectives, targets, KPIs and focus areas, measurement of progress against our goals and communication to our stakeholders.
- Running an internal audit program and expanding existing audit programs.
- Commitment to provide safe and healthy working conditions for the prevention of work-related injury and ill health and which is appropriate to the purpose, size and context of OOPC, and to the specific nature of its OH&S risks and OH&S opportunities, while engaging our people to build and maintain a safe workplace.
- Development and delivery of training and education material to improve workers skills and awareness of IMS requirements and practices.
- Adhering to workers' complaints, and giving workers the ability to remove themselves from work situations that they consider present an imminent and serious danger to their life or health (with verifiable evidence, such as a certified medical practitioner's report), as well as the arrangement for protecting them from undue consequences for doing so.
- Complying with all local and national legislations, and other requirements.
- Investigate all incidents to the root cause and make Corrective and Preventive Action Plans to avoid reoccurrence.
- Commitment to eliminate hazards and reduce OH&S risks through conducting periodical risk assessments and job hazard analysis to discover what is likely to harm employees.
- Regular monitoring of PPE compliance.
- Commitment to consultation and participation of workers.
- Commitment to recognize potential emergencies situations such as sudden catastrophes like, fire, chemical spill, security threat, electric shock, medical situations and flood; developing a plan, GP 12 to address with them. These emergencies are caused by Human error and Natural forces.

This policy is to be read in conjunction with the:

- Hazard Identification and Assessment of Risk and Opportunity – GP 08
- Environmental Policy
- Incident and Hazard Reporting- GP18
- Safe Work Permit- GP20
- Boiler Room Operation- GP29 & GP 51 (Oil mill and Rubber factory)
- Emergency Preparedness and Response- GP12

4.0 Responsibility

- The HSE Manager shall ensure implementation and monitoring of this policy.

5.0 Record of Approval

Task	Name/signature	Job title	Date
Approved by	Dr. Graham Hefer	Managing Director	 

	Document title	Revision: 1
	OKOMU OIL PALM COMPANY PLC	Date: 23/03/21
	TRAINING AND DEVELOPMENT POLICY	Page 1 of 1

1.0 Policy Statement

Training and development make OOPC a more effective organization. In pursuance of Employee's development and performance, the company shall continually strive through training and developmental programmes to update the skills and competencies of staff, as identified and deemed necessary within budgetary constraints. As a general rule, employees cannot reject nomination to any training that he/she has been so nominated for. Failure to attend a training program, when nominated, will be classified as a dereliction of duty and will, accordingly, be treated as such.

2.0 Objective

The objective of the company's policy on training and development is to redress behavioural and skills deficiencies inherent in employees as a prelude to improvement in the employee's job performance.

3.0 Scope

This policy is applicable to the company's Board, audit committee members, all company staff, contract staff, contractors, and third party contractors of OOPC.

4.0 Definition

Training and Development: Is any activity designed to help individuals become more effective at their work place by improving, updating or refining their knowledge and skills, in areas where a problem has been identified. It encompasses a range of activities, for example, involvement in various projects, attendance of training courses, conferences or seminars, visit to other institutions, work shadowing, formal studying, coaching and monitoring.

5.0 Types of Training

5.1 Inplant – where the problem is pervasive i.e. it cuts across many employees involved in a specific activity or in the company, then the company will address such a problem with inplant training

5.2 External – where the identified problem to be addressed through training is peculiar to very few employees involved in action, or where it is impossible to hold a specific training within the company's premises due to non availability of training instruments or trainers, such training will then be held outside the company premises.

6.0 Guidelines

- OOPC is committed through its performance review process and introduction of new concepts, to the creation of training and development opportunities for all employees, and will work to ensure equality of opportunities across all training and development activities.
- OOPC's approach to the provision of training and development is to consider the developmental needs that have been identified, and how these needs should be met.
- All request for training must be document on training request form.
- Equal opportunities to access training will be given to all employees, and this shall be monitored specifically via the implementation of OOPC's Equal opportunity and no discrimination policy.
- Employees are sent a training invitation by the HR, after they have been nominated for training by their HOD.
- OOPC will monitor and evaluate training and developmental activities of all participants, including asking feedback from participants on the value and effectiveness of the training they undertake so as to continually assess and improve the training process. All staff, contractors and third parties are expected to participate in the evaluation of their training and development.
- Training shall be funded by OOPC.
- The Head of Human Resource Department will endeavor to ensure that training is delivered only by people who are competent and qualified to do so.
- Individual training records will be kept securely and centrally in each staff member's file in the Human Resources Department of the company.
- The Human Resource Department will be responsible for the production of an annual Staff Training & Development Programme, which will be based on a review of both the individual staff training needs and that of staff team training needs.
- This policy will be communicated to all company staff, contract staff, the company's Board, audit committee members, contractors and third parties(as per OOPC communication procedure GP10)

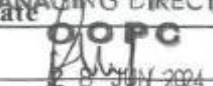
7.0 Record of Approval

Task	Name/signature	Job title	Date
Approved by	Dr. Graham Hefer	Managing Director	23/03/21

MANAGING DIRECTOR
OOPC
DR. GRAHAM HEFER

	OKOMU OIL PALM COMPANY PLC		Revision: 4
	CHILD LABOUR POLICY		Date: 20/05/2024
			Page 1 of 1

- 1.0 **Objective**
OOPC does not condone the use of any child labour in any form whatsoever, by any person, company or institution, as defined in the International Labour Organization's Convention on Child Labour, and in the Nigerian Labour Act.
- 2.0 **Scope**
This policy is applicable to all employment processes in OOPC, contractors, and third party contract workers, or any company and/or institution that do business with OOPC.
- 3.0 **Definitions**
Child Labour: is defined as the employment of a child in business or industry in violation of Nigerian Federal statutes prohibiting the employment of children under a specified age. The Nigerian Labour Act 2004, as amended, classifies a child as a 'young person' under the age of fifteen (15) years.
- 4.0 **Guidelines**
- OOPC shall always comply with all relevant and applicable National labour regulations and principles relating to the protection, welfare, health and safety of children. In this regard, the company recognizes the negative effect of Child labour, which can persist to affect children during their life time, to include the following:
 - lack of schooling, and opportunity for higher education for older children, results in missing educational and higher qualifications, respectively, and higher skills thus perpetuating their life in poverty;
 - general child injuries and abuses like cuts, burns and lacerations, fractures and tiredness;
 - children might be exposed to sexual abuse, particularly sexual exploitation of girls by adults, rape, early sex and unwanted pregnancy, abortion, Sexually Transmitted Diseases (STDs) and HIV/AIDS, drugs and alcoholism
 - physical abuse that involve corporal punishment, emotional maltreatment such as blaming, belittling, verbal attacks, rejection, humiliation and bad remarks.
 - emotional neglect such as deprivation of family love and affection, resulting in loneliness, and hopelessness,
 - physical neglect like lack of adequate provision of food, clothing, shelter and medical treatment.
 - competition of children with adult workers leads to depressing wages and salaries.
 - Therefore, no person deemed to be a child, as defined herein, shall be employed on any OOPC sites of operations.
 - Furthermore, OOPC shall ensure that all contractors, companies and or organizations of any kind engaged by OOPC on the premises strictly abide by this policy.
 - OOPC shall comply with the Child's Rights Act of Nigeria (2003), as amended, to ensure the protection of all children against all forms of abuse, and the Employment Rights Act of Nigeria (2004), as amended, which prohibits the employment of any persons aged below 16. OOPC also, subscribes to the Education Act (2004) of Nigeria, as amended, which provides for compulsory education of all children up to the age 15. Article 3 of International Labour Organization (ILO) Minimum Age Convention 1973 (No. 138), states that the minimum age for admission to any type of employment or work which by its nature or the circumstances in which it is carried out is likely to jeopardise the health, safety or morals of young persons shall not be less than 18 years. **Therefore, due to the various stipulations between Nigeria Labour law and ILO, the minimum age for employment in OOPC is 18.**
 - If a worker below 18 is found to be working, the activity the worker is carrying out will be stopped, the worker will be sent home and the contractor whom the worker works for will face appropriate disciplinary action.
 - If employment is temporary, such as an educational internship, apprenticeship etc. OOPC may, at its sole discretion consider such employment that in some cases involve young persons between the ages of 15 years and 18 years.
 - A suspected under age worker is required to present affidavit of aged declaration done in a court of law or birth certificate for age verification.
 - HR Department shall ensure proper implementation and monitoring of this policy.
 - This policy will be communicated to all workers, staff, contractors, third parties, visitors and suppliers, or anyone who does business with OOPC (as per OOPC communication procedure GP10).
- 5.0 **Record of Approval**

Task	Name/signature	Job title	MANAGING DIRECTOR
Approved by	Dr. Graham Hefer	Managing Director	 Date: 20/05/2024 DR. G. HEFER

	Document title	Revision: 0
	OKOMU OIL PALM COMPANY PLC	Date: 19/10/17
	ZERO BURNING POLICY	Page 1 of 1

1.0 Policy Statement

Okomu Oil Palm Company (OOPC) adheres to a strict zero burning policy, which is enforced by all means, agriculturally, economically and/or socially (see Clause 6.0 for Policy Exception). This is in line with OOPC's commitment to following environmentally friendly practices and is also in accordance with Socfin's Responsible Management policy and sustainability principles.

2.0 Objective

This policy is aimed towards combating air pollution and is a pledge by the company to actively assist government's efforts to reduce greenhouse gas (GHG) emissions that have become a major factor in global climate changes.

3.0 Scope

This policy is applicable to all stakeholders actively engaged in OOPC's land clearing and preparation processes for all new developments as well as future replanting.

4.0 Definition

Zero burning: a method of land clearing whereby the tree stand is felled, shredded, stacked and/or left in situ to decompose naturally.

5.0 Guidelines

OOPC is committed to:

- Complying with all international and national legislation and RSPO national interpretations.
- A ban on the use of fire in land clearing (see Clause 6.0 for Policy Exception).
- Implementing the zero-burning policy on new plantings or replanting of oil palm/rubber.
- The provision of forest and fire management plans such as Fire Management Meetings & Fire Surveillance.
- Safeguarding OOPC's plantations against fire risks using fire hazard monitoring and management processes such as daily patrols during dry seasons/briefings and maintaining a competent firefighting team that is equipped with up-to-date fire-fighting equipment and proper skills through regular trainings and fire drills.
- Strictly applying this policy to waste management where all felled palms/rubber are left for biomass reuse.
- Continually channeling resources towards the prevention, management and suppression of fires from both inside and outside of the company's plantations.
- Communicating this policy to both employees and contractors, highlighting that any non-compliance may result in termination of employment or contracts. Efforts will be made to communicate this policy to the surrounding communities/farmers.

5.1 Mechanical Clearing

The following steps are to be taken to ensure proper implementation of this policy.

- Trees are to be directionally felled and stacked using excavators and/or bulldozers.
- The felled trees are stacked between the rows of re-plantings on flat or undulating terrain. On hilly areas, they are spread out evenly on the lips of planting terraces which will be opened when the slopes are above 6°.

The management and staff shall be trained and made aware that the zero burn policy should be adhered to.

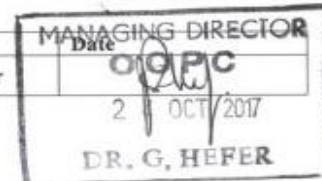
The Palm Agriculture Coordinator, Rubber Agriculture Coordinator and HSE Manager shall implement and monitor this policy.

6.0 Policy Exception

OOPC will consider burning only as a last resort for the control of diseases such as Fomes in rubber. In such cases, burning will be limited to root disease infected or susceptible areas. Pictorial evidence (prior to burning) of the infections and/or presence of predisposing factors such as heaps of vulnerable soft wood biomass will be collected to substantiate the need for minimal burning. Organic matter will be retained on the ground as much as possible. In the case of a change in land use, such as the replanting of rubber to oil palm and with due consideration to clause 4.5.4 of the Guidelines for Implementation of ASEAN Policy on Zero Burning, 2003, the incidence of rodents, pests like *Oryctes* and pathogens like *Ganoderma* will be checked. If there is any need for use of fire, a decision will be taken by all the management staff, responsible for implementing this policy, after weighing the pros and cons with sufficient documentation.

7.0 Record of Approval

Task	Name/signature	Job title
Approved by	Dr. Graham Hefer	Managing Director



	Document title	Revision: 0
	OKOMU OIL PALM COMPANY PLC	Date: 01/11/21
	CORPORATE SOCIAL RESPONSIBILITY POLICY	Page 1 of 1

1.0 Policy Statement

Okomu Oil Palm Company PLC (OOPC) embraces Corporate Social Responsibility (CSR) and will actively look for opportunities to improve our working environment and contribute to the wellbeing of the communities in which we operate. Our corporate social responsibility approach is driven by our values and mission with the objective to create and promote behavior that generates value to all interested stakeholders in the context of a socially responsible culture that is reflected in the development of a sustainable tropical oil palm company.

The following policies contribute to our corporate social responsibility commitment: Bursary Policy, Code of Ethics Policy, Environmental Policy, Human Rights Policy and Workplace Health and Safety Policy.

2.0 Scope

This policy is applicable for all activities and projects aimed at the environment, human rights, economic, stakeholder engagement (and philanthropy, during pandemics or environmental disasters) and is implemented for all stakeholders, especially neighboring communities and our employees.

3.0 Definition

CSR is a continuing commitment by business to behave ethically and to contribute to economic development while improving the quality of life of the workforce and their families as well as of the local community and society

4.0 Guidelines

OOPC commits to:

- Operate ethically in an environmentally sustainable way and to include concern for societal, environmental, legal, cultural, and organizational diversity, as well as differences in economic conditions, in all our activities and decision making.
- Execute our mission through developing strong relationships with communities, workers, partners, organizations and individuals which are conducted with integrity and courtesy, and by ensuring that we honour our commitments.
- Comply with all applicable international & national laws and legislation. Where no legislation exists, OOPC will seek to adhere to best management practices, subscribed sustainability certifications and applicable principles of ISO 26000:2010 viz: Accountability, Transparency, Ethical behavior, Respect for stakeholder interests, Respect for the rule of law, Respect for international norms of behavior and Respect for human rights.
- Establish a CSR strategy embedded in the CSR Procedure (See GP 35) taking into account the perspectives and interests of stakeholders, priority areas, timeline for implementation, responsible staff/committee/partners, their roles and process for reviewing and assuring outcomes of the CSR of OOPC.
- Respect our staff and actively promote their welfare, engagement and empowerment.
- Clearly train and sensitize all interested stakeholders on the CSR strategies.
- Measuring, reporting and improving our CSR performance by setting applicable targets, developing and implementing specific environmental and social policies and procedures based on each CSR thematic areas.
- Communicating this CSR policy, strategies, mechanisms, objectives, actions and performance transparently to all interested stakeholders.
- Periodically review and evaluate the social, economic and environmental impacts of our CSR projects.
- Reviewing this policy annually, or following significant changes to our business practices, to ensure that our commitment to environmental responsibility, the communities, and our ethical policies are addressing current issues and are as proactive as possible.

The Managing Director will have ultimate responsibility for CSR management within the Company and will be responsible for the provision of advice and guidance on all CSR matters.

5.0 Record of Approval

Task	Name/signature	Job title	Date
Approved by	Dr. Graham Hefer	Managing Director	

