Final Report

of

Pest Management Plan(PMP)

for

Ogun State Agricultural Production & Industrialization Program (OGAPIP)

October 2018

The Project name has been changed from ***"Ogun State Agricultural Production and Industrialization Project" (OGAPIP)*** to "***Ogun State Economic Transformation Project" (OGSTEP).*** The new project name now replaces any occurrence of the old project name throughout the document. No other changes have been made in the document.

Table of Contents

List of Figures Page

List of Tables

Abbreviations and Acronyms

BP	Bank Policy
CADP	Commercial Agriculture Development Project
CBOs	Community Based Organizations
CDA	Community Development Associations
EA	Environmental Assessment
ECOWAS	Economic Community of West African States
ESMP	Environmental and Social Management Plan
ESSU	Environmental & Social Safeguards Unit

EIA	Environmental Impact Assessment
ESMF	Environmental and Social Management Framework
EPA	Environmental Protection Agency
FAO	Food & Agriculture Organization of the United Nations
FEPA	Federal Environmental Protection Agency
FGN	Federal Government of Nigeria
FMENV	Federal Ministry of Environment
FPMU	Federal Project Management Unit
GoN	Government of Nigeria
HSE	Health, Safety & Environment
IITA	International Institute of Tropical Agriculture
IPM	Integrated Pest Management
LGAs	Local Government Authority
LGIU	Local Government Implementation Unit
MDAs	Ministries Department and Agencies
M&E	Monitoring & Evaluation
MoE	Ministry of Environment
MSDS	Material Safety Data Sheet
NAFDAC	National Agency for Food & Drug Administration & Control
NARIs	National Agricultural Research Institutes
NEWMAP	Nigeria Erosion Watershed Management Project
NESREA	National Environmental Standards and Regulatory Enforcement Agency
NGOs	Non- Governmental Organizations
OGAPIP	Ogun State Agriculture Production & Industrialization Program
OP	Operational Policy
PDOs	Project Development Objectives
PIM	Project Implementation Manual
PMP	Pest Management Plan
PIU	Project Implementation Unit
RAPs	Resettlement Action Plans
RPF	Resettlement Policy Framework
TOR	Terms of Reference
TRIMING	Transforming Irrigation Management in Nigeria project
WAAPP	West Africa Agricultural Productivity Programme
WB	World Bank
WHO	World Health Organization

Executive Summary

A. Introduction

Background on the project and the preparation of the PMP

The Ogun State Government has recorded significant progress across various sectors over the past six years of the current administration and aims to ensure the achievements are placed on a sustainable footing in order to prepare adequately for the future. To achieve this goal, the conceptualized Ogun State Agricultural Production and Industrialization Program (OGAPIP) Project will support the Ogun State government's efforts to increase Agricultural Production and Industrialization. The OGAPIP Project will support the government's efforts to increase food production; increase the supply of raw materials to agro-processing industries; and attract domestic and foreign investment to the state and

develop the skilled and literate workforce needed to successfully increase agricultural production and industrialization.

Due to the nature, the characteristics and the scope of OGAPIPs proposed activities, The project has been assigned an Environmental Screening Category – EA Category "B". This rating is based on the scope of the project, which indicates limited adverse environmental and social impacts of the civil works activities related to the rehabilitation of existing access roads, road upgrades within Agbara estate, development of small scale irrigation schemes, development of small scale infrastructure such as storage facilities, processing equipment to enhance agricultural production and marketing in production areas and the rehabilitation of the technical colleges. However, considering the nature of the agricultural activities to be supported under this project, OP 4.09 is triggered, therefore necessitating the preparation of this Pest Management Plan (PMP).

Environmental and social consequences of pest management practices

Considering the cultivation techniques, breeding and processing of the different agricultural commodities under the OGAPIP value chains that have been selected under this project, which comprise cassava, rice, livestock – beef & poultry, vegetables and fish, there is undoubtedly the likelihood of infestation by pests, or migratory pests, currently within the proposed area. Consequently, as the project will support agricultural livelihoods and may procure pesticides directly or through beneficiaries under the different approaches aimed at incentivizing the involvement and participation of farmers and firms, by the project, especially as an initial pests & pesticides risk assessment of these value chains further indicates that risks range from low (fish) to moderate (livestock).

The OP 4.09 policy supports safe, effective and environmentally sound pest management and promotes the use of biological and environmental control methods, while prohibiting the use of agro-chemicals that fall under the classification of hazardous or moderately hazardous chemicals. It encourages the assessment of the capacity of the country's regulatory framework and institutions to promote and support safe, effective, and environmentally sound pest management. Projects that include the manufacture, use, or disposal of environmentally significant quantities of pest control products are classified as Category A. Depending on the level of environmental risk, other projects involving pest management issues are classified as A, B, C, or FI.

Potential impacts of pest and pesticide management on project activities

Safeguard Policies are from the World Bank. The Project has triggered five environmental safeguards policies: Environmental Assessment (OP/BP 4.01) Natural Habitat (OP/BP 4.04), Involuntary Resettlement (OP/BP 4.12), Pest Management (OP/BP 4.09), and Physical Cultural Resources (OP/BP 4.11). The project has been assigned an Environmental Screening Category – EA Category "B". This rating is based on the scope of the project, which indicates limited adverse environmental and social impacts. However, considering the nature of the agricultural activities to be supported under this project, OP 4.09 is triggered, therefore necessitating the preparation of this Pest Management Plan (PMP). In line with World Bank Environmental and Social Safeguard Policies, an agricultural development project such as this will trigger World Bank's Operational Policy OP 4.09 (Pest Management), hence the need for a suitable safeguard instrument for addressing pest management issues.

B. Project Description

Objectives, components, activities and expected results

The Project Development Objective (PDO) of the Ogun State Agricultural Production and Industrialization Program (OGAPIP) is to support the government of Ogun state in its effort to increase agricultural production and industrialization and this Program aligns with the government's reform efforts to develop the agricultural and industrial potential of Ogun State. The proposed project consists of two inter-related components including a results-based component, which is complemented by a technical assistance component. Component 1 which is results-based will disburse against agreed-upon *actions, outputs and outcomes* (Disbursement-Linked-Indicators or "DLIs") that result in the implementation of the agricultural and industrialization cardinal program of the state. Component 2 will finance select *technical assistance* to strengthen the Government's *capacity for implementing* the program and thereby achieving the results in Component 1. The two components are inherently linked through the results framework. With this approach, the project will cover technical assistance, implementation support, and co-financing of the underlying programs.

Objectives and specific activities leading to integrated pest management

The World Bank operational policy 4.09 is triggered by projects under which there shall be procurement of pesticides (agricultural use, vector control weed control, etc.) either directly by the project, or indirectly through on-lending, co-financing, or government counterpart funding, projects and programs that are expected to introduce new pest management practices, or expand or alter existing pest management practices and subsequent environmental and health risks. This study is part of the requirements of Operational Policy (OP) 4.09 and pest control. The application of environmental assessments to projects that include pest control as applied to agricultural development projects could possibly increase acquisition and use of pesticides by farmers.

C. Current approaches to pest management in the project sector in the country

Overview of target crops and associated pest problems

The typical pest challenges of the five major value chains (vegetables, cassava, rice, fish, livestock – beef & poultry) considered under the OGAPIP that were discussed during consultations in Ogun State are:

- Mammalian pests – rodents, grass-cutters etc. These are pests on cassava, maize and are controlled by use of poisonous baits, traps or cats as in case of rodents.
- Reptilian pests – especially snakes. These are pests on livestock – poultry. These are controlled by physically killing the reptiles.
- Birds (weaver/*quelea quelea* sp.) – These are pests majorly on rice and are controlled using bird scare means such as scarecrows. However, these are reportedly no longer effective.
- Ecto-parasite pests – such as insects e.g. termites, others include lice as in the case of poultry, mites, lice, ticks, fleas etc. These are pests on livestock – beef & poultry. Grasshoppers are pests on crops & caterpillars are major pests on vegetables. Mainly controlled using agro-chemicals for animal disinfectants, tick-baths, insecticides etc.
- Endo-parasite pests – such as worms, which are pests that are more associated with livestock (beef) and is controlled using regular vaccinations for de-worming of animals.

Current approaches to pest management

Pest management methods in Ogun State vary with the type of pests and the agricultural value chain under consideration. Most of the pest control options involve the use of pesticides and as such have varying pesticide risks, which is also dependent on the value chains. In the past, pesticides were once seen as the only answer to most of the pest

problems, however, in recent times, due to the increasing concerns about the environment, public health concerns coupled with increase in pest resistance to pesticides and the increasing economic pressures on farming and the food Industry, these range of concerns have continually demonstrated that pesticide use is increasingly seen as just one of a range of control measures available.

Practical experience in integrated management in the country and in the sector of activity
The OGAPIP project will benefit from Integrated Pest Management collaborative action and experience of other existing world-bank/donor funded projects, currently being implemented in agriculture sector of Ogun State, such as FADAMA III & the FGN IFAD/VCPD. This is possible, considering the fact that a lot of experience and success has been gained in Nigeria under such projects Other Collaborations include activities with regulatory bodies such as NAFDAC, NESREA, Customs Service, Consumer protection Council. Therefore, the project stands to gain from shared experience and capacity with these existing projects in terms of challenges and success drivers of PMP operations and other similar areas. As such, project beneficiaries will enjoy knowledge transfer on IPM implementation.

D. Current issues in the use and management of synthetic chemical pesticides in the country and the project sector

Use of pesticides in the country
Pests and disease vectors constitute serious hazards to public health, food security and general welfare of the citizenry not only in Ogun State but also in Nigeria. It is estimated that agricultural pests destroy over half of the yield of crops, fruits, ornamental plants, vegetables and livestock, annually. Vectors transmit several diseases of public health importance in Nigeria. These diseases have resulted in depopulation of many fertile farming areas thus contributing significantly to food insecurity and poverty. Farmers often respond to pest infestations in crops by heavy applications of pesticides, which threaten environmental quality and pose risks to human and livestock health. Pesticides used in vegetable agro-ecosystems, for example, include WHO toxicity Class 1a materials such as ***parathion***, and Class 1b materials such as ***Furadan/carbofuran***. The incautious dependence on chemical pest control options undermines overall economic growth through farmers' non-compliance with trade barriers on pesticide residues in export produce. According to EC directive 91/414, for example, approximately 80% of the active ingredients used in Africa will be banned for use in Europe, and PMP is a fast-emerging trade policy issue.

Circumstances of use of pesticides and competence to handle products
Many cultural practices deployed as physical control measures of pest control are currently in use in Ogun State and have been for several farming generations, however, some of them have not been demonstrated as sufficient and environmentally friendly options for pest management. The conventional chemical control has been the means generally used to control crop invasions by pests in the different agricultural programs in the State. Consequently, due to the existence of IPM based projects in the agriculture sector of Ogun State, knowledge transfer shall play a major role in establishing proper & safe use pesticide practices, through which competence to handle the products shall be further enhanced.

Assessment of risks to the environment, population health and the economy
Some of the specific risks identified and properly discussed are both environmental and social issues. The environmental issues; such as air pollution, soil contamination, surface and

groundwater contamination, harm to non-target species, and health risks identified are direct inhalation, consumption of crops and plants grown under chemical pest control, which could cause health hazards to humans and animals within and around the project site, skin, eye, and nose irritation, ppossibility of cancers, neurologic, endocrine and reproductive problems form direct and indirect exposure to pesticides and other occupational health and safety risks.

Control of the distribution and use of pesticides

Pesticide procurement in Ogun State as in other parts of Nigeria is available for purchase on the open market with weak institutional enforcement measures in place. For the OGAPIP, training programmes shall be carried out to enhance capacity & knowledge of participating farmers on the banned pesticides that should not be procured for use on the project. Also, training on the safe use of pesticides will be part of this programme, while to promote proper control of distribution & quality assurance of product, procurement by farmers would be done through only specific OGAPIP certified distributors.

Ability to manage / dispose of obsolete pesticides and polluted packaging

From the consultations carried out, the management of pesticides containers in Ogun State is primarily the responsibility of pesticide distributors and farmers and they must be closely supervised by the OGAPIP agriculture team under the PIU. It is therefore necessary to have a proper pesticide container management system in place for the OGAPIP project that will establish an obsolete and unused pesticide disposal plan as minimum operational procedure, which shall conform to global best practice on pesticide container disposal.

E. Policy, Legal and Institutional Framework for Integrated Pest Management (IPM)

Current plant protection / vector control system

The current vector control system for the OGAPIP shall be managed through the following:

(i) State Regulations, Laws & Policies

Ogun State Ministry of Environment - Ogun State Policy on Environment (2013)
Ogun State Ministry of Agriculture - Ogun State Policy on Agriculture (1989)
Ogun State Ministry of Lands - Ogun State Agricultural Land Management Unit Policy

(ii) National Regulations, Laws & Policies

- Federal Ministry of Agriculture & Rural Development (1988)
- National Policy on the environment, 1989. Reviewed in 2016
- FEPA Decree 58 of 1988 as amended by Decree 59 of 1992 and 1999 but complemented by rules and regulations such as FEPA S.1.5, FEPA S.1.9 dealing with disposal and distribution/use of pesticides.
- NAFDAC Decree 15 of 1993, as amended by Decree 19 of 1999.
- The Factories Acts 1990 being implemented by the Factories Inspectorate Division of FMLP.
- Harmful Waste (Special Criminal Provisions, Etc.) Act - CAP H1 L.F.N. 2004
- Nigerian Agricultural Promotion Policy (2016)
- Revised National Policy on the Environment 2016
- Workmen Compensation Act 2010
- National Gender Policy 2006
- Policy Guidelines on Pest & Vector Control 2005
- Child Rights Act 2003
- Federal Environmental Protection Agency Act 58 of 1988 as amended by Decree 59 of 1992

- National Environmental Standards and Regulations Enforcement Agency (NESREA) Act 2007
- Regulation C/Reg. 3/05/2008 on the Harmonization of Rules Governing Pesticides Registration in the ECOWAS Region
- The National Agency for Food and Drug Administration and Control (NAFDAC)
- Factories Act, Cap F1, LFN 2004
- Harmful Waste (Special Criminal Provisions, Etc.) Act - CAP H1 L.F.N. 2004

(iii) International Conventions & Treaties Relevant to Pest Management in Nigeria

- Montreal Protocol
- Bamako Convention on Hazardous Wastes
- Basel Convention on Trans-boundary Movements of Hazardous Wastes and their Disposal
- Stockholm Convention on Persistent Organic Pollutants (POPs)
- International Code of Conduct for the Distribution and Use of Pesticides
- Rotterdam Convention
- International Standards for Phytosanitary Measures, FAO

(iv) World Bank's Environmental & Social Policies

Analysis of the capacity, at national and local levels, to implement the GIP, particularly in the project area / sector

Training and Capacity Development is a fundamental component of the PMP. An assessment of the capacity of the PIU and the MDAs reveals weak capacity in safeguards knowledge, which will influence the enforcement capabilities. Consequently, this training & capacity development has been prepared and shall be undertaken to ensure that knowledge gaps are closed in a manner that will improve the overall performance of the OGAPIP project.

Promotion of Integrated Pest Management in the Context of Current Pest Management Practices

Even though pesticides were once seen as the only answer to most of the pest problems, as a result of the deepening issues realized from increasing anthropogenic activities & its consequent impact on the environment, the development of pest resistance to pesticides and the increasing economic pressures on farming and the food Industry, pesticides are increasingly being seen as just one of a range of control measures that can be deployed for the control of agricultural pest related challenges. Consequently, in implementing IPM for the proposed OGAPIP project, the use of highly persistent and highly toxic chemicals must be avoided in pest management. Natural pest control methods should be employed to effectively reduce or eliminate pest or disease infestation without harming humans, animals, crops and other ecosystems. The *IFC Guidelines on Pesticide Handling and Application* provides a criterion for choosing pesticides.

F. Project Integrated Pest Management Measures (IPMM)

Proposed relevant activities for integrated pest / vector management (including capacity building for direct actors in project implementation)

Strategy for intervention that integrates the IPM method into the OGAPIP project comprises:

I. Promote the establishment of organic farms that will encourage indigenous pest management methods that utilize cultural or biological approaches.

II. Pursue the implementation of the comprehensive pest & pesticide management action plan that comprises an environmentally sensitive approach to pest management, while also relying on a combination of multiple practices with a view of reducing reliance of the OGAPIP project on use of pesticides.
III. Integrate the use of current, comprehensive information on the life cycles of pests and their interaction with the environment, which are available in our research institutions through collaborations with NARI's (National Research Institutes). This information, in combination with available pest control methods, shall be deployed to manage pest damage by the most economical means, and with the least possible hazard to people, property, and the environment. By applying basic IPM principles, historical and future pest with respect to the proposed project site will be managed in an environmentally safe manner thus reducing increased dependency on pesticides or other environmentally unsafe approaches.
IV. Engage the tool of training and retraining of farmers (as direct actors) in the farm estates & farm settlements on the best practice approaches to pest control & safe use and application of pesticides.
V. Promote preparation of agro-chemicals & fertilizer procurement list.
VI. Ensure proper screening of procurement list use of agro-chemicals only when they are not on the list of prohibited pesticides in the Class Ia & b or Class II (annex 2) and ensure that distributors provide the Material Safety Data Sheet (MSDS) for approved agrochemicals.
VII. Encourage State Ministry of Agriculture to promote transfer of knowledge on biological, cultural and mechanical control measures that have been used in other agricultural programs in Nigeria (such as the FADAMA projects, IITA, FAO, CADP, TRIMING & WAAPP project etc.) shall offer a strong platform for proffering practicable safe measures towards mitigating adverse impacts of identified pests in the project area.

Monitoring, evaluation and reporting of the implementation of the Action Plan (IPMM)
The key issues to be considered by this monitoring process, which shall be the responsibility of the OGAPIP agriculture project team will ascertain if:

- A pesticides procurement checklist is available and used during procurement and screening types of pesticides procured.
- Ensure that POPs pesticides and WHO class (Ia) and (Ib) pesticides are not procured or used. For the IPM to be effective, measures to ensure that unacceptable pesticides are not procured with Bank's fund will be verified by the environmental safeguards specialist at the State level. The environmental specialists at the PIU will screen the pesticides procurement list prior to procurement and ensure that only pesticides that are acceptable and approved by the Bank/WHO/NAFDAC are procured.
- The outcome of the screening will be sent to World Bank for concurrence.
- Monitor and report on the progress of the IPM implementation.

Institutional arrangements (focused on the project implementation entity, phytosanitary services or vector control) with focus on the local level (actors and partners)
Institutional arrangements of responsibilities for the implementation of this PMP are shown in table ES 1.

Table ES1: Safeguard Responsibilities and framework for implementation of PMP

Category (Actors & Partners)	Responsibility

State Agencies, Government MDAs (Ministry of Lands, Survey and Urban Development, Ministry of Environment, etc.	• Provide project related policy decisions and guidance regarding the ESMF/PMP, through the Technical Committees (TC) • Provide project leadership on PMP matters through the PIU. • Ensuring compliance on matters of Environmental Assessment and Pest Management • Set up a functional ESSU in the OGAPIP office that will be responsible for PMP management and compliance monitoring.
Other MDAs	• Pursue mandates related to the core responsibility of the ministries, departments and agencies. • Intervene when relevant areas or resources under their jurisdiction or management are likely to be affected by or implicated sub-projects. • Participate in the EA, OP 4.09 pest management processes and in project decision-making that helps prevent or minimize impacts and to mitigate them.
World Bank	• Assess implementation process and ensure funds are not used for purchase of chemicals/pesticides • Relate with PIU on PMP related issues • Recommend additional measures for strengthening the PMP and implementation performance.
OGAPIP ESSU	• Liaise closely with Ministry of Environment in preparing a coordinated response on Pest Management activities and ensure they are in compliance with guidelines provided in PMP and ensure adequacy under the World Bank Safeguard policies. • Ensure that the project design and specifications adequately reflect the recommendations of the PMPs; • Develop, organize and deliver Safeguards training program that comprises an IPM component for the OGAPIP staff, the contractors and others involved in the project implementation, in collaboration with the PIU • Develop and implement PMP monitoring plan to ensure compliance • Ensures that project beneficiaries do not procure pesticides with bank funds provided
Local government	Liaising with the OGAPIP to set up agriculture production clusters that will ensure compliance with PMP requirements among the rural participants of the project.
NGOs/CSOs	Assisting in their respective ways to ensure effective response actions, Conducting scientific researches alongside government groups to evolve and devise sustainable PMP strategies and rehabilitation techniques.
The General Public	Same as above

Cost estimates for implementation

The Cost estimates for implementing this PMP are as shown in table ES 2 in the sum of fifteen million, four hundred thousand naira only (N15,400,000.00**)** or fifty thousand, nine hundred and forty one dollars, eighty cents, only. ($50,941.80)

Table ES 2: Annual cost Estimates for PMP Implementation

s/n	PMP Requirements	Considerations	Sub-total Cost per Year (N)	Total Cost (Annual Cost)	Cost in US Dollars (N305 =$1)
A	**Training & Capacity Strengthening**				
1.A	Capacity Building for OGAPIP personnel & farmers in clusters, farm estates & settlements	Training Programs (from capacity building budget)	2,000.000.00	6,000,000.00	19,672.13
B					
C	Capacity Strengthening for relevant Stakeholders/MDA's	Workshops to be held across 3			

s/n	PMP Requirements	Considerations	Sub-total Cost per Year (N)	Total Cost (Annual Cost)	Cost in US Dollars (N305 =$1)
D	Feeding & Venue Costs	senatorial districts		500,000.00	1,639.34
	PMP Implementation & Monitoring	Cost for monitoring PMP	1,000,000.00	1,000,000.00	3,278.68
B	**Mitigation & Management**				
1	PPE - Occupational Health & Safety.	Purchase of ***special*** protective clothing for pesticide use & handling - hand gloves, gas mask, safety boot and overall wear	4,000,000.00	4,000,000.00	13,114.75
C	**Environmental & Social Monitoring**				
1	Monitoring Compliance PMP requirements	Monitoring of IPM approach and safe pest management practices	See 1.D above		
2	Laboratory Services to test residual chemical levels in produce	Strengthening of capacity of laboratories with purchase of special laboratory equipment for testing.	2500,000.00	2,500,000.00	8,196.72
	Total Estimated Budget			**14,000,000.00**	**45,901.64**
	Contingency	**10% of sub-total**		1,400,000.00	4,590.16
Total				**15,400,000.00**	**50,491.80**

Grievance Mechanism

The Social Safeguards Specialist in the PIU of OGAPIP will oversee activation and proper functioning of the GRM for this project. The Grievance Redress Committee (GRC) and the Social Safeguard Specialist shall review any existing GRM systems (government/traditional) that are operative in the area and propose ways that the GRM may fit within these systems. Ideally the GRM should have second and third levels of appeal (including the court system, if appropriate, for legitimate claims that cannot be resolved at lower levels). The functioning of the GRM system, how to register complaints (written, by phone, or in person), where to go and hours of service, all should be clearly explained in local language (Yoruba) during initial public consultations on the project. There are two broad areas, from which grievances may arise, during project implementation:

- Dispute as fallout of the involuntary resettlement implementation (compensation) and
- Industrial disputes between: MDAs and industrialists; Industrialists and host communities; Inter-Industrialists; Employees of industries and the management.

For further reference, Grievance Redress Mechanism (GRM) is contained in Chapter 7 of the ESMF for this project.

G. Conclusion

The Project Development Objective of the (OGAPIP project is to support the government of Ogun state in its effort to increase agricultural production and industrialization. This PMP is prepared to contribute to the accomplishment of this goal, through the careful implementation of this plan, which shall be further strengthened if the following measures are carried out:

- Promote adequate awareness programmes to educate farmers and stakeholders including sellers, users and farm workers on the adverse impact/risk associated with the use of certain chemicals by WHO. Names and chemical class of banned chemicals will be brought to public attention through these awareness programs.
- Encourage that the implementing agriculture teams of the States Ministry of Agriculture will ensure that the PMP materials, species, personal protective equipment, etc. are distributed to beneficiaries early enough for timely implementation.
- Implement measures that will be considered complementary to strengthening participation with other partners & actors for the overall success of PMP such as:
    - Creating partnerships with agro-dealers & collaborating distributors of inputs to subsidize costs of approved products with the aim of discouraging the use of chemicals and harmful pesticides. If the alternative to chemical control to pest is available, and cost effective the tendency to use chemicals will be minimized, and that way, the proliferation of WHO Class 1 and Class 11 pesticides would have been avoided.
    - Sharing information contained in the PMP with farmers in the various clusters to promote compliance.

CHAPTER ONE

1.0 Introduction

The Ogun State Government has recorded significant progress across various sectors over the past six years of the current administration. There is however a need to plan for the medium to longer term, to ensure the achievements recorded is placed on a sustainable footing, and to prepare adequately for the future. To achieve this goal, the conceptualized Ogun State Agricultural Production and Industrialization Program (OGAPIP) Project will support the Ogun State government's efforts to increase Agricultural Production and Industrialization, and the key enablers of the sectors' development – business environment, skills development and public-sector governance through improved procurement efficiency and greater statistical capacity at the State level.

The planned agricultural production and industrialization will play a leading role in generating jobs and revenues for the State. Consequently, the OGAPIP Project will support the government's efforts to increase food production; increase the supply of raw materials to agro-processing industries; and attract domestic and foreign investment to the state and develop the skilled and literate workforce needed to successfully increase agricultural production and industrialization.

Due to the nature, the characteristics and the scope of OGAPIPs proposed activities, The project has been assigned an Environmental Screening Category – EA Category "B". This rating is based on the scope of the project, which indicates limited adverse environmental and social impacts of the civil works activities related to the rehabilitation of existing access roads, road upgrades within Agbara estate, development of small scale irrigation schemes, development of small scale infrastructure such as storage facilities, processing equipment to enhance agricultural production and marketing in production areas and the rehabilitation of the technical colleges. However, considering the nature of the agricultural activities to be supported under this project, OP 4.09 is triggered, therefore necessitating the preparation of this Pest Management Plan (PMP).

1.1 Objective of the Pest Management Plan (PMP)

The Project Development Objective (PDO) of the Ogun State Agricultural Production and Industrialization Program (OGAPIP) is to support the government of Ogun state in its effort to increase agricultural production

and industrialization and this Program aligns with the government's reform efforts to develop the agricultural and industrial potential of Ogun State.

The PMP includes a regulatory framework that shall cover the existing National, International and State legislations on the use of agro-chemicals & pesticides for pest management. It shall further assess the shared experiences from other projects on-going in the State, regarding pest management and capacity on integrated pest management (IPM) approach. Other areas that shall be addressed includes training and awareness for the public and users of pesticides on safety measures, description of pesticides banned for use in Nigeria as well as those approved for use.

Specifically, it further identifies institutional responsibility with regards to mitigation measures and monitoring indicators to be observed in order to evaluate the performance and effectiveness of the PMP.

1.2 Rational for the study/PMP

The Pest Management Plan (PMP) harmonizes the best practice approach from a combination of the best strategies of all control methods that pertain to a given concern created by the activities of pests.

IPM has been defined in various ways but a more scientific definition describes it as, "the **practical** manipulation of pest populations using sound **ecological** principles to keep pest populations below a level causing economic injury".

Considering the cultivation techniques, breeding and processing of the different agricultural commodities under the OGAPIP value chains that have been selected under this project, which comprise cassava, rice, livestock – beef & poultry, vegetables and fish, there is undoubtedly the likelihood of infestation by pests, currently within the proposed area or migratory pests. Consequently, as the project will support agricultural livelihoods and may procure pesticides directly or through beneficiaries under the different approaches aimed at incentivizing the involvement and participation of farmers and firms, by the project, especially as an initial pests & pesticides risk assessment of these value chains further indicates that risks range from low (fish) to moderate (livestock).

The OP 4.09 policy supports safe, effective and environmentally sound pest management and promotes the use of biological and environmental control methods, while prohibiting the use of agro-chemicals that fall under the classification of hazardous or moderately hazardous chemicals. It

encourages the assessment of the capacity of the country's regulatory framework and institutions to promote and support safe, effective, and environmentally sound pest management. Projects that include the manufacture, use, or disposal of environmentally significant quantities of pest control products are classified as Category A. Depending on the level of environmental risk, other projects involving pest management issues are classified as A, B, C, or FI.

The World Bank OP 4.09 ensures that EA covers potential issues related to pest management and considers appropriate alternative designs or mitigation measures. It places premium on using biological pest control measures, but where chemical pesticides must be used, it encourages the country's or states capacity to manage the procurement, handling, application and disposal of pest control products be evaluated and the capacity to monitor the precision of pest control and the impact of pesticide use, and to develop and implement an ecologically sound pest management program.

1.3 Scope of PMP

Safeguard Policies are from the World Bank. The Project has triggered five environmental safeguards policies: Environmental Assessment (OP/BP 4.01) Natural Habitat (OP/BP 4.04), Involuntary Resettlement (OP/BP 4.12), Pest Management (OP/BP 4.09), and Physical Cultural Resources (OP/BP 4.11). The project has been assigned an Environmental Screening Category – EA Category "B". This rating is based on the scope of the project, which indicates limited adverse environmental and social impacts.

It is expected that there are likely to be no adverse negative impacts during project implementation; especially as the project is rehabilitation of existing access roads, roads upgrades within Agbara estate, development of small scale irrigation schemes, development of small scale infrastructure such as storage facilities, processing equipment to enhance agricultural production and marketing in production areas, rehabilitation of the technical colleges.
However, considering the nature of the agricultural activities to be supported under this project, OP 4.09 is triggered, therefore necessitating the preparation of this Pest Management Plan (PMP). In line with World Bank Environmental and Social Safeguard Policies, an agricultural development project such as this will trigger **World Bank's Operational Policy OP 4.09** (Pest Management), hence the need for a suitable safeguard instrument for addressing pest management issues.

Two other safeguards instruments; the Resettlement Policy Framework (RPF) and Environmental and Social Management Framework (ESMF) have also been prepared. These safeguards instruments (PMP, PMP and RPF) will be disclosed, as the safeguards policies of the World Bank require that before a project is appraised the Pest Management Plan (PMP) alongside other safeguard instruments, be made available for public review at a place accessible to local people in a form, manner, and language they can understand. In order to reduce, minimize and mitigate adverse impacts and undue harm of its development projects to the environment.

1.4 Work Approach/Methodology

This PMP has been prepared in accordance with standard procedures for environmental assessment including the applicable World Bank safeguard policies and Nigerian environmental assessment guidelines. These include:

1.4.1 Literature review

This involved a thorough review of the existing baseline information and other literature material such as the PAD & OGAPIP Exco presentation material to enable a proper understanding of the Ogun State Agricultural Production and Industrialization Program (OGAPIP) project. Among other documents that were reviewed in order to familiarize and deeply understand the project and the potential pest management challenges that will accompany the agricultural activities under the value chains selected includes: Nigeria's National laws, edicts and regulations and Ogun State Legislation & policies on Pest Management, Disease and Vector Control, World Bank Operational Policies and other relevant information.

1.4.2 Stakeholder/Consultations

As a process of initiating the approach of continual consultation for a robust understanding of the pest risks on this project and to further encourage the involvement of the public, various discussions & stakeholder meetings were carried out in the course of undertaking consultations for this PMP, especially with the State's Ministry of Agric & Rural Development, Ogun State Commissioners of Budget & Planning and Agriculture, OGAPIP Program Manager, PM for Agriculture, farmers of value chains identified, stakeholders and farmers in farming settlements & estates and other relevant stakeholders. The consultations revealed that the major value chains of the OGAPIP project are rice, cassava, fish, vegetables and livestock – beef & poultry. Table 1 contains issues raised during the stakeholder consultations/meetings and how they were addressed.

Table 1: **Issues Raised during Consultation Meetings**

Issues raised	How they were addressed
The use of pesticides and agro-chemicals for pest control is an essential part of agriculture in Ogun State and the project should be able to procure pesticides and agro-chemicals.	The PMP has prepared an IPM approach that will discourage complete reliance on agro-chemicals for pest control but rather integrate cultural methods, biological & chemical methods of pest control.
Farmers are of the view that some cultural control methods used in the past are no longer effective. For example, use of certain plants to repel reptilian pests (e.g. snakes) no longer work.	The OGAPIP Agric project team will liaise with National Agricultural Research Institutes (NARI's) to update knowledge & practices that are of value to improving pest management.
Herdsmen allow their cattle to graze freely in their farms and destroy their crops.	The farmers have associations that have been meeting with the cattle herders to ensure that conflicts do not arise. This has been strengthened under the ESMF. Farms should also be fenced where possible.
Farmers purchase pesticides & agro-chemicals from specific agro-dealers and as such have no complaints about potency or effectiveness.	Agro-dealers are an integral part of the OGAPIP pest management process.
Containers of pesticides & agro-chemicals are retrieved for a token by some agro-dealers under a buy back scheme.	This scheme is to be strengthened to encourage proper agro-chemical container disposal on the OGAPIP project.
Some agro-dealers sell agro-chemicals to farmers but do not provide the Material Safety Data Sheet (MSDS)	OGAPIP agric team will discourage use of agro-chemicals that do not an MSDS.

1.4.3 Field Visits

Fieldwork was carried out with visitations to the different farm settlements and estates in the senatorial districts of Ogun State. Some of the settlements/estates visited & agricultural practices include; Ikenne farm settlement, Imashayi farm estate, Ilewo farm settlement & Eggua rice farm. The agricultural value chains & practices in the areas visited are in table 2:

Table 2: **Locations Visited**

Location Visited	Agricultural Practices/Value Chains
Ikenne Farm Settlement	• Small scale farming of cassava & maize on a farm settlement (residential & farming) • Livestock farming - Poultry
Imashayi farm estate	• Small scale fish farming
Ilewo farm settlement	• Small scale farming of cassava & maize • Livestock farming - Poultry
Eggua rice project	• Rice farming (640ha of rice farm)

These visitations were conducted with a view of gathering information on the pest risks & challenges of the different value chains regarding pests in Ogun State, while key areas such as institutional arrangement, capacity, etc were discussed at stakeholder meetings held with the Ogun State Ministry of Agriculture & Ogun State Ministry of Environment. Consequently,

undertaking of this fieldwork is aimed at determining the existing conditions and pest challenges envisaged on the OGAPIP project.

1.4.4 Identification of potential Environmental & Social impacts and Mitigation Measures

The potential impacts have been identified through initial generic screening of the anticipated changes that could result in the light of the socio-environmental conditions (project-environment interactions).

To ensure all the project activities are appropriately screened for environmental issues at their conception stage, a check -list tool was developed to screen each cycle of the project in terms of:

1. Do no harm

All projects: The do-no-harm principle applies to all projects under any circumstances. Its concerns further underpin the fact that pest management activities in Bank projects are sustainable and that health and environmental risks of pesticide use are to be minimized and can properly be managed by the user.

Projects that directly or indirectly finance pesticides: For pesticides, directly or indirectly procured under Bank financed projects the policy states that it needs to be established that their use is justified under an IPM approach. It stipulates that optimum use should be made of available non-chemical pest management techniques to reduce reliance on synthetic chemical pesticides and that adequate measures be incorporated in the project design to reduce risks associated with the handling and use of pesticides to a level that can be managed by the users. The policy encourages monitoring of the effectiveness of these measures in order to achieve project objectives.

Projects that do not finance pesticides, but nevertheless indirectly increase or alter pesticide use, or affect pest management: If no pesticides are procured under the project, but if the project nevertheless affects pest management by maintaining or expanding pest management practices that are unsustainable, not based on an IPM approach, and/or pose significant health and environmental risks, then it would be appropriate to set out clear targets for moving current practices towards IPM and to provide the necessary support to this process. Immediate measures may be required to reduce risks associated with the handling and use of pesticides to a level that can be managed by the users. These may be addressed via:

- Determining justification of pesticide use (that is whether pesticides use is justified under an IPM approach);
- Determining if pesticides use is justified in economic terms;
- Determining appropriateness of products through selection and procurement of pesticides
- Identification of risks and risk management to mitigate environmental and health concerns.

2. Do-Good Principle

The do-good principle calls for enhancing policy reform and strengthening the regulatory framework and institutional capacity for the implementation of IPM and the control of pesticides. The expected level of project involvement depends on the circumstances and the scope of the project. Relevant factors in this respect are the:

- Magnitude of the activity involving or affecting pest management.
- Nature of the risks involved.
- Size of the gap between actual practices and good practices.
- Geographical scope of the project.
- Degree to which policy reform and capacity building fit in the project.

CHAPTER TWO

2.0 Project Description

The proposed project consists of two inter-related components including a results-based component, which is complemented by a technical assistance component. Component 1 which is results-based will disburse against agreed-upon *actions, outputs and outcomes* (Disbursement-Linked-Indicators or "DLIs") that result in the implementation of the agricultural and industrialization cardinal program of the state. Component 2 will finance select *technical assistance* to strengthen the Government's *capacity for implementing* the program and thereby achieving the results in Component 1. The two components are inherently linked through the results framework. With this approach, the project will cover technical assistance, implementation support, and co-financing of the underlying programs.

Component 1: Increasing Agricultural Production and Industrialization ($268 million, Results-based component)

The objective of this component is to support the implementation of Ogun State Development Plan's cardinal program on Agricultural Production and

Industrialization. In alignment with the cardinal program, the component will focus on the achievement of the following results:

Improved Business Environment – (measured by the reduction in time required to start a business, register property, and obtain a construction permit; number of investment deals supported, private operation of and reduced transportation time within an industrial estate; and degree of digitization of land registry);

Increased linkages of Farmers to Markets through Productive Alliances – (measured by increased productivity and output from farms, rehabilitation of access roads and development of irrigation land);

Improved employability of participants in Technical and Vocational Education Trainings (TVET) – (measured by number of students finding employment within 6 months of graduation from TVET program; improved leaning outcomes of secondary school graduates in math and science subjects, since this contributes, on a more sustainable basis, to strengthening the basic competence for employability of the youth);

The proposed project selected ten key DLIs (actions, outputs and outcomes) to measure and mark progress towards achieving these objectives. The government will receive disbursements based on established amounts allocated to the achieved DLIs to the extent that there are sufficient eligible expenditures incurred by the government (defined as the Eligible Expenditure Programs – EEPs).

Sub-Component 1.1 Improved Business Environment - The objective of this component is to support government reforms to build an enabling business environment conducive for long-term private investments. Reform interventions within this component will address regulatory, institutional and infrastructure challenges that serve as barriers to private sector investments. Four DLIS were selected to help track implementation progress for improving the business environment:

Simplified business processes (DLI 1): This DLI will track implementation progress on addressing operational constraints to doing business in Ogun State, particularly transversal reforms improving systems for business registration, property registration and construction permit. In parallel to these reforms aimed at easing the entry and operation of businesses, the Project will support reforms to strengthen the institutional capacity of the government to facilitate reform implementation within these areas. This sub-component will disburse according to the achievement of the following results: i) establishment of the institutional setup for reforms; ii) development and implementation

of reform action plans; (iii) streamlined regulatory processes for business; and iv) communication of reforms to the private sector.

Strengthened Investment Promotion (DLI 2): This DLI will track implementation progress on strengthening the State's capacity to promote, attract and retain domestic and foreign private investments. In this regard, the Project will engage with government and relevant stakeholders to establish an independent investment promotion agency (IPA) to engage in proactive and targeted promotion of Ogun as an investment destination. This sub-component will disburse according to the achievement of the following results: i) Establishment of IPA; ii) operationalization of the IPA (including hiring of key personnel and budgeting); and iii) investment deals supported by the IPA.

Private sector participation in operation and development of Industrial Estates (DLI 3): This DLI will track implementation progress on improving the regime of industrial estates with the objective of attracting private sector participation for the development and operation of individual estates. This sub-component will disburse according to the achievement of the following results: i) conducting assessments (including benchmarking, site assessments and demand survey) to determine the competitiveness of the estates; ii) conducting feasibility studies for road upgrades within Agbara estate; iii) hiring a transaction advisor; and iv) developing a special-purpose vehicle for the development and operation of an industrial estate. The industrial estate(s) to be developed will be limited to land already owned by the government and demarcated as industrial estate land with minimal social and environment risks.

Improving Land Administration (DLI 4): This DLI will track implementation progress on improvements to the land administration and the development and implementation of the international best practice Framework for Responsible and Inclusive Land-Intensive Agricultural Investments (FRILIA) in the state. This sub-component will disburse according to the achievement of the following results: i) the adoption of FRILIA principles; ii) the development of the state land use policy and land management system; iii) improvement to the survey controls; iv) development of a spatial data infrastructure plan and land valuation mechanism; and v) reduction in time to obtain a certification of occupancy.

Sub-Component 1.2: Increasing Agricultural Production. The objective of this subcomponent is to provide support to farmers and businesses to incentivize rapid development of priority value chains; finance the development of critical infrastructure to address binding constraints and boost agricultural development in the State; and enable the capacity of the public sector to improve the role of the public sector in agriculture policy making, sector coordination and monitoring. This sub-component includes 2 DLIs:

Targeted Support to Value Chain Development (DLI5): This DLI will track implementation progress on the value chain development players' efforts to effectively coordinate and align their efforts towards the development of targeted value chains. Key players will include (i) smallholder farmers and agribusiness firms; (ii) specialized seed and input suppliers; iii) off-takers and (iv) value chain development firms (VCDF) to ensure timely linkage between producers, input suppliers and off-takers. This sub-component will disburse as VCDFs are competitively selected and contracted and farmers are linked to markets.

Infrastructure Development (DLI6): This DLI will track implementation progress on the development of critical infrastructure to enhance agricultural production and marketing in production areas where value chain alliances are being promoted. The focus will be on small-scale irrigation and feeder roads. Support to development of small scale irrigation schemes will provide wider access of smallholder farmers to irrigation services, in order to mitigate climate change effects, guarantee year-round farming and enhance productivity. This sub-component will disburse as: i) feasibility studies for the infrastructure, including a master plan for small scale irrigation, are completed; and ii) segments of the infrastructure are completed over the course of the project.

Increasing PPPs in Agriculture (DLI7): This DLI will also focus on the reduction of public sector involvement in actual agriculture-based operations by the gradual divestment of state agriculture assets. This sub-component will disburse as state assets in agriculture are divested or management partially or fully transferred to the private sector.

Sub-Component 1.3 Skills Development. The objective of this subcomponent is to support the reform of non-formal education, including literacy programs, as well as technical and vocational education and

training (TVET) in order to improve the quality and demand-orientation in the current system of skills development and to increase access to market-relevant skills training in the state. The program will incentivize a strong involvement of industry and the private sector in skills development, foster on-the-job training, increase training offers attractive for women, appropriate for vulnerable populations and people with disabilities, and accessible throughout the state including in rural and urban areas. This sub-component includes 4 DLIs:

Improved relevance and performance of post-basic TVET (DLI 8)*:* This DLI will track implementation progress on rehabilitation and restructuring of the institutions of post-basic formal technical and vocational education and training in line with needs of the emerging industrial sector. The DLIs will support the modernization of the public Technical Colleges (TCs) and converting them into model technical colleges (MTCs) linked to major industrial sectors. MTCs will develop into centers of excellence in one or two selected occupational groups providing high quality training and services to industry. MTCs will be run as and through partnerships with companies and industry groups, and new governance structures for the colleges delegating critical responsibilities to private sector stakeholders will ensure that the development of MTCs are industry-driven. This sub-component will disburse according to the achievement of the following results: i) formally agreed partnerships between technical colleges and industries; ii) companies participating in dual apprenticeship programs; iii) functioning workshops in MTCs; iv) reduction in vacancy rate of technical teachers in TCs; and v) increase in female enrolment rate.

Enhanced access to skills training programs (DLI 9): This DLI will track implementation progress on the replication and scale up ongoing dual vocational training (DVT) pilot initiative to broaden the range of programs delivered in a dual mode, expand DVT to more areas in the state, increase the number of enterprises and TVET institutions participating and increasing the number of youth undergoing apprenticeship training. Expanding dual apprenticeship training will at the same time increase the capacity of the formal TVET system. Funding under the program will be used for program development (curriculum development, teaching and learning material, etc), training of staff in companies involved in managing and supervising apprentices, capacity building in participating training institutions (including staff training and selected equipment and TL materials in case new programs are

introduced), awareness creation activities and monitoring and evaluation of the DVT approach. This sub-component will disburse according to the achievement of the following results: i) service contracts signed with community based skills training providers; ii) master crafts persons certified as NSQF assessors; iii) farmers who have improved their literacy scores; iv) traditional apprentices NSFQ certified; v) community based skills programs attendees that increased their income 6 months after the end of the course.

Improved Teaching Practices in STEM Subjects (DLI 10). This DLI will track implementation progress on strengthening the knowledge and practices of secondary school STEM teachers. This will include the introduction of an innovative and proven teaching program that utilizes interactive technology in the classroom and an enhanced delivery of content. Under this intervention area, the Program will improve the quality of math, science in targeted secondary schools through the provision of training to teachers of these subjects and subject advisors in a new approach and the provision of related learning resources. The MoE will introduce the Progressive Mathematics Initiative (PMI) and Progressive Science Initiative (PSI) (to be called PMI-PSI from here on) in a phased approach, beginning with an initial rollout that will include an intensive monitoring and evaluation (M&E) of the implementation process for lessons learned and refinement for scaling up. The program will eventually reach all public senior secondary schools in Ogun. Additionally, the sub-component will support subject advisor visits to schools and specific subject teacher cluster meetings with content specifically designed to support teachers in conducting the PMI-PSI content in their own classrooms. This sub-component will disburse according to the achievement of the following results: i) approval of PSI-PMI package; ii) schools participating in the STEM intensive teaching program; and iii) teachers with measured change in teaching practice.

Component 2: Technical Assistance to strengthen implementation capacity for increasing agricultural production and industrialization ($82 million)

The objective of this component is to strengthen the capacity of the government to deliver on the cardinal program on agricultural production and industrialization. By contributing to improvements in the Government's capacity to implement the agricultural production and industrialization program, this component will contribute to the achievement of the DLIs under Component 1.

This component will finance select technical assistance and investment activities. Implementing the cardinal program on agricultural production and industrialization will require many types of inputs, as discussed above. To complement those inputs, the proposed project would finance select technical assistance and advisory activities that will support improved capacity to implement and monitor reforms that would lead to the achievement of results (DLIs and ultimately the PDO of the project). Specific activities would be organized into four sub-components, supporting the three results areas (industrialization, agriculture and skills) plus the cross-cutting area of governance as follows:

Component 2.1 Business Environment ($20 million). This sub-component will finance select technical assistance and advisory activities to improve the business environment including: i) the institutional set up for business environment reforms and ongoing support to the Business Environment Council, Secretariat and Technical working groups including diagnostics, training and support with reform strategy and action plans; ii) establishment and ongoing support for the new State Investment Promotion Agency; iii) conducting a statewide firm survey; iv) assessments needed for the development of roadmap for Industrial Estates; v) transaction advisory services for the selection of and negotiations with private developer/operator for the industrial estates; vi) capacity building for all institutions involved in industrial estate regulation, development and operation including incorporating best practice environment and social safeguards; vi) conducting feasibility study on road improvements in and leading to Industrial estates; and vii) streamlining of land administration process and implementation of comprehensive land management system to rationalize requirements and make processes clear, transparent, and time-bound in accordance with best international practices; and vii) review of the Ogun State Building Code, relevant regulations for construction permits and their implementation including diagnostics of regulatory quality issues and liability regimes. Support for additional relevant assessments will be provided on an as needed basis as funding allows.

Component 2.2 Agriculture ($20 million): This sub-component will finance select technical assistance and advisory activities to increase agricultural production including: i) the preparation and adoption of the FRILIA, as well as the establishment and the Agricultural Land Management Office; ii) design of incentive packages and the rollout of these packages to cluster of farmers on a demand-driven basis, including TA for monitoring the results; iii) feasibility studies for rural roads and irrigation schemes; iv) capacity building for all relevant MoA departments; v) incorporate best practice environment and social safeguards elements into development and maintenance of feeder roads and irrigation schemes. Support to relevant

policy reviews and market studies will be provided on an as needed basis as funding allows.

Component 2.3 Skills ($12 million): This sub-component will finance select technical assistance and advisory activities to improve skills development including M&E, Project management and studies.

Component 2.4 Governance and PFM ($20 million): This sub-component will finance select technical assistance and advisory activities to improve governance and public financial management including: i) the establishment of the Statistical department and conducting household and sectoral surveys; ii) the establishment of the Procurement Bureau, the development of the procurement master plan and the systematic introduction of e-procurement across relevant MDAs.

Component 2.5 Project Implementation support ($10 million): In order to support successful implementation of the proposed project, the operational capacity of the state Ministry of Planning and Budget (MPB) will need to be strengthened by a group of technical specialists to be hired to coordinate the work of the MDAs that will be involved in the project. This component will finance the setup of a Project Coordination Unit (PCU) under the MPB with the following technical specialists: project coordinator, sector project managers, procurement specialist, financial management specialist, M&E specialist, environmental specialist, social specialists, IT specialist, Communication specialist.

2.1 Environment Safeguards Issues

The PMP is designed to minimize potential harmful effects on human and animal health and on the environment which may arise particularly from proposed activities relating to support to be provided to farmers which include inputs requirements such as agrochemicals (fertilizers, herbicides, etc.) as required under OP 4.09 (Pest Management).

The PMP shall comprise a comparison between the Nigerian EIA laws and the World Bank Environmental and Social Safeguard Policies by which the activities of ***Components 1 and 2*** (especially Component 1.2 – increasing agricultural production) triggers the following safeguard polices: Environmental Assessment (OP/BP4.01), Pest Management (OP/BP4.09), Involuntary Resettlement (OP/BP4.12). OP/BP 4.04 (Natural habitats), and OP/BP 4.11 (Physical Cultural Resources). Safeguards Instruments prepared are shown in table 3.

Table 3: **Potential Safeguard Instruments Prepared**

Policy	Yes	No	Applicability due to	How this Project Addresses Policy Requirements
Environmental Assessment (OP 4.01)	X		May trigger site-specific environmental impacts.	An ESMF has been prepared alongside this PMP.
OP/BP 4.04 (Natural habitats)	**X**		May trigger the disruption of natural habitats.	Site-specific mitigation measures in addition to the ESMF will address this policy.
Pest management (OP 4.09)	X		Agricultural activities included under the key value chains of this project have pest management risks.	A PMP has been prepared as part of the due diligence requirements.
OP/BP 4.11 (Physical Cultural Resources)	X		Intervention may trigger impact on physical cultural resources.	The safeguard that addresses this policy is the **Chance Find Procedures**, which is documented in Annex 14 of the ESMF.
Involuntary Resettlement (OP 4.12)	X		Interventions could lead to restriction of access to sources of livelihoods. There could be encroachment to farmlands	A standalone RPF has been prepared alongside this PMP.

This project is not expected to have adverse Environmental and Social impacts and is assigned as EA Category "B" according to WB safeguards policy requirements, mostly site specific, reversible and can easily be avoided or managed. The project is expected to have overall positive environmental and social impacts.

CHAPTER THREE

3.0 Regulatory Framework for the PMP

The applicable national and international guidelines on pest management and use of agro-chemicals & fertilizers that are relevant to OGAPIP project are highlighted as follows:

3.1 Laws, Policies and Guideline on Pesticides Management in Nigeria on Pesticides Management

State Regulations, Laws & Policies

Ogun State Policy on Environment (2013):
Ogun State Policy on environment is a broad course of action that the Ogun State Government adopts so that it meets its objectives of creating better living and conducive environment for the entire people of Ogun State. The mandate of environmental impact studies lies with the Department of Planning Research & Statistics whose functions include Flood and Erosion Control, Environmental Conservation and Resource Management, which includes beautification of the environment, cleaning and maintenance of major streets in the metropolis.

Ogun State Policy on Agriculture:
The main policy thrusts of the Ogun State Ministry of Agriculture as contained in the State Agricultural Policy Document, which was conceived and launched in April, 1989, include the following: to enhance self-sufficiency in food production, provide raw materials for agro-based industries, generate employment opportunities, as well as obtain desirable levels of exports in order to improve the country's foreign exchange earnings. The State's policy framework for agriculture recognizes the need for consistency with the global agenda on Sustainable Agriculture and Climate Change. The objective is to integrate food security, job creation and sustainable agriculture into the state's wider economic policies.

Ogun State Agricultural Land Management Unit Policy:
Land allocation for agricultural, commercial and Industrial uses in the state is the responsibility of the existing four government agencies namely:

i. Ogun State Bureau of Lands & survey
ii. Ministry of Agriculture
iii. Ogun Property and Investment Corporation (OPIC)
iv. Ogun State Housing Corporation

The Government through these agencies will ensure that land is promptly approved for commercial, agricultural and Industrial purposes

National Regulations, Laws & Policies

There are some legislations and institutional framework in Nigeria that exist for the regulation of the distribution and use of pesticides in Nigeria. The existing legislative tools are:

- Federal Ministry of Agriculture & Rural Development (1988)
- National Policy on the environment, 1989. Reviewed in 2016
- FEPA Decree 58 of 1988 as amended by Decree 59 of 1992 and 1999 but complemented by rules and regulations such as FEPA S.1.5, FEPA S.1.9 dealing with disposal and distribution/use of pesticides.
- NAFDAC Decree 15 of 1993, as amended by Decree 19 of 1999.
- The Factories Acts 1990 being implemented by the Factories Inspectorate Division of FMLP.
- Harmful Waste (Special Criminal Provisions, Etc.) Act - CAP H1 L.F.N. 2004

Nigerian Agricultural Promotion Policy (2016)

The general pest control objectives in this agricultural policy for Nigeria are to build on the successes of the Agricultural Transformation Agenda (ATA) and close key gaps, by:

- Controlling, and/or eradicating and maintain good surveillance of the major economic pests whose outbreaks are responsible for large-scale damage/loss to agricultural production.
- Providing protection to man and animals against vectors of deadly diseases.

Revised National Policy on the Environment 2016

Nigeria formulated its first national policy on the environment in 1991. It was revised in 1999, and seventeen years down the lane, it is due for another revision in order to capture emerging environmental issues and concerns. This is especially more pertinent as a considerable part of our economy is dependent on climate- sensitive resources. For example, the agriculture sector (crop production, livestock and fishery) and forestry, which employ up to 70% of the workforce and contributes about 22% of the rebased GDP is very climate sensitive.

- The key environmental issues facing Nigeria include land degradation, deforestation, and land, water and air pollution among others. Land is by far the most important resource necessary for subsistence.
- In addition to the existing 1991 and 1999 draft policy documents, this Policy derives its strength from the fundamental obligation for the protection of the environment as stated in section 20 of the Constitution of the Federal Republic of Nigeria 1999 which provides that the "State shall protect and improve the environment and safeguard the water, air and land, forest and wild life of Nigeria".
- In addition, Nigeria is party to several international treaties and conventions governing environmental issues. It is on the combined thrust of these instruments that the National Policy on the Environment rests.

Workmen Compensation Act 2010

The objectives of the Act are:

(a) To provide for an open and fair system of guaranteed and adequate compensation for all employees or their dependants for any death, injury, disease or disability arising out of or in the course of employment;

(*b*) Provide rehabilitation to employees with work-related disabilities as provided in this Act;

(*c*) Establish and maintain a solvent compensation fund managed in the interest of employees and employers;

(*d*) Provide for fair and adequate assessments for employers;

(*e*) provide an appeal procedure that is simple, fair and accessible, with minimal delays; and

(*f*) Combine efforts and resources of relevant stakeholders for the prevention of workplace disabilities, including the enforcement of occupational safety and health standards.

National Gender Policy 2006

Some of the key principles upon which the policy is premised are:

- Commitment to gender mainstreaming as a development approach and tools for achieving the economic reform agenda, evidence based planning, value re-orientation and social transformation.

- Recognition of gender issues as central to and critical to the achievement of national development goals and objectives and a requirement for all policies to be reviewed to reflect gender implications and strategies as contained in the gender policy and implementation modalities specified in the National Gender Strategic Framework;

Realization that effective and results focused policy implementation demands a cooperative interaction of all stakeholders. Promotion and protection of human rights, social justice and equity.

Policy Guidelines on Pest & Vector Control 2005

This policy aims control of pests and vectors in the environment that constitute threats to public health & property, by undertaking the following:

- Establishing & strengthening pest and vector control units in the three tiers of Government
- To control pests and vectors in households, offices, food premises, industries, agricultural farms and the environment in general
- To evolve sustainable pest and vector control systems
- To regulate the activities of pest and vector control operators

- To establish surveillance mechanisms for monitoring toxic effects of pesticides on the ecosystem and public health
- To establish and strengthen surveillance mechanism for monitoring pests and vectors in the environment.

Child Rights Act 2003

The objectives of this Act are:

- In every action concerning a child, whether undertaken by an individual, public or private body, institutions or service, court of law, or administrative or legislative authority, the best interest of the child shall be the primary consideration.
- A child shall be given such protection and care as is necessary for the well-being of the child, taking into account the rights and duties of the child's parents, legal guardians, or other individuals, institutions, services, agencies, organizations or bodies legally responsible for the child.
- Every person, institution, service, agency, organization and body responsible for the care or protection of children shall conform with the standards established by the appropriate authorities, particularly in the areas of safety, health, welfare, number and suitability of their staff and competent supervision.

Federal Environmental Protection Agency Act 58 of 1988 as amended by Decree 59 of 1992

This Act specifies the guideline and rules guiding the dealing with distribution, use and disposal of pesticides in Nigeria. The Act also mandates the Agency to establish instruments for air quality standards, water quality standards, atmospheric protection and ozone layer protection. In discharging the mandate, the FEPA in 1991 published a number of regulations for the protection of the environment, including the waste management and Hazardous Waste Regulation, which provides a comprehensive list of chemicals and chemical wastes by toxicity classification.

National Environmental Standards and Regulations Enforcement Agency (NESREA) Act 2007

NESREA is charged with the responsibility for the protection and development of the environment, biodiversity conservation and sustainable development of Nigeria's natural resources in general and environmental technology, including coordination and liaison with relevant stakeholders within and outside Nigeria on matters of enforcement of environmental standards, regulations, rules, laws, policies and guidelines.

Regulation C/Reg. 3/05/2008 on the Harmonization of Rules Governing Pesticides Registration in the ECOWAS Region

The National Agency for Food and Drug Administration and Control (NAFDAC)

NAFDAC was established by Decree 15 of 1993 as amended by Decree 19 of 1999 and now Act Cap N1 Laws of the Federation of Nigeria (LFN) 2004, to regulate and control the manufacture, importation, exportation, distribution, advertisement, sale and use of food, drugs, cosmetics, chemicals, medical devices and packaged water in Nigeria for the protection of human health. In discharge of its statutory responsibility, NAFADAC has approved the list of chemicals allowed in Nigeria for the control of pest. This list is attached in the annex 2 of this report.

Factories Act, Cap F1, LFN 2004

The Factories decree 1990 was a landmark in legislation in occupational health in Nigeria. It provides a substantial revision of the colonial legislation, Factories Act 1958, in which the definition of a factory was changed from an enterprise with 10 or more workers to a premise with one or more workers thereby providing oversight for the numerous small-scale enterprises that engage the majority of the workforce in Nigeria. It stipulates the enforcement of compliance on factories, industries and organizations that employ labour on the protection of the right of workers to friendly environment, health and safety.

Harmful Waste (Special Criminal Provisions, Etc.) Act - CAP H1 L.F.N. 2004

This Act, which was established on The 25th of November 1988, was necessitated by the illegal use and dumping of toxic wastes in the port town of Koko in Southern Nigeria. The Act defines harmful waste to mean any injuries, poisonous or toxic substances, which are capable of subjecting anybody to the risk of health. As contained in the section 1, it is an offence to purchase, sale, import, transit, transport, deposit and/or store any banned or obsolete chemical or any other form of wastes in the Nigeria territory or water.

3.2 International Conventions & Treaties Relevant to Pest Management in Nigeria

Nigeria is a signatory to many conventions on the protection of the environment, which lay credence to the PMP under study. Some of these conventions pertinent to this study include:

- Montreal Protocol
- Bamako Convention on Hazardous Wastes
- Basel Convention on Trans-boundary Movements of Hazardous Wastes and their Disposal

- Stockholm Convention on Persistent Organic Pollutants (POPs)
- International Code of Conduct for the Distribution and Use of Pesticides
- Rotterdam Convention
- International Standards for Phytosanitary Measures, FAO

Among the aforementioned conventions, a certain number of them have a direct importance with pesticides and the fight against pollution, particularly the Stockholm Convention on persistent organic pollutants. This convention, in accordance with Principle 15 of the Rio Declaration on Environmental and Development, aims at protecting human health and the environment from persistent organic pollutants such as aldrin, dieldrin, chlordane, endrin, heptacholic, hexachlorobenzene, mirex, toxaphene, DDT and PCBs. It is a global treaty to protect human health and the environment from highly dangerous, long-lasting chemicals by restricting and ultimately eliminating their production, use, trade, release and storage. The Convention was adopted in Stockholm, Sweden on May 22, 2001. It calls for outright banning and destruction of 12 Persistent Organic Pollutants, 9 of which are pesticides. These are: Pesticides POPs: Aldrin, Chlordane, DDT, Dieldrin, Endrin, Heptachlor, Hexachlorobenzene, Mirex, Toxaphene. The Industrial POPs: Dioxins, Furans, Polychlorinated biphenyls (PCBs).

3.2.1 The Rotterdam Convention

The Rotterdam Convention on the Prior Informed Consent on Procedure for Certain Hazardous Chemicals and Pesticides in International Trade is a global treaty that came into force in February 2004. It is designed to protect public health and the environment by promoting informed decision–making by importing countries in relation to products that have been banned or severely restricted by at least two other Parties to the Convention. It formalizes the voluntary principles established in the International Code of Conduct.

The Rotterdam Convention on Prior Informed Consent (PIC) aims to help participating countries make informed decisions about the potentially hazardous chemicals that might be shipped to them, and to facilitate communication of these decisions to other countries. The Convention requires exporting Parties to honour the decisions of importing Parties.
The key principles of PIC are:

- International shipment of a pesticide included in the PIC list should not occur against the wishes of the importing country.
- In the absence of a decision from an importing country, the export may proceed if the pesticide is registered in the country, or if it has previously been used or imported into the country.

- If an importing country decides not to consent to further imports, the decision must be applied to imports from all sources, and domestic manufacturing and use must cease.;
- Recommendations for inclusion of banned and severely restricted chemicals in the PIC procedure must be supported by risk evaluations reflecting prevailing conditions at the national level.

3.2.2 Basel Convention

The Basel Convention on the Control of Transboundary Movements of - Hazardous Wastes and their Disposal was concluded in Basel, Switzerland on March 22, 1989, and entered into force in May 1992. The Basel Convention contains specific provisions for the monitoring of implementation and compliance. A number of articles in the Convention oblige Parties (national governments which have acceded to the Convention) to take appropriate measures to implement and enforce its provisions, including measures to prevent and punish conduct in contravention of the Convention.

The key principles/outcomes of the Basel convention are:

- In order to minimize the threat, hazardous wastes should be dealt with as close to where they are produced as possible.
- Trans-boundary movements of hazardous wastes or other wastes can take place only upon prior written notification by the State of export to the competent authorities of the States of import and transit (if appropriate).
- Each shipment of hazardous waste or other waste must be accompanied by a movement document from the point at which a trans-boundary movement begins to the point of disposal. Hazardous waste shipments made without such documents are illegal.
- Outright bans on the export of these wastes to certain countries; however, Trans-boundary movements can take place, if the state of export does not have the capability of managing or disposing of the hazardous waste in an environmentally sound manner.

There is also the support for the document of harmonization of rules governing the pesticide agreement in the ECOWAS zone adopted at the 60th ordinary session of the ECOWAS Council of Ministers held at Abuja on 17 and 18 May 2008. The aim of this common regulation is to:

- Protect the West African population and environment against the potential hazards of pesticide use;
- Facilitate intra and inter-state trade in pesticides through the establishment of rules and principles accepted by common consent at the regional level to remove the trade barriers;

- Facilitate an appropriate and timely access by farmers to quality pesticides;
- Contribute to the creation of a suitable environment for private investment in the pesticide industry, and;
- Promote public-private sector partnership.

This regulation is applicable to all activities involving the experimentation as well as authorization; trade in utilization and control of pesticides and bio pesticides in the member countries.

3.3 World Bank's Environmental and Social Policies

The World Bank's environmental and social safeguard policies are a cornerstone of its support to sustainable poverty reduction. The objective of these policies is to prevent and mitigate undue harm to people and their environment in the development process. These policies provide guidelines for bank and borrower staff in the identification, preparation, and implementation of programs and projects. Safeguard Policies triggered are illustrated below:

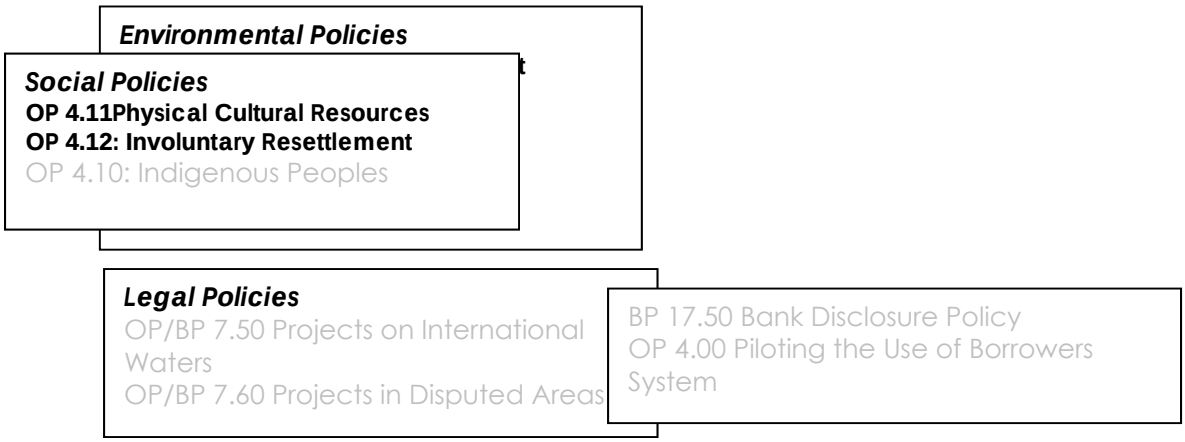


Figure 1: World Bank Safeguard Policies

OP 4.09 is triggered by components 1 & 2. The objective of subcomponent 1.2 is to provide support to farmers and businesses to incentivize rapid development of priority value chains, through Targeted Support to Value Chain Development (DLI5), which will track implementation progress on the

value chain development players' efforts to effectively coordinate and align their efforts towards the development of targeted value chains.

3.3.1 World Bank OP 4.09

The OP 4.09 policy is the WB policy on pest management that supports safe, effective and environmentally sound pest management and promotes the use of biological and environmental control methods. It encourages the assessment of the capacity of the country's regulatory framework and institutions to promote and support safe, effective, and environmentally sound pest management. Projects that include the manufacture, use, or disposal of environmentally significant quantities of pest control products are classified as Category A. Depending on the level of environmental risk, other projects involving pest management issues are classified as A, B, C, or FI.

The World Bank OP 4.09 ensures that EA covers potential issues related to pest management and considers appropriate alternative designs or mitigation measures. It places premium on using biological pest control measures, but where chemical pesticides must be used, it encourages the country's capacity to manage the procurement, handling, application and disposal of pest control products be evaluated and the capacity to monitor the precision of pest control and the impact of pesticide use, and to develop and implement ecologically based pest management program.

OP/BP4.01 annex C exempts procurement of impregnated bed nets and WHO Class III insecticides for intra-domiciliary malaria control from the requirement of preparing a pest management plan. In those cases, preparation of a hazard assessment would suffice. A hazard assessment identifies risks associated with the transport, storage, handling and use of the pesticides and provides measures to minimize these risks. The policy further provides that the PMP may be limited to pest control product screening when all of the following conditions are met:

- Expected quantities of pest control products are not significant from a health or environment standpoint,
- No significant environment or health concerns related to pest control need to be addressed,
- The project will not introduce pesticide use or other non-indigenous biological control into an area, or significantly increase the level of pesticide use;
- Products to be financed fall in class 111 or table 5 of the WHO Classification of pesticides by hazards.

The OP 4.09 principles provide general guidance that will be followed during appraisal on how to address pest management issues in different categories of projects to which OP 4.09 applies.

3.4 Comparison between National Laws & World Banks OP/BP 4.09

Generally with regard to environmental issues such as the sound management of pests, legislation is in an on-going process of development and improvement, in Nigeria. Nonetheless, there is still adequate enough legislation and guidelines for the OGAPIP to manage the project activities to ensure no harm to people and the environment from the management of pests. A comparison between the National policy guidelines on pest management and the World Bank policy on pest management OP 4.09 is shown in table below.

Table 4: Comparison between National Guidelines on Pest Mangt & World Bank OP 4.09

National Guidelines on Pest Management	World Bank Pest Management Policy – OP 4.09	Comparison/Gap in Approach
Pest management issues for agricultural projects are addressed by the proponent as a part of environmental impact assessment (EIA) requirements.	In Bank-financed projects, the borrower addresses pest management issues in the context of the project's environmental assessment (EA) for which a separate safeguard instrument, PMP, is prepared.	No gaps. Pest management plans are a requirement for agricultural projects.
Objectives		
Policy objective supports the control of pests and vectors in the environment that constitute threats to public health & property and one of the strategies is to support research into environmentally friendly methods of pest & vector control.	WB OP 4.09 policy supports safe, effective, and environmentally sound pest management. It promotes the use of biological and environmental control methods.	No gaps. Both policy guidelines recognize the need to pursue environmentally friendly methods of pest control, for which the strategies include biological & environmental, traditional & chemical control pest control methods in approach to pest mangt.
Institutional Capacity		
Encourages the establishment of pest & vector control units in relevant ministries, agencies and all tiers of Government.	Encourages an assessment of the capacity of the country's regulatory framework and institutions to promote and support safe, effective, and environmentally sound pest management.	Gaps exist in the strategy in place for promoting institutional strengthening on pest mangt. National guideline encourages procedural approach to institutional strengthening, while the OP 4.09 supports capacity & institutional strengthening through a capacity assessment-based approach, which has guided the preparation of this PMP.
Agricultural Pest Management		
Recognizes the fact that requirement for chemical inputs such as herbicides and	In Bank-financed agriculture operations, pest populations are normally controlled through IPM	No gaps. Emphasis is on use of environmental methods of control under both policy

pesticides, pose a concerns to environmental health as these may impact soils, water bodies and non-target crops as well as non-target pests and therefore encourages adoption of environmentally friendly control methods.	approaches, such as biological control, cultural practices, and the development and use of crop varieties that are resistant or tolerant to the pest. Where environmental methods alone are not effective, the Bank may finance the use of pesticides for control of disease vectors.	guidelines. Major challenge is in the area of weak enforcement of compliance under national guidelines. However, this PMP adopts an IPM approach to pest management.
Pesticide Selection & Use		
Policy guide in pesticide selection has specific generic group names & common chemicals/pesticides that can be procured and purpose for which they can be applied.	The procurement of any pesticide in a Bank-financed project is contingent on an assessment of the nature and degree of associated risks, taking into account the proposed use and the intended users.	OP.4.09 specifically refers to the World Health Organization's *Recommended Classification of Pesticides by Hazard and Guidelines to Classification* (Geneva: WHO 1994-95) and has guided the preparation of this PMP.
Specific in the list of 22 pesticides and recommended national import decisions of the banned status.	The Bank does not finance formulated products that fall in WHO classes IA and IB, or formulations of products in Class II.	OP 4.09 references specific WHO standards as included in the preparation of this PMP.
Disposal of Pesticide Containers		
Encourages the destruction of empty pesticide containers using a suitable incinerator or to bury in a hazardous waste disposal site.	Encourages disposal of pesticides & agro-chemical containers in line with the FAO's *Guidelines for Packaging and Storage of Pesticides* (Rome, 1985), *Guidelines on Good Labeling Practice for Pesticides* (Rome, 1985), and *Guidelines for the Disposal of Waste Pesticide and Pesticide Containers on the Farm* (Rome, 1985)	Gap in best approach to disposal. The FAO guidelines referenced in the OP 4.09 is the standard to disposal of waste pesticide and pesticide containers, which has also been given due consideration in this PMP.

In the event of divergence between the two, the World Bank safeguard policy shall take precedence over Nigerian environmental & pest management laws, guidelines and or standards.

CHAPTER FOUR

4.0 Description of the current biophysical and socio-economic environment

Ogun State is located in the southwest of Nigeria, it is contained within longitudes 2°45'E; and latitudes 6°15'N and 7°60'N. The land area is 16,432 square kilometres. It is bounded on the west by the Republic of Benin, to the south by Lagos State and a 20-kilometre stretch of the Atlantic Ocean, to the east by Ondo and Osun States, and to the north by Oyo State. This is illustrated in Figure 2, while Figure 3 shows a map of Ogun State.

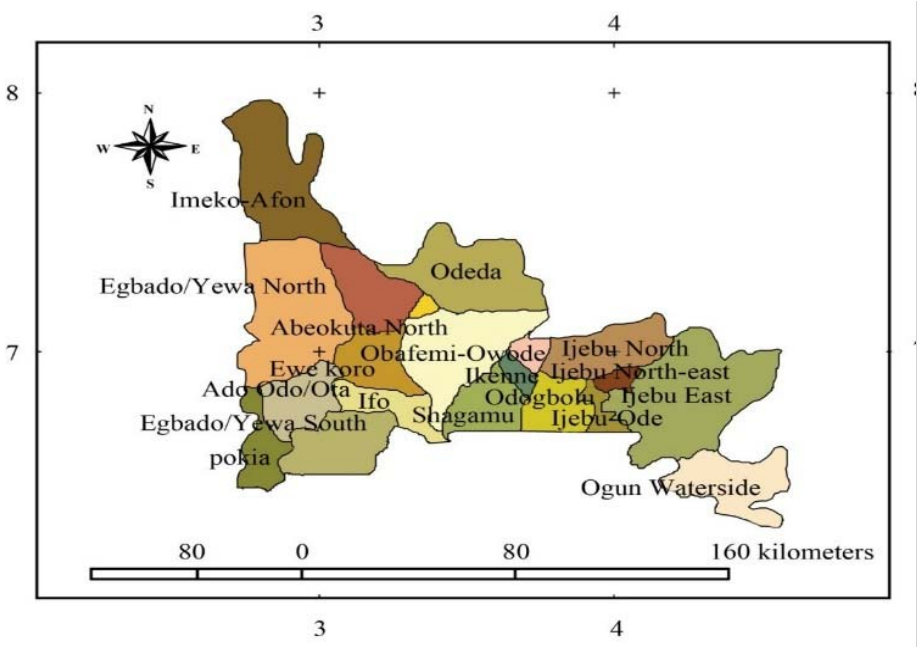
Figure 2: Map of Nigeria showing Ogun State highlighted

4.1 Physical Environment

4.1.1 Climate

The project area is categorized to be partly tropical with alternating wet and dry seasons. The climate is strongly influenced by Inter-tropical Convergence Zone (ITCZ) weather patterns. Maritime tropical air masses, characterized by warm, humid south- westerly winds and the continental air mass, characterized by hot, dry north-easterly winds, converge in the

ITCZ. Movement of these air masses results in two main seasons in the state; a wet season from April to October, and a dry season from November to March. During the dry season there are periods when the harmattan (a period characterized by dry dusty winds and relatively low temperatures) is experienced.



Source: OGAPIP PAD

Figure 3: Map of Ogun State

This typically occurs during the months of December and January. While there are two main seasons during the course of the year, the annual weather patterns are somewhat more complicated due to a short break in the wet season in August giving rise to four observed seasons:

- A long rainy season from March to the end of July, with a peak period in June over most parts of southern Nigeria.
- A short dry season in August, which lasts for 3-4 weeks. This is due to the ITCZ moving to the north of the region.
- A short rainy season follows the brief dry period in August and lasts from early September to mid-October as the ITCZ moves south again, with a peak period at the end of September. The rains are not usually as heavy as those in the long rainy season.
- A long dry season starts in late October and lasts to early March with peak dry conditions between early December and late February.

Important climatic variables within the tropics as related to Nigeria are summarized as:

4.1.2 Rainfall

The mean annual rainfall in the region ranges from 500 mm to 2,000 mm. During the wet season, rainfall events can be as much as 140 mm per day. Along the coast, the mean annual rainfall ranges between approximately 920 mm and 1,500 mm. Lagos (located approximately 60 km to the east of the Project site) receives an average of1 740 mm of rain, annually.

4.1.3 Temperature

At near sea level in the equatorial zone, temperatures can be high and only vary by approximately 8°C throughout the year. Maximum temperatures are in the region of 32°C during the dry season (February and March) and at a minimum of around 22°C in August.

4.1.4 Topography

The terrain of the state is characterized by high lands to the north and sloping downwards to the south. The highest region is in the north-west and rises to just over 300 metres above sea level. The lowest level is to the south terminating in a long chain of lagoons. The only window to the Atlantic Ocean is to the south east of the State in Ogun Waterside LGA. With the general topography sloping from the north to the south, all the main rivers in the State flow from the north to the south.

4.1.5 Ambient Air Quality

Generally, air quality in the Nigeria complies with regulatory standards. However, variations have been noticed in major industrial cities like Lagos, Ibadan, Aba, Kano, Port Harcourt and Kaduna, and Agbara section of Ogun state. The Federal Ministry of Environment (FMEnv) has established national standards (Table 5) for gaseous emissions against which air quality parameters monitored are compared in order to ascertain its quality.

Table 5: Nigerian Ambient Air Quality Standard

Air Pollutants	**Emission Limits**
Particulates	250 (µg/m^3)
SO2	0.1 (ppm)
Non-methane Hydrocarbon	160 (µg/m^3)
CO	11.4 (µg/m^3) or 10 (ppm)
NOx	0.04-0.06 (ppm)

Photochemical Oxidant	0.6 (ppm)

Source: FMEnv, 1991

Geology

The geology of Ogun State comprises sedimentary and basement complex rocks. The rock is soft and brittle but, in some places, cemented by iron and silicon containing materials. The basement complex is essentially non-porous and water can only be contained in the crevices of the complex. This basement complex primarily underlies the sedimentary layers, which consist of Cretaceous, Tertiary and Quaternary sediments deposited in the coastal basin. The sedimentary rock of Ogun State consists of the Abeokuta formation, which lies directly above the basement complex and is in turn overlain by the Ewekoro, Oshosun and Ilaro formations. These formations are overlain by coastal plain sands (Benin formation).

Soils

The soil profile in the area consists of reddish clay to approximately 2.0 m depth, followed by reddish brown clay. The subsequent strata include clayey units, sandy aquifers and greyish dark clay beneath these. The Ise Formation comprises of conglomerates and grits at the base and is in turn overlain by coarse to medium grained loose sands

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The State is endowed with many natural resources that include forest and water bodies as well as commercial quantities of mineral deposits. These minerals include limestone, bitumen, laterite, kaolin, stones, gypsum, feldspar, clay, glass sand, quartz, tar sand, phosphate, bauxite, granite, crude oil and more. Much of the potential of the State with respect to solid minerals is yet to be fully exploited as only 16.4Mt was mined in 2016, being 37.65% of the total national output, led by limestone, laterite and granite.

4.2. Biological Environment

The primary vegetation is equatorial rain forest with large trees and dense under-growths. With human intervention, however, a lot of the trees have been felled for commercial uses and secondary forests with smaller trees are re-emerging. The geographical landscape of the State comprises extensive fertile soil suitable for agriculture, and Savannah land in the north

western part of the State, suitable for cattle rearing. There are also vast forest reserves, rivers, lagoons, rocks, mineral deposits and an oceanfront.

In addition, the State has approximately 16,700sq km of arable land (almost all of its land mass) suitable for growing a wide range of crops including Cassava, Rice, cocoa, oil palm, fruits & vegetables among others, with just 30% of it under cultivation.

4.3 Description of Social Environment

4.3.1 Population

Ogun state has a population of 5.2 million people in 2017, projected at 3.04% growth rate from the 2006 population census of 3,751,140. The state population ratio is made up of 50.5% for females and 49.5% males. About 55% of the populations live in the rural areas while 45% are in the urban areas. Rural – Urban migration in Nigeria, like in most other countries is fueled by the pursuit for increased economic/ livelihood opportunities. Presently, it is estimated that 47.8% or 90.1 million people live in the urban centers. About 68.8% or 40.3million of this urban population are considered to be low-income earners. This pressure has forced changes in urbanization patterns. According to the National Population Census conducted in 2006, population of Nigeria stood at 140, 431,790. However, projected population of Nigeria as at 2016 was 193,392,517 with male at 98,251,852 and the female 95,140,665 representing 50.8% and 49.19%, respectively. This is shown in the table 6.

Table 6: Nigeria Projected Population (2013-2016)

Description	2006	2013	2014	2015	2016
Total Population	140,431,790	175,690,143	181,403,148	187,301,926	193,392,517
Total Male Population	71,345,488	89,258,272	92,160,729	95,157,566	98,251,852
Total Female Population	69,086,302	86,431,870	89,242,419	92,144,360	95,140,665

Source: NBS, 2018

4.3.2 Social and Health Impacts in the Project Area

One aspect of developmental projects, depending on the type and magnitude, is that positive economic values may be offset by adverse social and health impacts if not well taken into account and mitigated for. OGAPIP will ensure that the baseline social and health information of the specific sites for the project will be implemented is carried out at the time of implementing this PMP. This shall be a requirement to enable generation and collection of data on health status, health facilities and social conditions can be documented and used in decision making both for improving the quality of the life of the beneficiaries and for monitoring implementation progress of the project.

4.3.3 Land Use Pattern

There is a largely peaceful co-existence in the communities and among indigenes and settlers in the State, especially with respect to land use and social interactions. However, project activities-induced urbanization may trigger social dynamics that may offset the cultural and communal peace now in existence in many rural farming areas. Categorically, increase industrialization and improvement in infrastructure will change land use pattern and inadvertently increase land competition and conflict and therefore, reinforces the need for land reform and administration.

4.3.4 Agriculture in Ogun State

Ogun State's agricultural potential is rich. The state has 1.6 million hectares of arable land, which is 74% of the State's total land area, but only 30% of this arable land (480,000 hectares) is under cultivation. Major crops grown or cultivated in the state include: Cassava, Rice, Maize, Oil Palm, Cashew, Citrus, Cocoa, Rubber, Kola-nut, Cotton, Soybean, Vegetables, Pine-Apple, Sugar-Cane, Cocoyam, Banana and tomato among others. Livestock and fish farming are also strong and viable. Most of the agriculture production in the State is rain-fed, with a few irrigated hectares under donor-assisted programs like the FADAMA. Growth in the sector has been strained by the poor condition of feeder roads that enables agricultural activities especially connecting farms to markets and processing hubs. There is also a significant challenge of post-harvest losses due to insufficient produce markets and processing facilities. A high percentage of rural farmers still use manual/crude methods of processing products like cassava and rice, especially the women who further have limited access to mechanized equipment.

4.3.5 Industrial Estates

There are two major industrial estates in the State at Ota and Agbara. The concentration of industries in these areas is very high and constitutes the dominant land use in the area. The Regional Plan proposes five additional industrial areas, one in each sub-region. Industrial estates are very important to the economy of the State as it provides a cluster for industries and residential areas. Whilst OGAPIP activities will include studies and benchmarking, there is also the proposed rehabilitation of the internal road in Agabara Industrial estate as Agricultural activities will be carried out in the different clusters of the farm settlements/estates that are yet to be identified, which may eventually also be situated on farms in industrial estates.

CHAPTER FIVE

5.0 Pest management concerns and control measures in Ogun state

Pests and disease vectors constitute serious hazards to public health, food security and general welfare of the citizenry not only in Ogun State but also in Nigeria. It is estimated that agricultural pests destroy over half of the yield of crops, fruits, ornamental plants, vegetables and livestock, annually.

5.1 Pests in Agriculture & Public Health: National Context

Vectors transmit several diseases of public health importance in Nigeria. These diseases have resulted in depopulation of many fertile farming areas thus contributing significantly to food insecurity and poverty. Farmers often respond to pest infestations in crops by heavy applications of pesticides, which threaten environmental quality and pose risks to human and livestock health. Pesticides used in vegetable agro-ecosystems, for example, include WHO toxicity Class 1a materials such as ***parathion***, and

Class 1b materials such as ***Furadan/carbofuran***. The incautious dependence on chemical pest control options undermines overall economic growth through farmers' non-compliance with trade barriers on pesticide residues in export produce. According to EC directive 91/414, for example, approximately 80% of the active ingredients used in Africa will be banned for use in Europe, and PMP is a fast-emerging trade policy issue.

5.2 Pest Management in Ogun State

Pest management methods in Ogun State vary with the type of pests and the agricultural value chain under consideration. Most of the pest control options involve the use of pesticides and as such have varying pesticide risks, which is also dependent on the value chains. In the past, pesticides were once seen as the only answer to most of the pest problems, however, in recent times, due to the increasing concerns about the environment, public health concerns coupled with increase in pest resistance to pesticides and the increasing economic pressures on farming and the food Industry, these range of concerns have continually demonstrated that pesticide use is increasingly seen as just one of a range of control measures available.

5.2.1 Typical Pests in Ogun State

The typical pest challenges of the five major value chains (vegetables, cassava, rice, fish, livestock – beef & poultry) considered under the OGAPIP that were discussed during consultations in Ogun State are:

- Mammalian pests – rodents, grass-cutters etc. These are pests on cassava, maize and are controlled by use of poisonous baits, traps or cats as in case of rodents.
- Reptilian pests – especially snakes. These are pests on livestock – poultry. These are controlled by physically killing the reptiles.
- Birds (weaver/*quelea quelea* sp.) – These are pests majorly on rice and are controlled using bird scare means such as scarecrows. However, these are reportedly no longer effective.
- Ecto-parasite pests – such as insects e.g. termites, others include lice as in the case of poultry, mites, lice, ticks, fleas etc. These are pests on livestock – beef & poultry. Grasshoppers are pests on crops & caterpillars are major pests on vegetables. Mainly controlled using agro-chemicals for animal disinfectants, tick-baths, insecticides etc.

- Endo-parasite pests – such as worms, which are pests that are more associated with livestock (beef) and is controlled using regular vaccinations for de-worming of animals.

Consequently, the pest management approach used by the farmers includes a heavy reliance on chemical control methods. However, the IPM approach of this PMP encourages an integration of cultural methods of pest control, biological controls and chemical control methods as shown in table 7.

Table 7: Pests and Control methods of major OGAPIP Agricultural Value Chains

Value Chains	Pests	Control Methods		
		Cultural	**Biological**	**Chemical**
Horticulture (Vegetables)	Nematode Caterpillars (Moths and Butterflies) Beetles Grasshoppers Stem borers	Use of resistant species Adoption of crop rotation techniques.	Soil polarization	-
Tomato	Cutworms	Elimination of weeds around beds at least two weeks before planting. Hand-picking cutworms	--	--
	Aphids	Crushing aphids by hand or removing them with a strong jet of water	--	--
Rice	Nematodes (Apelenchoides besseyi; Hirshmanniella grazilis; H.oryza; H.spinicaudata) Stalk-eyed fly, Rice caseworm Weaver birds Rodents Insect/ Stem borers	Land fallow and planting of trap crops Adopting crop rotation techniques Bird scare Use of scarecrows or physical methods such as catapults. Use of cats or traps for rodents, manage bounds between planting areas	Encourage or introduce natural enemies of the pest or interfering with the life cycle of the pest such as Metarhizium, Beauveria, Hirsutella	-

		Spray with mixture using neem, vinegar, pepper solution soaked for 7-10 days in water.		
Cassava	Green mite Cassava mealy bug Variegated grasshopper. Termites	Crop Rotation Alteration of planting date Disposal of crop residues Choice of resistant crop variety Management of Irrigation. Apply mixture of salt, diesel & kerosene and flush into termite holes.	Encouraging or introducing natural enemies of the pest or interfering with the life cycle of the pest Crush neem seeds and soak in water. Use solution to spray cassava.	-
Fish	• Flukes • Leeches • Anchor worm • Lice • Nematode	Avoid introduction of raw plants or snails	--	Use of organophosphates Potassium Permanganate bath against fresh water parasites or salt water bath for fresh water parasites
Livestock (Poultry) & poultry products (eggs)	• Mammalian pests (rodents) • Reptilian pests (snakes) • Insects – mites & lice (ectoparasites) • Worms (Endoparasites)	• Use of cats & traps • Planting of snake repellant plants e.g. tobacco •		
Livestock (Beef)	• Ectoparasites – ticks • Endoparasites - worms • Flies – tse tse fly (vectors of trypanosomiasis) • Snakes	• Improve strain of resistance • Use of kerosene externally to prevent tick infestation • Use of smoke to pursue flies		

		• Change of grazing location to prevent tse tse fly • Veterinary Standard Precautions • Physical removal of snakes • Use of sanitary & phyto-sanitary measures		

Table 8: Some diseases and control methods for OGAPIP Value Chain

Value Chain	Diseases	Control Methods		
		Cultural	**Biological**	**Chemical**
Beef	**Tetanus**	Integrating Biosafety into daily cultural practices Undertaking surgical procedures (such as castration) properly, in a clean environment, with disinfected instruments and surgical area, will significantly reduce the risk of tetanus. The same rules apply to calving, be as clean as possible and minimize contamination. Antitoxin can be useful as a short-acting (up to 21 days) preventative if used at high risk times, however on some farms vaccination may be better, as a three dose course of vaccination can result in protection for over three years.	--	Keep magnesium additions to mineral supplements available from May until October. Commercial mineral mixes that are high in magnesium are readily available. A mix can be made at home, which also features a selenium supplement, with the following recipe (Wahlberg, 1995): 22.5% trace-mineralized salt, 22.5% dicalcium phosphate, 10% of a 0.06% selenium mix; 22.5% magnesium oxide, and 22.5% ground corn. Cattle should

		Integrate proper veterinary standard precautions that would enable appropriate livestock care.		eat about one-fourth of a pound of the mixture daily. An emergency treatment includes preparing 200mL of a saturated solution of epsom salts. This solution should be injected under the skin of the animal in at least multiple sites with 10 mL injected at each site. A veterinarian should be consulted to provide intravenous magnesium supplements
	Prussic acid poisoning	During grazing management: Use certified seed Select varieties low in prussic acid Follow fertilizer application recommendations Do not begin grazing until plants have reached a height of 18 to 20 inches Allow frosted Sudan grass to thoroughly dry before pasturing	--	--

		Dilute intake of infected material with hay and other forages		
	Acetonaemia (ketosis)	Prevention depends on adequate feeding and management practices	When using corticosteroids, it is important to supply an adequate amount of glucose either as a high carbohydrate diet and/or propylene glycol drenches to prevent excessive breakdown of muscle protein	A quick-acting glucose supplement is required immediately. Follow-up treatment is aimed at providing a long term supply of glucose.
	Foot and Mouth Disease **Bovine Tuberculosis**	As a result of the loss of production and the infectious state of the disease, infected animals are usually culled. • Establish preventive measures by minimizing livestock contact with vectors such as arthropod control. • Situate livestock housing away from bushes • Immunization of exposed animals • Test and destruction of diseased or infected animals (e.g. bovine tuberculosis). Main control strategy for this subspecies is active	--	Infected carcasses must be disposed of safely by incineration, rendering, burial or other techniques. Milk from infected cows can be inactivated by heating to 100°C (212°F) for more than 20 minutes. Slurry can be heated to 67°C (153°F) for three minutes. Vaccination with one serotype does not protect the animal against other serotypes, and may not protect the animal completely or at all from other strains of the same serotype. Currently, there is no

		case finding through population screening (undertake serological tests), followed by treatment of the infected persons that are identified to be infected (reservoir reduction).		universal FMD vaccine.
	Leptospirosis	Antibiotic therapy should be prescribed for animals with leptospirosis. Antibiotics can also eliminate persitant infections. Infected animals should be segregated from others to avoid transmission of the disease.	In some cases streptomycin is added as a precautionary measure to semen from bulls held at artificial insemination centres.	chemoprophylaxis and vaccination of replacement stock
Rice	Blast (Pyricularia oryza) Brown leaf spot (Cochliobolus miyabeanus) Black kernel (Curvularia spp)	Adopting crop rotation techniques	--	--
Cassava	Cassava Mosaic Bacterial blight Anthracnose Root rot	Crop Rotation Alteration of planting date Disposal of crop residues Choice of resistant crop variety	--	--
Fish	Coccidiosis	--	--	Use of coccidiostat monensin,

	Hexamitosis Streptococcosis Dropsy Vibrio			sulfamidimine or amprolium
Tomatoes	**Early Blight**	Avoid getting water on the leaves whenever possible, change the locations where you plant your tomatoes, mulch well around each plant, and clear away all dead or infected plant material at the end of each season. Picking off infected leaves may slow the progression of the disease until the weather is more favorable	--	--
	Speck and Spot	Prevent and control these diseases as you would Early Blight, above. Bacterial spots stop spreading in dry, warm weather.	--	Chemical controls are usually not needed.
	Late Blight	Avoid sprinkler irrigation, very dense planting, or other things which keep humidity high. Remove volunteer potatoes or tomatoes, and clean up debris at the end of the season. Mulching may help prevent initial infection	--	--
	Fusarium Wilt	Cleaning up all tomato debris, including old roots, and solarizing the soil may help.	The typical solution in an infected garden is to grow resistant varieties	--

	Powdery Mildew	--	--	No control is necessary on mature plants, but in the case of young or severely affected plants, sulfur dust (1) provides good control.
Poultry	**Increase in zoonotic infections of poultry**	• Quarantine of infected animals • Immunization of exposed birds • Test and destruction of diseased birds • Biosecurity • Strict sanitation & health checks should be in place		

5.3 Assessment of Knowledge & Practices in Pesticide Management

Many cultural practices deployed as physical control measures of pest control are currently in use in Ogun State and have been for several farming generations, however, some of them have not been demonstrated as sufficient and environmentally friendly options for pest management. The conventional chemical control has been the means generally used to control crop invasions by pests in the different agricultural programs in the State.

On a national scale, In Nigeria, this approach has led to non-acceptance of the agricultural produce from Nigeria in foreign markets due to the high residual chemical contents. In addition, concerns such as the resistance of numerous pests to many chemicals (case of *Helicoverpa armigera* to pyrethroids) have been raised, while the destruction of useful species, the perturbation of the ecological balance has been attributed to the dependence ton these synthetic chemical pesticides.

5.3.1 Some advantages for Persistent Use of Pesticides

The usage of pesticides; fungicides, insecticides and herbicides is generally on the increase in the State. The reasons have been attributed to:

Manpower Requirements – Pesticide application save labour, time and cost especially in areas where labour costs are high. In subsistence farming, practiced by many farmers in Nigeria, cultural methods of farming involve the intensive use of labour to cultivate crops. However, due to the rural-urban drift currently experienced, labour costs have become higher and the use of pesticides to control pest challenges becomes an attractive option to many rural farmers.

Wastage reduction – Pests that attack agricultural stored products cause losses from damage to these products. Thus, due to the simplistic way pesticides can be applied to solve this problem and curb the losses, it becomes an attractive option to farmers for the treatment of granaries, storage bins, greenhouses, grain elevators and other structures.

Quantity & Quality Improvement – Pests tend to attack and damage agricultural crops & products and these attacks cause losses. However, the use of pesticides is an effective approach to curb these losses & thereby increase output, which translates to the crop yield and to preserve the quality of the products from many agricultural activities.

To Save Human Life – Pesticides destroy pests & therefore improves food security essential for the preservation of life. This advantage is seen to far outweigh the

economic, environmental and health costs giving the fact that the chemicals easily kill pests that eat and destroy food supply.

Awareness – The health risks associated with the use of pesticides is improving and farmers are better informed on risks, which can be minimized or mitigated by responsible handling practices and development of safer products, which reduces the reluctance of farmers for deploy chemical pest control measures.

Availability – Perhaps one of the most important advantages of pesticide use is in its availability and affordability, in comparison to other environmentally friendly options, in Nigeria.

Avoidance of Social Disadvantages – In the rural areas, many people associate social advantages to farmer that can best manage their farming activities with chemical pest control measures and regard the presence of unmanaged pests in some farmer's field and stored food as an indication of low quality of life so in order to maintain the social ranking, pursue the chemical control approach.

Thus, in order to seek a balance through the safe use of pesticides or agro-chemicals aimed at reducing the incidences of pest in Nigeria and improve the dissemination of knowledge on alternative environmentally friendly pest control measures, a number of project-based interventions have been carried out on PMP. Some of these are:

- PMP for pest control in the Commercial Agriculture Development Project (CADP)
- Farmer's training on PMP under the Transforming Irrigation Management in Nigeria (TRIMING) project.
- Cocoa farmers training on the use of PMP to pest control and the PMP for pest control in the National FADAMA Agricultural Development in Nigeria
- Sensitization activities carried out by WAAPP – Nigeria in some selected states in the country

5.3.2 Assessment of Collaboration on PMP

The OGAPIP project will benefit from PMP collaborative action and experience of other existing world-bank/donor funded projects, currently being implemented in Ogun State, such as FADAMA III & the FGN IFAD/VCPD. This is possible, considering the fact that a lot of experience and success has been gained in Nigeria under such projects Other Collaborations include activities with regulatory bodies such as NAFDAC, NESREA, Customs Service, Consumer protection Council. Therefore, the project stands to gain from shared experience and capacity with these existing projects in terms of challenges and success drivers of PMP operations and

other similar areas. As such, project beneficiaries will enjoy knowledge transfer on PMP implementation.

CHAPTER SIX

6.0 Identification of potentially negative impacts and mitigation measures

Even though pesticides were once seen as the only answer to most of the pest problems, as a result of the deepening issues realized from increasing

anthropogenic activities & its consequent impact on the environment, the development of pest resistance to pesticides and the increasing economic pressures on farming and the food Industry, pesticides are increasingly being seen as just one of a range of control measures that can be deployed for the control of agricultural pest related challenges.

6.1 Negative Pest & Pesticide Management Issues for OGAPIP

Priority negative issues identified are:

Environmental

Air Pollution
The vapour released from spraying of pesticides will remain in the air, and if the chemical compound is very stable, this vapour may travel beyond the sub-project sites, communities or adopted villages. Whether pesticides are applied by spraying or by surface application, air is the usual the medium through which the chemicals move to their intended and unintended targets. While some of the active ingredients in pesticides stay in the atmosphere for only a short time, others may last longer and may have the potential to contaminate the air, affecting humans and animals even beyond sub-project sites. This way use of pesticides could become a non-point source of pollution.

Soil contamination
Pesticides that are in use on agricultural land in and around the proposed sites could enter soil during spraying causing wash-off or run-off into soil. However, some pesticides such as soil fumigants and nematocides that are applied directly into soil to control pests and plant diseases are often retained in the soil. Long-term excessive use of pesticides will cause higher pesticide residues in the soil, which will cause soil contamination within the area.

Surface and Groundwater Contamination
Generally, there are four major routes through which pesticides could contaminate water bodies:
they may be blown by wind (Wind drift) to outside of the intended area when sprayed (1-5% of Insecticide sprayed), may percolate, or leach (leaching) through soil and into the groundwater may be carried to the surface water bodies as runoff (Surface runoff). Pesticides typically enter surface water when rainfall or irrigation water exceeds the infiltration capacity of soil and resulting runoff then transports pesticides to streams, rivers, other surface-water bodies and into groundwater reservoirs. Groundwater contamination may occur when pesticide residue in surface water such as drainages, streams, and municipal wastewater is leached downward into groundwater. Groundwater contamination may also

occur from pesticide residue in surface water, such as drainages, streams, and municipal wastewater.

Harm to Non-target Species

The environmental impact of pesticides consists of the effects of pesticides on non-target species. Over 98% of sprayed insecticides and 95% of herbicides reach a destination other than their target species, because they are sprayed or spread across entire agricultural fields. Runoff from precipitation events can carry pesticides into aquatic environments while wind can carry them to other fields, grazing areas, human settlements and undeveloped areas, potentially affecting other species. Other problems emerge from poor production, transport and storage practices. Over time, repeated application increases pest resistance, while its effects on other species can facilitate the pest's resurgence.

6.2. Health

General

Pesticides can enter the body through various means. It is possible to take in pesticides through inhalation of aerosols, dust and vapour that contain pesticides; through oral exposure by consuming food and water; and through skin exposure by direct contact. The effects of pesticides on human health are from a combination of factors, which depend on the toxicity of the chemical and the length and magnitude of exposure. Farmers, farm workers and their families experience the greatest exposure to agricultural pesticides through direct contact.

Children are more susceptible and sensitive to pesticides, because they are still developing and have an immune system less developed than adults. Children may be more exposed due to their closer proximity to the ground and tendency to put unfamiliar objects in their mouth. Hand to mouth contact depends on the child's age. Children under the age of six months are more likely to experience exposure to pesticides in the form of inhalation of small particles or through breast milk. Pesticides can also bio-accumulate in the body over time.

Potential Site-related Health Concerns

Site related public health concerns include the following:

- Consumption of crops and plants grown under chemical pest control could cause health hazards to humans and animals within and around the project site.
- Certain kinds of chemical intoxication especially after drinking pesticide-contaminated water are a medium to high likelihood. This is a crucial potential impact considering that most of the locals get drinking water from surface and groundwater sources.

- Skin, eye, and nose irritation
- Possibility of cancers, neurologic, endocrine and reproductive problems form direct and indirect exposure to pesticides.
- Occupational health and safety risks. Long term inhalation of toxic pesticides sprayed, could eventually result in respiratory illnesses or disease conditions.
    - Strategy for intervention and pesticide management action plan
    - Monitoring and evaluation plan
    - Training of actors involved in pest and pesticide management
    - Information and awareness raising among users and the general public
    - Coordination and monitoring of the PMP
    - Institutional arrangements for the implementation and monitoring of the PMP
    - Cost of activities proposed in the PMP

6.3 Negative impacts of uncontrolled use of pesticides

Generally, pesticides are toxic substances released most times intentionally into our environment. This includes substances that kill the following; weeds (herbicides), insects (insecticides), fungus (fungicides), rodents (rodenticides), which are all pests that shall be encountered on the OGAPIP project.

Some of the specific issues identified and properly discussed in earlier, are both environmental and social issues. The environmental issues; such as air pollution, soil contamination, surface and groundwater contamination, harm to non-target species, and health risks identified are direct inhalation, consumption of crops and plants grown under chemical pest control, could cause health hazards to humans and animals within and around the project site, skin, eye, and nose irritation, possibility of cancers, neurologic, endocrine and reproductive problems form direct and indirect exposure to pesticides and other occupational health and safety risks.

The use of toxic pesticides to manage pest problems has become an increasingly common practice around the world. Pesticides are used almost everywhere not only in agricultural fields, but also in homes, parks, schools, buildings, forests, and roads. Though they could be very useful in managing pest problems, they are also a great environmental and health risk. For example, it should be established that pesticide contaminated clothing be kept from other fabric. PPE should be cleaned and dried in a well-ventilated place before storage.

6.3 Persistent Organic Pollutants (POPs)

Most agricultural pesticides could constitute any of the POPs chemicals, which use pose adverse environmental, animal and human health risks, if in use. Nigeria became a signatory a signatory to the Stockholm Convention on Persistent Organic Pollutants In May 2001, and this was ratified in 2004. Under Annex A (listed for Elimination) of the convention, it is pertinent that parties take measures to **eliminate** the production and use of the chemicals listed under Annex A. These obsolete pesticides are characterized by a high persistence in the environment (e.g. half-life for DDT in soil ranges from 22 to 30 years, Toxaphene -14 years, Mirex -12 years, Dieldrin- 7 years, Chlordecone up to 30 years), low water solubility and thus potential to accumulate in fatty tissue of living organisms including humans and toxicity to both human and wildlife. Due to intensive releases to the environment in past several decades, and tendency to long-range trans-boundary atmospheric transport, they are now widely distributed and are found around a globe.

Nevertheless, considering that Nigeria is a Signatory, the country is obligated to stop the use of POPs pesticides if still in use. It is also mandatory that Ogun State in implementing the OGAPIP be in compliance to this commitment. For other pesticides, which are not POPs, the issues regarding toxicity still remains and the consequence of application on agricultural farmland, and resultant wider environmental and social impacts.

6.4 Accidents resulting from pesticide use

As regards the sanitary consequences of the use of pesticides, there are often cases of death or intoxication. Indeed, cases of lethal intoxication have been recorded for human, and animals. The data on pesticide poisoning and accidents resulting from pesticides use or disposal must be collected. Furthermore, there is the need to create awareness that will target the different pesticide users in order to avoid accidents and incidents.

6.5 Management of pesticide containers

The management of pesticides containers is primarily the responsibility of pesticide retailers and farmers (as a result of the retail sales system) and they must be closely supervised by the OGAPIP agriculture team under the PIU. Pesticide containers are usually managed under the following categories:

- Sales to pesticides buyers who do not have empty containers and who reuse these containers for other purposes;
- Cleaning of containers & resell for other uses
- Farmers/buyers reuse empty containers for storage purposes at household levels. As these pesticide containers are reused in homes, improper washing or cleaning could lead to harmful consequences where containers are reused as food or drink containers. The population groups at

risk include women, children, elderly and rural farmers who are mostly illiterate and principal users of empty containers without proper treatment.

It is therefore necessary to have a proper pesticide container management system in place for the OGAPIP project that will establish the following as minimum operational procedure, which shall conform to global best practice on pesticide container disposal by carrying out the following:

- Prepare an obsolete and unused pesticide disposal plan for the project that shall articulate the OGAPIP approach in compliance with requirement under the international code of conduct on the distribution and use of pesticides to:
    - Encourage collection of empty pesticide containers in a safe receptacle at a designated location in the OGAPIP farm estates or settlements. This is a.
    - Discourage improper disposal of pesticide containers such as by burying or burning of due to the possibility of causing contamination in the environment from leakage of toxic material.
    - Ensure all discarded pesticide containers are rinsed at least three times before disposal
    - Prevent further re-use of discarded containers by properly perforating the base

CHAPTER SEVEN

7.0 Pest Management Plan

Even though the site locations and activities are yet to be identified, this Pest Management Plan (PMP) is intended to anticipate and thereafter help manage the adverse effects of identified pests and pesticides that are likely to be encountered on the project sites to acceptable levels. The plan is designed to minimize potential adverse impacts on human health and the environment and to advance ecologically based IPM.

7.1 PMP Overview

The PMP study is aimed at ensuring the OGAPIP project delivers on its goals of sustainable development by embarking upon an approach that will assess the pesticide risks associated with this project, define/suggest appropriate environmentally responsible & socially acceptable mitigation measures aimed at addressing the issues that trigger the preparation of a PMP in a manner that harmonizes the best practice approach from a combination of the best strategies

of all control methods that pertain to a given concern created by the activities of pests.

Consequently, in implementing IPM for the proposed OGAPIP project, the use of highly persistent and highly toxic chemicals must be avoided in pest management. Natural pest control methods should be employed to effectively reduce or eliminate pest or disease infestation without harming humans, animals, crops and other ecosystems. The *IFC Guidelines on Pesticide Handling and Application* provides a criterion for choosing pesticides based on the following factors in decreasing order of importance:

- Biodegradability;
- Toxicity to mammals and fish;
- Occupational health and safety risks; and
- Costs

7.2 Specific PMP Objectives

Some specific objectives of this PMP are:

- Assist the OGAPIP project to plan and design location specific IPM activities.
- To reduce to a bearable minimum the adverse impact of pest on OGAPIP farms & produce
- To complement the mitigation framework & requirements of the ESMF
- Promote participatory approaches in IPM to learn, test, select and implement best practice IPM options.
- To improve the technical capacity and skill-based capacity of farmers & OGAPIP PIU/Agric. Ministry personnel on making suitable and timely decision for storage pest.
- Promote biodiversity monitoring to serve as early warning systems on pest status, alien invasive species, beneficial species, and migratory pests.
- Monitor and evaluate the benefits of IPM including its impact on the environment and health

7.3 Best Suitable IPM methods for the OGAPIP project

Clearly, the methods adopted for pest management on the OGAPIP project will vary with the type of pests and with the agricultural activity such as; crop, livestock or fishery. In spite of this fact, most of the pest control options that are currently in practise involve the use of pesticides. The controls that shall be established for the OGAPIP project comprise:

Cultural control: These are the adjustments made to agricultural practises and crop husbandry techniques by the farmer. These include but are not limited to:

- Crop Rotation

- Alteration of planting date
- Disposal of crop residues
- Choice of resistant crop variety
- Management of Irrigation

Biological Control: which involves either encouraging or introducing natural means for the control of the pest or employing natural means to disrupt the life cycle of the pest

Chemical controls: which employs the use of toxic pesticides to kill pests. Careful consideration must be given for the selection of non-hazardous agrochemicals or pesticides in order to reduce negative environmental and health impacts. Therefore, chemical control methods under the OGAPIP project should follow the following principles:

- Use of Cost-effective non-pesticide chemicals
- Use of high efficiency, low toxicity and low residue pesticides (category III of WHO);
- Extension of the application technologies that have low toxicity to humans, animals and plants and with reduced pollution to the environment;
- Use of safe spraying devices to enhance the efficiency and effectiveness of the pesticides.
- Strengthen the awareness and education on safe and proper use of pesticides, extend safe application of pesticides through training, follow strictly the regulations on pesticide application, and pay attention to safety;

Strategy for intervention that integrates the IPM method into the OGAPIP project comprises:

VIII. Promote the establishment of organic farms that will encourage indigenous pest management methods that utilize cultural or biological approaches.

IX. Pursue the implementation of the comprehensive pest & pesticide management action plan that comprises an environmentally sensitive approach to pest management, while also relying on a combination of multiple practices with a view of reducing reliance of the OGAPIP project on use of pesticides.

X. Integrate the use of current, comprehensive information on the life cycles of pests and their interaction with the environment, which are available in our research institutions through collaborations with NARI's (National Research Institutes). This information, in combination with available pest control methods, shall be deployed to manage pest damage by the most

economical means, and with the least possible hazard to people, property, and the environment. By applying basic IPM principles, historical and future pest with respect to the proposed project site will be managed in an environmentally safe manner thus reducing increased dependency on pesticides or other environmentally unsafe approaches.

XI. Engage the tool of training and retraining of farmers in the farm estates & farm settlements on the best practice approaches to pest control & safe use and application of pesticides.

XII. Promote preparation of agro-chemicals & fertilizer procurement list

XIII. Ensure proper screening of procurement list use of agro-chemicals only when they are not on the list of prohibited pesticides in the Class Ia & b or Class II (annex 2) and ensure that distributors provide the Material Safety Data Sheet (MSDS) for approved agrochemicals.

XIV. Encourage State Ministry of Agriculture to promote transfer of knowledge on biological, cultural and mechanical control measures that have been used in other agricultural programs in Nigeria (such as the FADAMA projects, IITA, FAO, CADP, TRIMING & WAAPP project etc.) shall offer a strong platform for proffering practicable safe measures towards mitigating adverse impacts of identified pests in the project area.

7.4 Planning matrix for the Pest Management Plan of the OGAPIP Project

The OGAPIP action plans for addressing these priority issues are contained in table 9.

Table 9: Pest Management Plan for OGAPIP

Impact, Issues & Pest/Pesticide Risks	Mitigation Measure	Implementing Tool	Expected Result	Monitoring Indicators	Responsibility
Air Pollution	• Control and supervise pesticide use by farmers • Undertake regular training for farmers • Develop procedures for safe use & application of pesticides, fertilizers and agrochemicals	Adoption of PMP approaches/ techniques	Farmers trained in PMP techniques	Number of farmers trained, Training records	OGAPIP, Ogun State Ministry of Agriculture
(Harm to non-target species,	Educate farmers to adopt best agricultural practices based upon IMP techniques; and do	IMP techniques with emphasis on cultural and biological forms	Compliance with national policy on	Number of farmers trained in IMP techniques;	

Health) General health and safety of farmers/crops and environmental hazards	not use chemical pesticides unless absolutely necessary as in the case of vaccines for livestock (OGAPIP Beef & Poultry value chains) Also only use pesticides & agrochemicals that have the MSDS is available	of pest control	Pest & Vector Control and WB policy on Pest/ pesticide management	Number of farmers implementing PMP on their farms Frequency of chemical pesticides usage	OGAPIP safeguards team, Ogun State Ministry of Agriculture
	Provide Personal Protective Equipment (PPE) to farmers	HSE policies for farm activities	Farmers & other staff protected against exposure to toxicity from pesticide use	PPE supplied or made available under project	
	Educate farmers/ farm assistants in different farm estates/settlements on the proper use of pesticides Educate farmers/ farm assistants in cultural & biological control measures of pest control for various value chains.	Pesticide hazards and use guide manual or leaflet for the project (include simple pictorial presentations)	Farmers know and use pesticides properly; pesticide hazards and use guide leaflet or flyers produced	Number of farmers trained in pesticide use; Number of farmers having copies of the pesticide hazard and use guide flyers;	
	Properly dispose obsolete and unused pesticides	Prepare an obsolete and unused pesticide disposal plan	Obsolete and unused pesticide disposal plan prepared and implemented	Relationship between pesticide supply and usage	
	Develop emergency response to pesticide accidents and poisoning	Emergency response plan	Pesticide accidents and emergencies managed under the project	Number of pesticide Accidents & emergencies	
Improper use of pesticides by farmers and farm assistants (Soil contaminatio n)	Educate farmers and farm assistants on proper use of pesticides and pesticide use hazards	Pesticide hazards and use guide manual or leaflet for the project (include simple pictorial presentations)	Proper use of pesticides by farmers and farm assistants	Number of cases of pesticide poisoning occurring under the project	OGAPIP safeguards team, Ogun State Ministry of Agriculture

	Control and supervise pesticide use on farms	Adoption of IMP approaches/ techniques	Farmers trained in IMP techniques	Number of farmers trained, Training records	
	Monitor pesticide residue in crops	Random sampling procedure for crops and storage products	Pesticide residue in crops within acceptable limit/MRL	Levels and trend of pesticide residue in sampled crops	
Pollution of water resources and aquatic life (Surface & groundwater contaminatio n)	Control and supervise pesticide use by farmers	Adoption of IMP approaches/ techniques	Farmers trained in IMP techniques	Number of farmers trained, Training records	OGAPIP safeguards team, Ogun State Ministry of Agriculture
	Proper disposal of pesticide containers by resellers/farmers	Pesticide container collection and disposal plan	Pesticide container disposal plan developed and implemente d	Number of farmers/ resellers aware of pesticide container disposal plan	
	Monitor pesticides in water resources	Environmental quality monitoring plan (mainstream into Project ESMP for specific locations)	Pesticide concentrati on in water resource	Levels of pesticides in water resources	
Threat from other crop pests and diseases	Educated and train farmers to adopt best agricultural practices	Adoption of IMP techniques/ approaches	Farmers trained in IMP techniques and best agricultural practices.	1. Number of farmers trained, Training records 2. Incidence of crop pests 3. Production losses from crop pests	OGAPIP safeguards team, Ogun State Ministry of Agriculture
Impact on post harvest losses due to pests	Provide adequate and proper storage facilities	Post-harvest loss reduction plan based on IMP techniques in place	1) Post harvest losses avoided or minimized 2) Applied pesticides registered and approved by key stakeholders and in conformity with IMP	Number of farmers trained in IMP techniques for post harvest storage, number & conditions of storage facilities in use.	OGAPIP safeguards team, Ogun State Ministry of Agriculture

CHAPTER EIGHT

8.0 IPM Implementation and Management

The action plan for implementation & management of the Pest and pesticide Management Plan on the OGAPIP project is guided by the following:

- Institutional Arrangements and Framework for Implementation
- Monitoring and Evaluation Plan
- Training and Capacity building plan
- Participation/ Consultation Measures
- Disclosure of Safeguard Instrument

8.1 Institutional arrangements for the implementation and monitoring of the PMP

The OGAPIP project management unit (PIU), coordinating agricultural activities through the agric. project team of the State Ministry of Agriculture will be largely responsible for ensuring participation of the relevant stakeholders/community at sub-project level. Involvement of the stakeholders/community should not be limited to interactions with the community but also disclosing relevant information pertaining to the project tasks.

The roles and responsibilities of the different levels of institutions are outlined in Table 10.

Table 10: PMP Safeguard Responsibilities and framework for implementation of PMP

Category	Roles & Responsibilities
Federal Government MDAs (Federal Ministry of Environment and other agencies (Such as NESREA, NAFDAC)	• Lead role in provision of advice on screening, scoping, review of draft PMP safeguard instruments (in liaison with State Ministry of Environment), receiving comments from stakeholders, public hearing of the project proposals, and convening a technical decision-making panel, Project categorization for EA, Applicable standards, Environmental and social liability investigations, Monitoring and evaluation process and criteria, liaison with relevant stakeholders within and outside Nigeria on matter of enforcement of environmental standards, regulations, rules, laws, policies and guidelines. Disclosure of documents, where required.

Category	Roles & Responsibilities
State Agencies, Government MDAs (Ministry of Lands, Survey and Urban Development, Ministry of Environment, etc. Other MDAs	• Provide project related policy decisions and guidance regarding the ESMF/PMP, through the Technical Committees (TC) • Provide project leadership on PMP matters through the PIU. • Ensuring compliance on matters of Environmental Assessment and Pest Management • Set up a functional ESSU in the OGAPIP office that will be responsible for PMP management and compliance monitoring.
	• Pursue mandates related to the core responsibility of the ministries, departments and agencies. • Intervene when relevant areas or resources under their jurisdiction or management are likely to be affected by or implicated sub-projects. • Participate in the EA, OP 4.09 pest management processes and in project decision-making that helps prevent or minimize impacts and to mitigate them.
World Bank	• Assess implementation process and ensure funds are not used for purchase of chemicals/pesticides • Recommend additional measures for strengthening the PMP and implementation performance.
OGAPIP ESSU	• Liaise closely with Ministry of Environment in preparing a coordinated response on Pest Management activities and ensure they are in compliance with guidelines provided in PMP and ensure adequacy under the World Bank Safeguard policies. • Ensure that the project design and specifications adequately reflect the recommendations of the PMPs; • Develop, organize and deliver Safeguards training program that comprises an IPM component for the OGAPIP staff, the contractors and others involved in the project implementation, in collaboration with the PIU • Develop and implement PMP monitoring plan to ensure compliance • Ensures that project beneficiaries do not procure pesticides with bank funds provided
Local government	• Liaising with the OGAPIP to set up agriculture production cluster that will ensure compliance with PMP requirements among the rural participants of the project.
NGOs/CSOs	• Assisting in their respective ways to ensure effective response actions, Conducting scientific researches alongside government groups to evolve and devise sustainable PMP strategies and rehabilitation techniques.
The General Public	• Same as above

8.1 Monitoring & Evaluation Plan

The objectives that guide this PMP monitoring and evaluation plan are as follows:

- Providing timely information about the compliance with or otherwise, of the OGAPIP PMP operation process outlined for this project. This will ensure continuous improvement activities undertaken in for the different sub-project.
- To make periodic evaluation & assessment to determine if mitigation measures incorporated in the PMP have been successful.

The monitoring requirements for the environmental and health impacts of the pesticides management activities are articulated under this management component. It is also important to note that the monitoring and evaluation component of the agricultural support PMP will be mainstreamed into the overall monitoring and evaluation system for the project's ESMF.

The key issues to be considered in the monitoring process that shall be the responsibility of the OGAPIP agriculture project team will entail if a pesticides procurement checklist is available and used during procurement and screening to carry out the following:

1) Ensure that POPs pesticides and WHO class (Ia) and (Ib) pesticides are not procured or used. For the IPM to be effective, measures to ensure that unacceptable pesticides are not procured with Bank's fund will be verified by the environmental safeguards specialist at the State level. The environmental specialists at the PIU will screen the pesticides procurement list prior to procurement and ensure that only pesticides that are acceptable and approved by the Bank/WHO/NAFDAC are procured. The outcome of the screening will be sent to World Bank for concurrence.

2) Monitor the progress of the IPM implementation.

Specifically, the monitoring indicators (see annex for checklist) required achieve PMP project development objectives shall include:

- Level of understanding of World Bank operational policy on pest management among the collaborating clusters, farm estates or farm settlements
- Level of involvement of men, youth and women in agriculture activities

- Monitoring of Personal Protective Equipment (PPE) compliance: It is vital that the people who will be approved to undertake the application and handling of pesticides under the OGAPIP project wear and use appropriate personal protective gears in the course of their activities. Wearing PPE can greatly reduce the potential for dermal, inhalation, eye, and oral exposure, of humans to pesticides and thereby significantly reduce the chances of a pesticide poisoning. PPEs for pest handling include the following:
- Protective gloves
- Shoes and socks
- Coveralls or Long-Sleeved shirt and full trousers made from closely woven fabric
- Respiratory Masks

It is also mandatory that pesticide contaminated clothing be kept from other fabric. PPE should be cleaned and dried in a well-ventilated place before storage.

8.2 Training & Capacity Building on pest and pesticide management

Training and Capacity Development is a fundamental component of the PMP. An assessment of the capacity of the PIU and the MDAs reveals weak capacity in safeguards knowledge, which will influence the enforcement capabilities. Consequently, this training & capacity development shall be undertaken to ensure that knowledge gaps are closed in a manner that will improve the overall performance of the OGAPIP project. The key areas that have been identified to be in need of capacity strengthening are in the areas of:

- Environmental Assessment
- Introduction to Environmental & Social Safeguards
- Occupational Health and Safety (OHS) Basics in pest control for agricultural value chain.
- Developing Safe Practices in the non-chemical (biological & cultural) control of pests (transportation, storage, handling, storage of empty pesticide containers and final disposal)
- PMP Implementation and Monitoring (with field exercises)

Accordingly, a series of trainings have been proposed and are as follows:

Table 11:Training & Capacity Development

Modules	Workshop Duration	Targets	Responsibility
Environmental Assessment • Basic Concept of Environment • Environmental Regulations and Statutory requirements as per Government and World bank	½ day	OGAPIP, ESSU, State Ministry of Agriculture	Environmental & Social Specialists /External Agency engaged for capacity building
Introduction to Environmental & Social Safeguards • Different safeguard policies & triggers • Applicable safeguard policies to OGAPIP project (Pest Management - OP. 4.09) • Decision making on the selection of PMP approaches or options	½ day	OGAPIP, ESSU, State Ministry of Agriculture	Environmental & Social Specialists of Design Consultant/External Agency engaged for capacity building
Occupational Health and Safety (OHS) Basics in pest control for agricultural value chain.	¼ day	OGAPIP, ESSU, State Ministry of Agriculture	PMP Consultant
Developing Safe Practices in the non-chemical (biological & cultural) control of pests (transportation, storage, handling, storage of empty pesticide containers and final disposal)	¼ day	OGAPIP, ESSU, State Ministry of Agriculture	PMP Consultant
PMP Implementation and Monitoring (with field exercises)	½ day	OGAPIP, ESSU, State Ministry of Agriculture	OGAPIP ESSU/PMP Consultant

8.3 Participation & Consultation Measures

For the PMP to be effective, effective coordination & monitoring measures shall be in place among farmers & beneficiaries in the OGAPIP clusters and farming estates/settlements to ensure that unacceptable pesticides are not procured with the World Bank and this will be verified by the environmental safeguards specialist in the OGAPIP PIU who will screen the

pesticides procurement list prior to procurement and ensure that only pesticides that are acceptable and approved by the Bank/WHO/NAFDAC are procured. The outcome of the screening will be sent to World Bank for no objection.

Other measures that will be considered to strengthen participation for the overall success of PMP are:

- There will be adequate awareness programmes to educate farmers and stakeholders including sellers, users and farm workers on the adverse impact/risk associated with the use of certain chemicals by WHO. Names and chemical class of banned chemicals will be brought to public attention through various awareness programs.

- The implementing agriculture teams of the States Ministry of Agriculture will ensure that the PMP options (materials, species, equipment, etc) are distributed to beneficiaries early enough for timely implementation There will be engagement of advisors (extension workers, etc) to assist farmers acquire the technical know-how of the PMP in the formative years of operation

- Creating partnerships with agro-dealers & collaborating distributors of inputs to subsidize costs of approved products with the aim of discouraging the use of chemicals and harmful pesticides. If the alternative to chemical control to pest is available, and cost effective the tendency to use chemicals will be minimized, and that way, the proliferation of WHO Class 1 and Class 11 pesticides would have been avoided.

- Information contained in the PMP shall be shared with farmers in the different clusters to promote compliance.

8.4 Disclosure of Safeguard Instruments

Copies of this PMP, like other safeguard instruments (such as ESIAs/ESMFs, RPFs etc.) that would be prepared for the OGAPIP project will be made available to the public by the States Ministry of Environment.

The OGAPIP office will disclose the PMP as required by the Nigeria EIA public notice and review procedures as well as the World Bank Disclosure Policy on the World Bank external website. Copies of other safeguards instruments (such as ESMFs/RPFs etc.) are required to be disclosed in like manner. Table 12 outlines documents to be disclosed.

Table 12: Typical documents to be disclosed

Topic	Documents to be disclosed	Frequency	Media
Public Consultation	Minutes of Formal Public Consultation Meetings	Within two weeks of Meeting	World Bank's Info-shop, Implementation agency's website/ Project Management Unit & Project Implementation Units (FPIU), Ministry of Environment, Local government Secretariat, National Dailies
Environment and Social Management	PMP, ESMF, ESIA, EMP with Key Actions, safeguard Monitoring reports, and audit	Prior to awarding works and to remain on website	World Bank's Info-shop. Implementation agency's website/ Project Management Unit (FPIU/PIU) & Ministry of Environment, Local government Secretariat, National Dailies

8.5 Grievance Redress Mechanism

The Social Safeguards Specialist in the PIU of OGAPIP will oversee activation and proper functioning of the GRM for this project. The Grievance Redress Committee (GRC) and the Social Safeguard Specialist shall review any existing GRM systems (government/traditional) that are operative in the area and propose ways that the GRM may fit within these systems. Ideally the GRM should have second and third levels of appeal (including the court system, if appropriate, for legitimate claims that cannot be resolved at lower levels). The functioning of the GRM system, how to register complaints (written, by phone, or in person), where to go and hours of service, all should be clearly explained in local language (Yoruba) during initial public consultations on the project. There are two broad areas, from which grievances may arise, during project implementation:

- Dispute as fallout of the involuntary resettlement implementation (compensation) and
- Industrial disputes between: MDAs and industrialists; Industrialists and host communities; Inter-Industrialists; Employees of industries and the management.

For further reference, Grievance Redress Mechanism (GRM) is contained in Chapter 7 of the ESMF for this project.

CHAPTER NINE

9.0 Cost of activities proposed in the PMP

To effectively implement the PMP measures suggested in the cost elements for training & development is shown in table 13, while the overall estimated annual PMP implementation budget is contained in table 14.

Table 13: Estimated Costs for Training & Capacity Development Plan

2-Day Workshop (Training Modules)	Budget
Environmental Assessment • Basic Concept of Environment • Environmental Regulations and Statutory requirements as per Government and World bank	250,000.00
Introduction to Environmental & Social Safeguards • Different safeguard policies & triggers • Applicable safeguard policies to OGAPIP project (Pest Management - OP. 4.09) • Decision making on the selection of PMP approaches or options	250,000.00
Occupational Health and Safety (OHS) Basics in pest control for agricultural value chain.	750,000.00
Developing Safe Practices in the non-chemical (biological & cultural) control of pests (transportation, storage, handling, storage of empty pesticide containers and final disposal)	750,000.00

2-Day Workshop (Training Modules)	Budget
PMP Implementation and Monitoring (with field exercises)	1,000,000.00

Cost of training:	**2,000,000.00**
Sub-Total other costs	**1,000,000.00**
Sub-Total (Venue & Feeding)	**500,000.00**
Total	**3,500,000.00**

Table 14: Estimated Annual Budget to Implement PMP

s/n	PMP Requirements	Considerations	Sub-total Cost per Year (N)	Total Cost (Annual Cost)	Cost in US Dollars (N305 =$1)
A	**Training & Capacity Strengthening**				
1.A	Capacity Building for OGAPIP personnel & farmers in clusters, farm estates & settlements	Training Programs (from capacity building budget)	2,000.000.00	6,000,000.00	19,672.13
B	Capacity Strengthening for relevant Stakeholders/MDA's	Workshops to be held across 3 senatorial districts			
C	Feeding & Venue Costs			500,000.00	1,639.34
D	PMP Implementation & Monitoring	Cost for monitoring PMP	1,000,000.00	1,000,000.00	3,278.68
B	**Mitigation & Management**				
1	PPE - Occupational Health & Safety.	Purchase of ***special*** protective clothing for pesticide use & handling - hand gloves, gas mask, safety boot and overall wear	4,000,000.00	4,000,000.00	13,114.75
C	**Environmental & Social Monitoring**				
1	Monitoring Compliance PMP requirements	Monitoring of IPM approach and safe pest management practices	See 1.D above		
2	Laboratory Services to test residual chemical levels in produce	Strengthening of capacity of laboratories with purchase of special laboratory equipment for testing.	2500,000.00	2,500,000.00	8,196.72
	Total Estimated Budget			**14,000,000.00**	**45,901.64**
	Contingency	**10% of sub-total**		1,400,000.00	4,590.16
Total				**15,400,000.00**	**50,491.80**

References

Environmental & Social Management Framework (ESMF) for Ogun State Agriculture Production & Industrialization Program (OGAPIP)

Integrated Pest Management Plan (IPMP) for APPEALS project

Integrated Pest Management Plan (IPMP) for Nigeria For Women Project (NFWP)

Nigerian Environmental Impact Assessment (EIA) Act. No. 86 of 1992

S.M Maton, J.D Dodo, R.A Nesla, A.Y Ali, (2016). Environmental Impact of Pesticides Usage on Farmlands in Nigeria. *International Journal of Innovative Research& Development*, 311-317.

National Policy on the Environment

National Policy on Agriculture

NESREA Act 2007

Project Appraisal Document (PAD) for OGAPIP

World Bank Operational Policy 4.09

FMEnv 1991

Annexure

Annex 1

Requirements on disclosure and translation of safeguards documentation:

- For information on disclosure requirements, please see the OPCS Instructions: Preparation of Investment Project Financing: http://intresources.worldbank.org/INTOPCS/Resources/380831-1360104418611/Instructions_Track_2.pdf

- For information on translation requirements, please see the Translation Framework Guidance: http://siteresources.worldbank.org/EXTINFODISCLOSURE/Resources/Translationframework.pdf

Annex 2

Terms of Reference

Draft Terms of Reference
Agricultural Production and Industrialization Project Ogun State Government
For a Consultant Assignment to Prepare a Pest Management Plan (PMP)

1. Description of the Project

The Ogun State Government has recorded significant progress across various sectors over the past six years of the current administration. There is however a need to plan for the medium to longer term, to ensure the achievements recorded is placed on a sustainable footing, and to prepare adequately for the future. The Government has prepared a State Development Plan for 2017-2030, which is underpinned by strategies to achieve sustainable development in five key sectors – also referred to as the five cardinal programmes or objectives.

- Affordable Qualitative Education,
- Efficient Health Care Delivery,
- Affordable Housing and Urban Renewal,
- Agricultural Production and Industrialization, and
- Rural and Infrastructural Development/ Employment Generation

This plan recognizes the need for the State to invest in the welfare of its citizens, and the importance of economic growth in driving up the pool of resources available for investment. There are two main themes to the plan, firstly, a focus on improving the economic base of the State, and secondly a focus on improving the quality of lives through better access to social services.

To improve and strength the economic impact to citizens in the state the government is in the process of applying for budget support from the World Bank to support a number of key sectors. Sectors include are:

1. Business Environment: To improve the ease of doing business in Ogun State with a focus on the WB subnational indicators, and Sustainable Investment Promotion and Facilitation.2. Min of Agriculture to focus on increased emphasis on efficiency, output, employment and the development of value chains in key crops.

3. The Ministry of Education Science and Technology is focusing on improving skills development through investment in Technical and Vocational Education, and increasing opportunities for Adult Literacy to ensure appropriate participations of Ogun citizens in the Industrial and Agricultural growth in the State.
4. Bureau of Lands and Survey will focus on shortening the time of issuing Certificate of Occupancy and the Recording of Deeds.
1
5. Industrial Parks with a focus on increasing private participation in the development and operation of industrial parks. The proposed project will be financed through a World Bank project preparation advance payment and is designed to identify institutional capacities of the State for the coordination and implementation of the project at different levels of governance.
In order to support the efficient and effective implementation of the **Agricultural Production and Industrialization Project** there is need to design and include in the project implementation plan, a communications and advocacy strategy to guide the States engagement process, prior to program launch and implementation.
The safeguards policies of the World Bank require that, before a project is appraised a Pest Management Plan (PMP) be made available for public review at a place accessible to local people in a form, manner, and language they can understand. In order to reduce, minimize and mitigate adverse impacts and undue harm of its development projects to the environment.

2. Rationale of a PMP

The proposed project is classified under the Nigerian Environmental Act as "Category II,' and, under the World Bank's Operational Policy on Environmental Assessment (OP/BP4.01), as "Category B." or "A" on the basis of the direct and indirect environmental and social impacts associated with the identified sub-projects and activities known at this time.
The PMP is designed to minimize potential harmful effects on human and animal health and on the environment which may arise particularly from proposed activities related to support to farmers which include inputs requirements such as agrochemicals (fertilizers, herbicides, etc.) as required under OP 4.09 (Pest Management).
The implementation of project activities will benefit the local population, but in some cases, this could result in negative environmental and social impacts. From the foregoing, the less significant environmental and social impacts that are likely to occur, can be reduced or minimized through compliance with appropriate mitigation measures.

3. Objectives

The World Bank operational policy 4.09 triggers with Projects under which any procurement of pesticides (agricultural use, vector control weed control, etc) either directly by the project, or indirectly through on-lending, co-financing, or government counterpart funding, projects and programs that are expected to introduce new pest management practices, or expand or alter existing pest management practices and subsequent environmental and health risks.
2
This study is part of the requirements of Operational Policy (OP) 4.09 and pest control. The application of environmental assessments to projects that include pest control as applied to agricultural development projects could possibly

increase acquisition and use of pesticides by farmers.
With respect to its objectives and execution, BP 4.01 - Annex C stipulates that: "A pest management plan reflects the policies set out in OP 4.09, *Pest Management.* The plan is designed to minimize potential adverse impacts on human health and the environment and to advance ecologically based Integrated Pest Management Plan (IPMP). The plan is based on on-site evaluations of local conditions conducted by appropriate technical specialists with experience in participatory PM."
The PMP shall complement the stand alone Environmental and Social Management Framework (ESMF) and Resettlement Policy Framework (RPF) being prepared covering impacts related to Involuntary Resettlement (OP/BP4.12).
During the assessment, the consultant will collaborate and work closely with: o PIU Project Coordinator and safeguards team o Ogun State Ministry of Environment; and o Ogun State Environmental Protection Agency (OGEPA)
o Ogun State Ministry of Agriculture o Other relevant MDAs

The work shall be carried out according to the following tasks:

1. A description of the proposed project;
2. Description of the legal framework and institutional capabilities for pesticide management explaining the content of applicable national, state and local laws and regulations and implications to the project;
3. Conduct an initial reconnaissance/field visits to identify the main pest problems, identify the challenges in terms of pesticide accessibility and application in Ogun State and their contexts (ecological, agricultural, public health, economic, and institutional) and to define broad parameters;
4. The consultant will review existing applicable laws, regulations and policies guiding pest use and management in Nigeria and Ogun State, review the World Bank Safeguard Policy on Pest Management, OP 4.09, existing Bank documents regarding the project/program (PID, EA, PAD) and will obtain background information on pest and pesticide management in the country, and any existing relevant projects (e.g. through the World Bank, FAO, WHO, UNEP, UNITAR web sites; the web site of the national government; web sites of relevant CGIAR institutes, etc.);
5. Describe the environmental and socio economic baseline of the proposed area of influence.
6. Assess the capacity available (including institutional and implementation arrangement) to implement/enforce the PMP and suggest recommendation in terms of training and capacity building, and estimate their costs; 3

4. Scope of Services

The consultant will prepare a Pest Management Plan (PMP) which represent a framework for screening, monitoring, and mitigating potential impacts, with a process for triggering subsequent sub-projects.

- Review existing Integrated Pest Management (IPM) initiatives, achievements, constraints/gaps, pest management practices, challenges and control methods in Nigeria and Ogun State;
- Present the potential negative impacts of pesticides which includes the environmental and health risks as well as negative impacts on humans;
- Propose appropriate mitigation measures for the negative impacts identified;

- Develop an implementation strategy which includes the institutional arrangement for implementing the PMP;
- Public participation and consultation: The consultant shall discuss and interact with national NGOs, community opinion leaders, scientific experts, relevant government agencies and the private sector;
- Develop patterns of the functional surveillance for early warning on alien invasive species and migratory pests;
- Identify local, national and international partnerships to implement the Pesticide Management Plan;
- Identify the need for collaboration between different institutions in the state for pest management;
- Development of specific operational plans to identify, understand address the pest and vector problems;
- Specify procedures for screening pest control products;
- Prepare a monitoring and evaluation plan as well as supervision responsibilities
- Prepare a screening checklist for future monitoring of the project; and
- Prepare a budget for the implementation of the PMP

5. **Duration of the assignment and estimated staff input** The duration for preparing the PMP shall not exceed 10 Weeks.

6. **Deliverables**

The consultant will work in close coordination with the Project team. In addition, the Consultant will liaise with the various relevant State Ministries and Departments during preparation of the framework document. The implementing agency will provide to the Consultant all available documents that would facilitate completion of the PMP

The key output of the services is a PMP prepared based on the scope of work under this consultancy. The following report shall be submitted through the PIU for the review and approval of the PIU and the World Bank as detailed below:

Inception Report-Not later than one (1) weeks from contract award, an Inception Report shall be submitted that presents the Consultant's Work Plan, defines the Implementation Schedule by task, and methodology should be submitted. This will include the table of content of the final report. Five (5) hard copies and one electronic copy shall be submitted

Draft Report - Not later than five (5) weeks from contract award, a draft report shall be submitted. This shall be circulated to the PIU and the World Bank for review and comments.

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Issues and comments raised shall be incorporated in the draft final report. Five (5) hard copies and one electronic copies shall be submitted.

Draft Final Report – Not later than eight (8) weeks after contract signing, a draft final report that addresses all comments raised at the draft stage shall be submitted. Five (5) hard copies and one electronic copy of this report shall be submitted. This version shall be consulted upon with relevant stakeholders prior to submission. The final version must contain an executive summary in local language in addition to the English summary

Final PMP– Not later than ten (10) weeks from contract signing, a final report which addresses all comments raised shall be submitted in ten (10) hard copies and one electronic copy. This version must contain an executive summary in the local language in addition to the English language executive summary.

7. **Management Arrangements**

The Consultant will be supervised by the Project Coordinator in the Project Management Unit and will submit all documents to this unit. The Consultant shall provide overall management of all aspects of the work / services and ensure internal quality control and assurance procedures during the execution of the Contract.

8. **Expertise Required**

- Masters in Environmental Management Sciences, Agricultural Sciences or related subjects
- Extensive knowledge but not less than 7 years' development experience (5 years for Pest Control and Management), ESMF and/or other EAs instruments recognized by the World Bank in the international agencies and programs; private sector
- Sound analytical and technical competence in the subject matter
- Having conducted similar exercise in the recent past will be an added advantage
- Excellent writing and organizational skills

9. Reference Materials

a. World Bank Operational Manual: Operational Policies OP 4.09 - Pest Management (December 1998)
b. World Bank Operational Manual: Bank Procedures BP 4.01-Annex C - Application of EA to Projects Involving Pest Management (January 1999)
c. World Bank Pest Management Guidebook (2002)
d. World Bank Environmental Assessment Handbook - Chapter 8: Agriculture and rural development
e. Background paper to the objectives and implementation of OP 4.09 (to be developed as part

of OP 4.09 tool kit?) The WHO recommended classification of pesticides by hazard (latest version)

5

10. Fees and Reimbursable

Consultant fees and reimbursable (travel costs, organization of consultation meetings with key stakeholders) shall be included in the proposal.

Resumes to be delivered to OgunP4R@ogunstate.gov.ng

The procurement procedure to be followed in the selection of the Individual Consultant shall be The World Bank Procurement Regulations for IPF Borrowers, July 2016, revised November 2017.

6

Annex 1- Sample Outline of a Pest Management Plan (PMP)

a. Cover page
b. Table of contents
c. List of Tables
d. List of Figures
e. List of Plates

f. List of Appendices
g. List of abbreviations and acronyms
h. Executive summary **Chapter 1: Introduction**
a. Introduction and Background
b. Objectives of PMP
c. Rationale of the PMP
d. Scope of the PMP **Chapter 2: Description of the project** **Chapter 3: Policy, legal and regulatory framework** **Chapter 4: Description of current biophysical and socio economic environment Chapter 5: Pest management concerns and control measures in Ogun state Chapter 6: Identification of potentially negative impacts and mitigation measures Chapter 7: Pest Management Plan**

PMP Overview
Specific PMP Objectives
Best suitable IPM methods for the project
Planning matrix for the Pest Management Plan of the Project

Chapter 8: PMP Implementation and Management
Institutional Arrangements and Framework for Implementation
Capacity Assessment to perform institutional role
Monitoring and Evaluation Plan
Training and Capacity building plan
Participation/ Consultation Measures
Disclosure of Safeguard Instrument

Chapter 9: Workplan and Budget References

Annexes

- TOR
- List of crop and livestock protection products approved for use by NAFDAC
- List of banned pesticides
- Good Management Practices Guide and Pesticides Management Measures
- WHO Pesticide Classification (Class I & II)
- Labelling, Packaging, Storage and Disposal (FAO)
- OHS Plan

Annex 3

List of Banned Pesticides

S/n	Trade Names	Uses	Alternative
1	Aldrin	Used to control soil insects such as termites, corn rootworm, wireworms, rice water weevil, and grasshoppers	IPM
2	Captafol		IPM
3	Chlordane	Used extensively in the control of termites	IPM
4	Ethylene		IPM
5	Chlordimeform, Bermat, C8514, Ent 27567, EP-333, Fundal, Galecron, SN	Insecticide, acaricide and ovicide	IPM
	3626		
6	Chlorobenzilate		IPM
7	DDT--Organochlorine	Used to control mosquito vectors of malaria in numerous countries	Organophosphate and carbamate insecticides, *e.g.* malathion (already banned) and bendiocarb
8	Lindane,	Insecticide, Acaracide, Seed treatment and soil treatment	Austraa Azinphlios ethyl, carbaryl, chlorpyrifos, fenitrothion, methidathion,disulfoton, methamidophos, mevinphos, vamidothion, diazinon, malathion, permethrin, deltamethrin, bioresmethrin, cyfluthrin, cypermethrin, propoxur,

	Aalindan; Africide; Agrocide; Agrocide III; Agrocide WP;Ameisenmittel Merck; Ameisentod; Aparasin; Aphtiria; Aplidal; Arbitex;BBH; Ben-Hex; Bentox; Bexol; Celanex; Chloresene; Codechine;DBH; Detmol-Extrakt; Devoran; Dol; Drill Tox-Spezial Aglukon; ENT7796; Entomoxan; Exagamma; Forlin; Gallogama; Gamaphex;Gammalin; Gammalin 20; Gammex; Gammexane; Gammaterr;Gexane; Grammapox; Hecltox; Hexa; Hexachloran; yHexachloran;Hexachlorane; Hexaverm; Hexicide; Hexyclan; HGI; Hortex; Inexit;Isotox; Jacutin; Kokotine; Kwell; Lacca Hi Lin, Lacca Lin-O-Mulsion;		pirimicarb, phonate, methomyl
	Lendine; Lentox; Linafor; Lindafor; Lindagam; Lindagrain; Lindagam;Lindagram; Lindatox; Lindasep; Lin-O-Sol; Lindagranox; Lindalo;Lindamul; Lindapoudre; Lindaterra, Lindex; Lindust; Lintox; Lorexane;Milbol 49; Msycol; Neo-Scabicidol; Nexen FB; Nexit; Nexit-Stark;Nexol-E; Nicochloran; Novigam; Omnitox; Ovadziak;Owadizak;		Indonesia Permethrin, decamethrin, phormothion
	Pedraczak; Pflanzol; Quellada; Sang-gamma;Silvanol; Spritz-Rapidin;Spruehpflanzol;		

	Streunex; TAP 85; Tri-6; Vitron		
9	Alochlor Lasagrin Lassagrin Lasso Lazo; Metachlor Pillarzo Alanox Alanex Chimichlor	Herbicide for control of annual grasses and broadleaf weeds in crops, primarily on corn, sorghum and soybeans	Short season cotton varieties, plowing, crop rotation, re-introduction of beneficial insects, growing in proximity to alfalfa plants, and other approaches
10	Dieldrin	used in agriculture for the control of soil insects and several insect vectors of disease	IPM
11	Heptachlor	used primarily against soil insects and termites.	IPM
12	Mirex	used to combat leaf cutters and harvester termites	IPM
13	Toxaphene	used primarily on cotton, cereal grains fruits, nuts and vegetables and to control ticks and mites in livestock.	IPM
14	Endrin	used as a rodenticide to control mice and voles.	IPM
15	Hexachlorobenzene (HCB)	Used for seed treatment, especially for control of bunt of wheat.	IPM
16	Dinoseb		IPM
17	Fluoroacetamide		IPM
18	HCH		IPM
19	2,4,5-T		IPM
20	Captafol,		IPM
21	Chlordane		IPM
22	1,2-dibromoethane (EDB)		IPM
23	Dinitro – ortho – cresol		
24	Endosulfan	Used in the control of insects and mites	chlorfluazuron, chromafenozide ,

			flubendiamide, indoxacarb, isoxathion, lufenuron, malathion, profenofos, spinosad, spirotetramat, and thiodicarb
25	Mercury compounds		IPM
26	pentachlorophenol		IPM
27	Ethylene oxide		IPM
28	Dichloride		IPM
29	Aldicarb		IPM
30	binapacryl		IPM

Annex 4

Recommended Pest & Pest Management Practices Guide and Pesticides Management Measures

a. Required measures for the reduction of pesticides-related risks

Safe use of pesticides

Pesticides are toxic for pests and for humans. However, if sufficient precautions are taken, they should not constitute a threat either for the population or for non-targeted animal species. Most of them can have harmful effects if swallowed or in case of prolonged contact with the skin. When a pesticide is sprayed in the form of fine particles, there is a risk of absorbing them with the air we breathe. There is also a risk of water, food and soil contamination.

Specific precautions should therefore be taken during the transportation, storage and handling of pesticides. The spraying equipment should be regularly cleaned and well maintained to avoid leakages. The individuals using pesticides should learn how to use them safely.

Insecticides registration

Reinforce the registration process of insecticides by ensuring:

- Streamlining, between the national pesticides registration system and other products used in Public Health;
- Adoption of WHO specifications applicable to pesticides for national registration process purposes;
- Reinforcement of the pilot regulatory body;
- Collection and publication of data relating to imported and manufactured products;
- Periodical review of registration.

When planning to buy pesticides to control vectors, consult the guiding principles issued by WHO. For the acquisition of insecticides intended for public health use, the following guidelines are recommended:

- Develop national guidelines applicable to the purchase of products intended for vector control and ensure that all the agencies buying them strictly comply with those guidelines;
- Use synthetic Pyrethroids: Deltamethrin SC, Permethrin EC, Vectron, Icon, Cyfluthrin, as recommended by the national policy;
- Refer to the guiding principles issued by WHO or FAO on calls for tenders, to FAO recommendations regarding labeling and to WHO recommendations regarding products (for indoor spraying);
- Include in calls for tenders, the details regarding technical support, maintenance, training and products recycling that will be part of the after-sale service committing manufacturers; apply the back-to-sender principle;
- Control the quality and quantity of each lot of insecticides and impregnated supports before receiving the orders;

- Ensure that the products are clearly labeled in French and if possible in local language and in the strict respect of national requirements;
- Specify which type of package will guarantee efficiency, preservation duration as well the human and environmental security of handling packaged products while strictly complying with national requirements;
- Ensure that donated pesticides intended for public health, comply with the requirements of the registration process in Mali (CSP) and can be used before their expiry date;
- Establish a consultation, before receiving a donation, between the ministries, agencies concerned and the donors for a sound use of the product;
- Request users to wear protective clothes and equipment recommended in order to reduce their exposition to insecticides to the strict minimum;
- Obtain from the manufacturer a physic-chemical analysis report and the product acceptability certification;
- Request the manufacturer to submit an analysis report of the product and of its formulation along with guidelines to follow in case of intoxication;
- Request the buying agency to perform a physic-chemical analysis of the product before shipping and arrival.

Precautions:

Labeling

Pesticides should be packaged and labeled according to WHO standards. The label should be written in **English** and in the local language (**Hausa, Igbo and Yoruba** as applicable); it should indicate the content, the safety instruction (warning) and any action to be taken in case of accidental ingestion or contamination. The product should always remain in its original container. Take all appropriate precautionary measures and wear protective clothes in accordance with recommendations.

Storage and transportation

Pesticides should be stored in a place that can be locked up and is not accessible to unauthorized individuals or children. The pesticides, should, in no event, be stored in a place where they could be mistaken for food or beverage. They should be kept dry and out of the sun. They should not be transported in a vehicle that also carries food products.

In order to ensure safety during storage and transportation, the public or private agency in charge of managing purchased insecticides and insecticide-impregnated supports, should comply with the current regulations as well as the conservation conditions recommended by the manufacturer regarding:

- Preservation of the original label;
- Prevention of accidental pouring or overflowing;
- Use of appropriate containers;
- Appropriate marking of stored products;
- Specifications regarding the local population;
- Products separation;
- Protection against humidity and contamination by other products;

- Restricted access to storage facilities;
- Locked storage facilities to guarantee product integrity and safety.
- Pesticides warehouses should be located far from human residences or animal shelters, water supplies, wells and channels. They should be located on an elevated surface and secured with fences with restricted access for authorized individuals only.
- Pesticides should not be stored in places where they could be exposed to sunlight, to water or to humidity, which could harm their stability. Warehouses should be secured and well ventilated.
- Pesticides should not be transported in the same vehicle with agricultural products, food products, clothes, toys or cosmetics as these products could become dangerous in case of contamination.
- Pesticides containers should be loaded in vehicles in order to avoid damages during transportation, that their labels will not tear off so that and they would slip off and fall on a road with an uneven surface. Vehicles transporting pesticides should bear a warning sign placed conspicuously and indicating the nature of the cargo.

Distribution

Distribution should be based on the following guidelines:

- Packaging (original or new packaging) should ensure safety during the distribution and avoid the unauthorized sale or distribution of products intended for vector control;
- The distributor should be informed and made aware of the dangerous nature of the cargo;
- The distributor should complete delivery within the agreed deadlines;
- The distribution system of insecticides and impregnated supports should enable to reduce the risks associated with the numerous handlings and transportations;
- In the event the purchasing department is not able to ensure the transportation of the products and materials, it should stipulated in the call for tenders that the supplier is expected to transport the insecticides and impregnated supported up to the warehouse;
- All pesticides and spraying equipment distributors should have an exploitation permit in accordance with the current regulation in Mali.

Disposal of pesticide stocks

After the operations, the remaining stocks of pesticides can be disposed of without risk by dumping them in a hole dug specifically or in a pit latrine. A pesticide should not be disposed of by throwing it in a place where there is a risk of contaminating drinking water or for bathing or where it can reach a pond or a river. Some insecticides, such as pyrethroids, are very toxic for fish.

Dig a hole to at least 100 meters from any stream, well or habitat. If in hilly areas, the whole must be dug below. Pour all waters used for hand washing after the treatment. Bury all containers, boxes, bottles, etc. that have contained pesticides. Reseal the hole as quickly as possible. Packaging or cardboard, paper or plastic containers— the latter cleaned — can be burnt, if allowed, far away from homes and drinking water sources, regarding the re-use of containers after cleaning. Pyrethroid suspensions can be discharged on a dry soil where they are quickly

absorbed and then will go through a decomposition process making them harmless for the environment.
If there is an amount of insecticide solution left, it can be used to destroy ants and cockroaches. Simply pour a little bit of solution on infested areas (under the kitchen sink, in corners) or to rub a sponge soaked with water on it. To temporarily prevent insect proliferation, a certain amount of solution can be poured inside and around latrines or on other breeding places. Pyrethroid suspensions for mosquito nets treatment and other fabrics can be used days after their preparation. It can also be used to treat mats and rope mattresses to prevent mosquito to bite from the bottom. Mattresses can also be treated against bugs.

Cleaning of empty pesticide packaging and containers

Re-using empty pesticide containers is risky and it is not recommended to do so. However, it is estimated that some pesticide containers are very useful to be simply thrown away after use.
Can we therefore clean and re-use such containers? This depends both on the material and the content. In principle, the label should indicate the possibilities for re-using containers and how to clean them.
Containers having contained pesticides classified as hazardous or extremely dangerous should **not** be re-used. Under certain conditions, containers of pesticides classified as dangerous or that do not present any risk under normal use, can be re-used unless they are not used as food or drink containers or as food containers for animal food. Containers made of materials such as polyethylene that preferentially absorb pesticides, must not be re-used if they have contained pesticides whose active ingredient has been classified as moderately or extremely dangerous regardless of the formulation. Once a recipient is empty, it should be rinsed, then filled completely with water and allowed to stand for 24 hours. Then it should be emptied and this process should be done over again.

General Hygiene

Do not eat, drink or smoke when handling insecticides. Food should be placed in tightly closed containers. Measurement, dilution and transfer of insecticides should be done with the adequate material. Do not shake or take liquid with unprotected hands. If the nozzle is blocked, press the pump valve or unblock the opening with a flexible rod. After each fill, wash hands and face with water and soap. Eat and drink only after washing hands and face. Take a shower or a bath at the end of the day.

Individual protection

- Adapted coveralls covering hands and legs
- Dust, gas and respirator masks, based on the type of treatment and product used
- Gloves
- Goggles
- Hoods (facial shield)

Protection of the population

- Minimize the exposure of local populations and livestock

- Cover wells and other reservoirs
- Sensitize populations on risks

Protective clothing

Treatments inside homes:

Operators should wear coveralls or a long sleeves shirt over a pair of pants, a flapped hat, a turban or any other type of headgear as well as boots or big shoes. Sandals are not suitable.

Nose and mouth should be protected using a simple method, for example a disposable paper mask, a disposable surgical or washable mask or a clean cotton cloth. Once the fabric is wet, it should be changed. Clothing must be in cotton for easy washing and drying. It must cover the body and contain no opening. In hot and humid climates, it can be uncomfortable to wear additional protective clothing; therefore, one will be forced to spray pesticides during hours when it is very hot.

Preparation of suspensions:

People responsible for bagging insecticides and preparing suspensions, particularly for the treatment of mosquito bed net units must take special precautions. In addition to the abovementioned protective clothing, they must wear gloves, an apron and eye protection, for example a facial shield or glasses. Facial shields protect the entire face and keep less warm. Nose and mouth should be covered as indicated for treatment in homes. They should ensure that they do not touch any part of their body with gloves during pesticide handling.

Treatment of nets:

To treat mosquito nets, clothes, grills or with tsetse traps with insecticides, it is necessary to wear long rubber gloves. In some cases, additional protection is required, for example against vapours, dusts or insecticide dusting that could be dangerous. These additional protective accessories should be mentioned on the product label and may consist of aprons, boots, facial masks, coveralls and hats.

Maintenance:

Protective clothing should always be impeccably maintained and should be checked periodically to verify tearing, wearing that could lead to skin contamination. Protective clothing and equipment should be washed daily with water and soap. Particular attention should be paid to gloves and they must be replaced once they are torn or show signs of wear. After usage, they should be rinsed in water before removing them. At the end of each working day, they will need to be washed inside and outside.

Safety measures

During spraying:

Spurt form the sprayer must not be directed towards a part of the body. A leaking sprayer must be repaired and skin must be washed if it is accidentally contaminated. The household and animals must stay outside during the whole spraying activity. Avoid treating a room where there is a person — a sick person for example — who cannot be taken outside. Before starting spraying activities,

kitchen utensils should be taken out and all utensils as well as dishes containing drinks and food. They can be gathered in the centre of the room and covered with plastic film. Hammocks and paintings should not be treated. The bottom part of furniture and the side against the wall should be treated while ensuring that surfaces are effectively treated. Sweep or wash the floor after spraying. Occupants should avoid contact with walls.

Clothing and equipment should be washed every day. Avoid spraying organophosphate or carbamate for more than 5 to 6 hours daily and wash hands after each filling. If Fenitrothion is used or old stocks of Malathion are used, operators should control the level of cholinesterase in their blood every week.

Monitoring exposure to organophosphate:
There are country kits available on the market to control cholinesterase activity in the blood.
If this activity is low, it can be concluded that their excessive exposure to organophosphate insecticide. These dosages should be done every week with people handling such products.
Any person whose cholinesterase activity is very low should be stopped from working until it returns to normal.

Fabric spraying:
When handling insecticide concentrates, or preparing suspensions, gloves should be worn.
Attention should be paid particularly to spraying in the eyes. A big bowl not too high should be used and the room should be well ventilated to avoid inhaling smokes.
b. Measures to minimize transportation, storage, handling and usage risks

Annex 5

List of Persons Consulted during Study

s/n	Name	Organization	Designation	Contact
1	Dr. Eyitope Ajayi	Consultant	PMP	08138807454
2	Mr. Gboyega Osobu	Agric	PM Agric	08034947702
3	Mosuro Olatubosun	Agric	Ag. Perm Sec	08034049406
4	Lanre Adeyinka	Agro Services	Director	08037180590
5	Osiyoye O.A	Ogun ADP	Dep. Director	08033777121
6	Shoetan Olalekan	Agrodealer	Chairman	08033480281
7	Bello Adebayo O.	Min of Agric	Produce Officer	07033269831
8	Somade A. Adedeji	Min of Agric	Chief Produce Off.	08034706514
9	Sulaimon Orija	Min of Agric	Agric Res. Off.PRS	08038567276
10	Owuye Damilare	Min of Agric	Agric Res. Off.PRS	08066250365
11	Omoba Segun	Min of Agric	Agric Res. Off.	08066630071
12	Fashola O.S.	Min of Agric	Director Planning	08055266149
13	Akinmolayan A.T	Min of Agric	SA (Agric)	08034379163
14	Dr. Dotun Sorunbe	Min of Agric	Director Vet.	08033371451
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16	Kushimo O.O	Min of Agric	Director Produce	08033613692
17	Sodiya, Josephine O.	Min of Agric	Director, Agric	08023716279
18	Lola-Adeoye K.	AFAN	V. Chairperson	08037269355
19	Mrs F.A. Oyekunle	AFAN/NCGA	Women Leader	08055344960
20	Balogun Olufemi	AFAN/NCGA	Secretary	08062656710
21	Adegbite Margaret	AFAN/NCGA	W/Leader cassava	08069686170
22	Osunkoya O.L	RIFAN	Chairman	08029267342
23	Ajiboye Peter O.	RIFAN	Member	07030957444
24	Ayansanwu Taiwo	Osun ADP	Ag. PM	07035524929

25	Ibrahim Fausat	Agrodealer		08034078335
26	Engr. Adebayo	Fadama III	State Project. Cood	08034088067
27	Ogunyinka Dapo	Farmer	Farm settlement	08038470931
Ikenne Farm Settlement				
28	Onajole A.A.	Farmer	Farm settlement	08035550208
29	Seun Kehiinde	Farmer	Farm Settlement	08033433728
30	Joshua Olalekan	Farmer	Farm Settlement	08066235083
31	Oso Anthony I.	Farmer	Farm Settlement	08027810898
32	Okuweye Adewale	Farmer	Farm settlement	08162847559
33	Abudu Mudeshiru	Farmer	Farm Settlement	08137494966
34	Tunde Adekoya	Farmer	Farm settlement	07032972931
35	Dr. Osunuga Bunmi	Farmer	Farm Settlement	08034840747
36	Sotubo Adebayo	Farmer	Farm Settlement	08051522919
37	Dr. O Jagun	Farmer	Farm Settlement	08037190490
38	Mr. M.A. Disu	Farmer	Farm Settlement	08032395951
39	Olanloye S.	Min of Agric	Farm Settl. Officer	08034300225

s/n	**Name**	**Organization**	**Designation**	**Contact**
Ilewo Farm Settlement				
40	Raufu Nurudeen	Farmer	Farm settlement	08035744328
41	Falola J.A	Farmer	Farm settlement	08050442553
42	Afolabi-Kufo O.B.A.	Farmer	Farm settlement	07031187278
43	Idowu O.O. Mrs	Agric Officer	Farm settlement	08033621892
44	Agboola A.A.	Agric Officer	Farm settlement	08039179642
45	Soyemi Olanike	Settlement officer	Farm settlement	08100565661
Imasayi Farm Estate				
46	Kalejaiye Muideen	Estate officer	Farm estate	08034658718
47	Durodola T.A.	Farmer	Farm estate	08024157328
48	Ignatius Ilegogu	Farmer	Farm estate	08086359730
49	O.Adebamojo	Farmer	Farm estate	08037143665
50	Olawunmi Michael	Farmer	Farm estate	08065000749
51	Inaolaji Bola	Estate officer	Farm estate	08036720456
52	Olabode Isiaka	Agric officer	Farm estate	08144478633
53	Leoto Timothy	Agric Officer	Farm estate	08060488419
54	Badmos Ibrahim	Agric officer	Farm estate	08038474553
55	Adeleye T. Taiwo	Agric Officer	Farm estate	08034480240
56	Ayinde Sunday	Agric officer	Farm estate	08028282313
57	Oyekan Esther	Agric Officer	Farm estate	08038443076
Eggua Rice Project				
58	Ajayi Gbemisola	Farmer	Farm settlements	07060446130
59	Aduragbemi Odukoya	Farmer	Farm settlement	08068887554
60	Olusegun Odukoya	Farmer	Farm settlement	08033324452
61	Babatunde Bilaminu	Farmer	Farm settlement	07062199424
62	Sanni Saliu	Farmer	Farm settlement	07032315015
63	Asisi Olaleye	Farmer	Farm settlement	09065726807
64	Akinpelu Tayo	Farmer	Farm settlement	08030789293
65	Folarin T.A.	Farmer	Farm settlement	00803760404
66	Akan Joseph .E.	Farmer	Farm settlement	08062225708
67	Kalejaiye M.O.	Farmer	Farm settlement	08034658118

68	Shogunle James	Famer	Farm settlement	08133666600

Annex 6

List of crop and livestock protection products approved for use by NAFDAC

a) Insecticides

Organochlorines insecticides

1. Endosulfan
2. Helptachlor
3.Lindane (Restricted to use on Cocoa only)

Organophosphorus insecticides

Organophosphorus i 1. Diazinon
2. Dichlorvos (DDVP)
3. Chlorpyrifos
4. Chlorpyrifos – Methyl
5. Dicrotophos
6. Dimethoate
7. Monocrotophos
8. Perimiphos – Ethyl
9. Perimiphos – Methyl

Carbamates

1. Carbaryl 2. Carbofuran 3. Propoxur 4. Carbosulfan 5. Furathiocarb 6. Temik (Aldicarb

Pyrethroids

1. Lambda – Cyhalothrin
2. Cypermethrin 3. Deltamethrin 4. Phenothrin 5. Permethrin
6. Tetramethrin 7. Cyfluthrin 8. Allethrin
10. Ethion
11. Rugby (Cadusofas)
12. Malathion
13. Temeguard (Temephos)
14. Isazofos 15. Parathion – 31 Methyl
16. Phosphamidon
17. Methidathion

b) Herbicides and fungicides

Organophosphorus Organophosphorus 1. Anilofos 2. Piperophos
3. Glyphosate
4. Glyphosate Trimesium (Touchdown or Sulfosate)
5. Amideherbicides (Acetochlor; Alachlor; Propanil; Butachlor; Metalochlor)
Triazines and Triazoles
Carbamates
1. Asulam
Other herbicides
1. Dimethachlor 2. Metazachlor
3. Monosodium Methyl Arsonate (MSMA)
4. Fluxixpyr 5. Imazaquine
6. Triassulfuran (Amber)
7. Osethoxydim
8. Oxadiazon (Ronster)
9. Clomaone
10. Trifluralin
11. Stamp 500 (pendimethalin)
12. Fluazifop – P.butyl

Fungicides

1. Benomyl (Nitroheterocyclic Compound)
2. Dazomet (Thiadiazine Fungicide)
3. Folpet (Phthalimide Fungicide)
4. Metalaxyl (Acylalamine Fungcide)
5. Cyproconazole (Alto – 100SL)
6. Bavistin (Carbon) – Benzimide
7. Triadmenol (Bayfidon GR Conzole Fungicide)

(Atrazine; Desmetryn; Terbuthalazine; Terbutrex Terbutryne)
Chlorophenoxy herbicides (Prometryn; Simazine; 2.4-D (2.4 Dichlorphenoxy acetiacid)
7. **Urea and guadinidines** ; (Diuron ; Linurex (=Linuron); Fluometurone; Chloroxuron; Neburon)
Quaternary nitrogen compounds (paraquat; diquat)
Ametryn;

Annex 7

WHO Pesticide Classification

Class		LD50 for a rat (mg / kg body weight)			
		Oral Way		**Dermal Way**	
		Solid	Liquid	Solid	Liquid
Ia	Extremely dangerous	<5	<20	<10	<40
Ib	Very dangerous	5-50	20-200	10-100	40-400
II	Moderately dangerous	50 - 500	200 - 2000	100 – 1000	400 – 4 000
III	Slightly dangerous	>500	>2000	>1000	>4000
U	Safe in case of use Normal	>2000	>3000	-	-

Annex 8

World Bank Safeguard Policy OP 4.09

These policies were prepared for use by World Bank staff and are not OP 4.09 necessarily a complete treatment of the subject.

Pest Management (OP 4.09) The policy supports safe, affective, and environmentally sound pest management. It promotes the use of biological and environmental control methods. An assessment is made of the capacity of the country's regulatory framework and institutions to promote and support safe, effective, and environmentally sound pest management. This policy will most likely not apply to The World Bank.

1. In assisting borrowers to manage pests that affect either agriculture or public health, the Bank[1] supports a strategy that promotes the use of biological or environmental control methods and reduces reliance on synthetic chemical pesticides. In Bank-financed projects, the borrower addresses pest management issues in the context of the project's environmental assessment.[2]

2. In appraising a project that will involve pest management, the Bank assesses the capacity of the country's regulatory framework and institutions to promote and support safe, effective, and environmentally sound pest management. As necessary, the Bank and the borrower incorporate in the project components to strengthen such capacity.

Agricultural Pest Management[3]

3. The Bank uses various means to assess pest management in the country and support integrated pest management (IPM)[4] and the safe use of agricultural pesticides: economic and sector work, sectoral or project-specific environmental assessments, participatory IPM assessments, and investment projects and components aimed specifically at supporting the adoption and use of IPM.

4. In Bank-financed agriculture operations, pest populations are normally controlled through IPM approaches, such as biological control, cultural practices, and the development and use of crop varieties that are resistant or tolerant to the pest. The Bank may finance the purchase of pesticides when their use is justified under an IPM approach.

Pest Management in Public Health

5. In Bank-financed public health projects, the Bank supports controlling pests primarily through environmental methods. Where environmental methods alone are not effective, the Bank may finance the use of pesticides for control of disease vectors.

Criteria for Pesticide Selection and Use

6. The procurement of any pesticide in a Bank-financed project is contingent on an assessment of the nature and degree of associated risks, taking into account the proposed

use and the intended

users.[5] With respect to the classification of pesticides and their specific formulations, the Bank refers to the World Health Organization's *Recommended Classification of Pesticides by Hazard and Guidelines to*

Classification (Geneva: WHO 1994-95).[6] The following criteria apply to the selection and use of pesticides in Bank-financed projects:

This Operational Policy statement was revised in August 2004 to ensure consistency with the requirements of OP/BP 8.60, issued in August 2004.
Note: This OP 4.09 replaces the version dated July 1996. Changes in wording have been made in paras. 1 and 3 and footnotes 2, 3, and 4. Further guidance for implementing the Bank's pest management policy is in the *Environmental Assessment Sourcebook* (World Bank: Washington, D.C., 1991). Questions regarding agricultural pest management may be addressed to the Director, Rural Development.
Questions regarding pesticide use in public health projects may be directed to the Director, Health Services.

(a) They must have negligible adverse human health effects.

(b) They must be shown to be effective against the target species.

(c) They must have minimal effect on non-target species and the natural environment. The methods, timing, and frequency of pesticide application are aimed to minimize damage to natural enemies. Pesticides used in public health programs must be demonstrated to be safe for inhabitants and domestic animals in the treated areas, as well as for personnel applying them.

(d) Their use must take into account the need to prevent the development of resistance in pests.7. The Bank requires that any pesticides it finances be manufactured, packaged, labeled, handled, stored, disposed of, and applied according to standards acceptable to the Bank.[7] The Bank does not finance formulated products that fall in WHO classes IA and IB, or formulations of products in Class II, if (a) the country lacks restrictions on their distribution and use; or (b) they are likely to be used by, or be accessible to, lay personnel, farmers, or others without training, equipment, and facilities to handle, store, and apply these products properly.

1. "Bank" includes IBRD and IDA, and "loans" includes IDA credits and IDA grants.

2. See OP/BP 4.01, *Environmental Assessment*.

3. OP 4.09 applies to all Bank lending, whether or not the loan finances pesticides. Even if Bank lending for pesticides is not involved, an agricultural development project may lead to substantially increased pesticide use and subsequent environmental problems.

4. IPM refers to a mix of farmer-driven, ecologically based pest control practices that seeks to reduce reliance on synthetic chemical pesticides. It involves (a) managing pests

(keeping them below economically damaging levels) rather than seeking to eradicate them; (b) relying, to the extent possible, on nonchemical measures to keep pest populations low; and (c) selecting and applying pesticides, when they have to be used, in a way that minimizes adverse effects on beneficial organisms, humans, and the environment.

5. This assessment is made in the context of the project's environmental assessment and is recorded in the project documents. The project documents also include (in the text or in an annex) a list of pesticide products authorized for procurement under the project, or an indication of when and how this list will be developed and agreed on. This authorized list is included by reference in legal documents relating to the project, with provisions for adding or deleting materials.

6. Copies of the classification, which is updated annually, are available in the Sectoral Library. A draft Standard Bidding Document for Procurement of Pesticides is available from OPCPR.

7. The FAO's *Guidelines for Packaging and Storage of Pesticides* (Rome, 1985), *Guidelines on Good Labeling Practice for Pesticides* (Rome, 1985), and *Guidelines for the Disposal of Waste Pesticide and Pesticide Containers on the Farm* (Rome, 1985) are used as minimum standards.

Annex 9

Pictures of Stakeholder Meetings & Facilities

Stakeholders at Ikenne Farming Estate

Stakeholders at Eggua Farming Estate

Ilewo Farm Estate

Stakeholders at Imashayi Farm Estate

Important Notice:

The Project name has been changed from ***"Ogun State Agricultural Production and Industrialization Project" (OGAPIP)*** to "***Ogun State Economic Transformation Project" (OGSTEP).*** The new project name now replaces any occurrence of the old project name throughout the document. No other changes have been made in the document.