

LIVESTOCK PRODUCTIVITY AND RESILIENCE SUPPORT PROJECT

Federal Ministry of
Agriculture and Rural
Development



THE FINAL REVISED REPORT

The Final Revised Report

Integrated Pest Management Plan (IPMP) for the Livestock Productivity and Resilience Support Project (LPRES)

February,
2022

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Federal Ministry of Agriculture and Rural Development

PREPARATION OF SAFEGUARD INSTRUMENTS FOR THE LIVESTOCK PRODUCTIVITY AND RESILIENCE SUPPORT (LPRES) PROJECT

STAKEHOLDERS CONSULTATION MEETING, OYO STATE

ATTENDANCE SHEET

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Federal Ministry of Agriculture
and Rural Development

PREPARATION OF SAFEGUARD INSTRUMENTS FOR THE LIVESTOCK PRODUCTIVITY AND
RESILIENCE SUPPORT (LPRES) PROJECT

STAKEHOLDERS CONSULTATION MEETING, ~~010~~ STATE ADAMAWA

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LIST OF ABBREVIATIONS AND ACRONYMS

ADPs	Agricultural Development Projects
APP	Agricultural Promotion Policy
ATA	Agricultural Transformation Agenda
CADP	Commercial Agriculture Development Project
CGIAR	Consultative Group for International Agricultural Research
CITES	Convention on International Trade of Endangered Species
EA	Environmental Assessment
EMP	Environmental Management Plan
ECOWAS	Economic Community of West African States
ERGP	Economic Recovery and Growth Plan
ESGU	Environmental and Social Safeguards Unit
ESS	Environmental Safeguards Specialist
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
FAO	Food and Agriculture Organization
FGN	Federal Government of Nigeria
FMARD	Federal Ministry of Agriculture and Rural Development
FME _{env}	Federal Ministry of Environment
FMF	Federal Ministry of Finance
GDP	Gross Domestic Product
IDA	International Development Agency
IPCC	International Plant Protection Convention
IPF	Investment Project Financing
IPMP	Integrated Pest Management Plan
LPRES	Livestock Productivity and Resilience Support Project
MRL	Maximum Residue Levels
MDAs	Ministries, Departments and Agencies
NAFDAC	National Food and Drug Administration Commission
NGO	Non- Governmental Organizations
NPCO	National Project Coordination Office
OEL	Occupational Exposure Limit
OIE	Office International of thedes Epizootics
OSHA	Occupational, Health and safety Act
NSC	National Steering Committee
PA	Productive Alliance
PAD	Project Appraisal Document
PDO	Project Development Objective
PIM	Project Implementation Manual
PLM	Participatory Learning Module

PMU	Project Management Unit
REDISSE	Regional Disease Surveillance Systems Enhancement
RPF	Resettlement Policy Framework
RNSC	Regional Pre-Selection Committees
RCU	Regional Coordination Units
TRIMING	Transforming Irrigation Management in Nigeria
UNEP	United Nations Environment Programme
UNITAR	United Nations Institute for Training and Research
WHO	World Health Organization
WB	World Bank
YESSO	Youth Employment and Social Support Operation
WAFRINET	West African Network for Taxonomy

EXECUTIVE SUMMARY

ES 1 Background

Nigeria's agriculture sector remains a major contributor to the country's economy. Despite the overall negative growth (-1.92 percent) recorded in Nigeria in 2020, the agriculture sector grew at a rate of 2.17 percent in 2020 with the livestock sub-sector recording a growth rate of 1.91 percent. The livestock subsector is vital to socio-economic development and key to national food security. Despite the subsector's moderate growth rate, however, the dietary animal protein supply gap is increasing. To close this gap, livestock production and productivity would have to triple, with most production focusing on improving the situation of small holders and connecting them better with the market.

The Government of Nigeria has requested the assistance of the World Bank for the development of Livestock Productivity and Resilience Support (LPRES). The Project locations would be selective with focus on regions where it can demonstrate high potential of impact. The Project will target selected states and value chains based on comparative advantages, subsector growth prospects in the states, formal expression of interest by states, existing value chains and markets, and states' performance in ongoing externally financed projects in the states. The Project Development Objective (PDO) is to improve productivity and commercialization of targeted livestock production systems and strengthen the resilience of livelihoods affected by farmer-herder conflicts

ES 2 Project Components

The LPRES will assist the Government of Nigeria in the development and implementation of a Livestock Sector Plan, which will govern the technical and institutional aspects of improving livestock productivity.

The project will have three interrelated components with sub-components as summarized below:

Component 1: Institutional and Innovation System Strengthening (US\$95 million IDA)

The objective of project support under this component is to strengthen the policy and institutional foundations necessary to underpin the improved performance and governance of the livestock sector in Nigeria. Project support will focus on (i) strengthening the livestock policy and regulatory framework, planning, and monitoring at both Federal and State levels; and (ii) improving the capacity and capability of relevant institutions in the sector's innovation system to deliver public goods and services necessary to improve sector productivity, increase resilience of sector-dependent livelihoods, reduce competition for natural resources and the sector's negative externalities. Project support will be provided through three related, and mutually reinforcing subcomponents. Subcomponent 1.1: Support to Policy Formulation, Planning and Capacity Strengthening (US\$15 million IDA); Subcomponent 1.2: Support to Animal Husbandry and Advisory Support Services (US\$40 million) and Subcomponent 1.3: Support to Animal Health Services Strengthening (US\$40 million IDA).

Component 2: Livestock Value Chain Enhancement (IDA US\$275 million and Beneficiaries US\$26.7 million)

Support under this component builds on herd-level improvements in productivity - expected to accrue from project investments in GAHPs, breed improvements, and animal health under Component 1 - to expand overall commodity (i.e., meat and milk) production, which is key to reducing Nigeria's reliance on imports of these commodities. The project will support value chain enhancements/modernization with a focus on promoting smallholder market-orientation/commercialization and encouraging increased private sector investment in priority segments of the value chain. Besides augmenting national production, value chain improvement as envisaged in the project design, would help build the resilience of livelihoods, create jobs, promote rural economic growth, and improve food safety. It would also promote sustainability of all project investments and foster intensification which is key to reducing the environmental footprint of the livestock sector. Project support will be provided under the following four subcomponents, namely: Subcomponent 2.1: Support to Markets and Market Linkage Development; Subcomponent 2.2: Support to Increased Access to Finance; and Subcomponent 2.3: Support to Selected Livestock Service Centers (LSCs) (US\$35million IDA).

Component 3: Crisis Prevention and Conflict Mitigation (US\$100 million: US\$94 million IDA, US\$6 million GoN)

While improved provision of animal husbandry, animal health and animal identification and traceability services as proposed under Component 1 would indirectly contribute to mitigating herder-farmer conflict (mainly through improved productivity and reduced resource use intensity, and livestock security), support under this Component is designed to address declining resource (water and pasture) quantity and quality, constrained access to resources, and declining socio-cohesion, the most proximate causes of herder-farmer conflict. In line with the NLTP, the project will support two subcomponents namely: Subcomponent 3.1: Support to Natural Resource Management and Pasture Improvement (US\$60 million IDA); and Subcomponent 3.2: Support to Conflict Mitigation (US\$40 million IDA)

Component 4: Project Coordination and Management (US\$30 million IDA, US\$6 million GoN)

This component aims to ensure that programmed Project activities are implemented in a timely and appropriate manner. This includes adequate support relating to overall management, monitoring and evaluation (M&E), and communication. It will finance the creation and operation of a National Coordination Office (NCO) in the FMARD with its main objectives to: (i) ensure effective strategic, operational planning, implementation and monitoring and evaluation of the project, beginning with a base-line assessment by which to measure the project's progress and impacts; (ii) ensure the efficient use of various sources of funding and provide coordination of project interventions implemented by participating stakeholders and partners; (iii) evaluate the project's mid-term and final results, outcomes, and impacts on beneficiaries; (iv) support states to meet the eligibility criteria for joining

the project; and (v) support and ensure efficient knowledge management and effective communication to various public and private entities on project activities, outcomes, best practices, and lessons learned. Training of staff will include sessions focusing on national climate change policies.

Component 5: Contingency Emergency Response Component (US\$0.00 million)

Given Nigeria's vulnerability to shocks, the project includes a Contingency Emergency Response Component (CERC), with a zero-dollar allocation, to create a mechanism within the project to finance a response to a natural disaster, disease, or other eligible emergency. This CERC is particularly critical in light of the unpredictable trajectory of the COVID-19 pandemic and the continuing threat of a desert locust invasion in West Africa. If a crisis develops, GoN may request the World Bank to reallocate project funds to cover some of the costs of emergency response and recovery. All expenditures under this CERC will be in accordance with paragraphs 11, 12, and 13 of World Bank OP10.00 (Investment Project Financing). They will be appraised and reviewed to determine if they are acceptable to the World Bank before any disbursement is made. Disbursements will be made against an approved list of goods, works, and services required to support crisis mitigation, response, recovery, and reconstruction.

ES3: Rationale for the Integrated Pest Management Plan (IPMP)

In line with World Bank Operational Policies, an agricultural development project such as the Livestock Productivity and Resilience Support Project (L-PRES) will trigger World Bank's Operational Policy OP 4.09 (Pest Management), hence the need for an Integrated Pest Management Plan (IPMP) which is the suitable safeguard instrument for tackling pest management issues. Integrated Pest Management (IPM) brings together, into a workable combination the best strategies of all control methods that apply to a given problem created by the activities of pests. Other areas addressed include 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.

Purpose of Integrated Pest Management Plan (IPMP)

Considering the magnitude of the LPRES which is expected to improve livestock production in the country, there is undoubtedly the likelihood of infestation by pests, currently within the proposed area or migratory pests. The IPMP has been developed to reduce dependency on pesticides and encourage integrated pest control methods such as biological, cultural, physical, chemical methods and design a program for capacity building in IPM. The IPMP provides an overview of potential impacts of pests and pest management activities, it also ensures that the identified impacts related to application of pesticides are mitigated, controlled or eliminated through planned activities to be implemented throughout the project life. These mitigation measures will address health, environment, social components and how proposed activities will affect these components.

Objectives of the IPMP

The specific objectives of the L-PRES IPMP include;

- Assist the targeted State governments to plan and design location specific IPM activities;
- Promote participatory approaches in IPM to learn, test, select and implement “best-bet” IPM options.
- Promote biodiversity monitoring to serve as early warning systems on pest status, alien invasive species, beneficial species, and migratory pests;
- Establish linkages to drive the draft policy document for L-PRES in Nigeria and ensure compliance with national and international conventions and guidelines on pesticide use in agriculture.
- Monitor and evaluate the benefits of IPM including its impact on the environment and health.

ES4: Legislative and Regulatory Framework

Several legislations, policies and treaties were considered in this study to include National extant laws, international conventions and treaties, and the World Bank Operational Policy 4.09, as outlined in chapter three. It further describes the institutional framework for pest management at the National and State levels.

ES5: General methods of Pest Control in Nigeria

Pest management methods in Nigeria vary with the type of pests and Livestock. Most of the pest control operations in Nigeria today are through the use of pesticides. Other control measures include:

- cultural control methods (hygiene, herbs and local concoctions, change of location, bush burning, timing on grazing, nutrition, herd sharing and use of holy books);
- mechanical methods (e.g. use of grooming combs);
- physical control methods (ventilation, avoiding over-crowding);
- biological control;
- legislative measures; and
- chemical method.

ES6: Integrated Pest Management Plan

The IPMP spells out how pests would be managed to acceptable level under the L-PRES Project in Nigeria in line with the existing national and international legislations on the use of pesticides and pest management practices. The plan provides background on pest management concerns and control measures in Nigeria, and subsequently outlines a responsive plan for pest management in an environmentally sound and safe manner.

The IPMP identified a number of potential environmental and health risk that may be encountered through unsafe use of pesticides in the project area, and adequate mitigation measures for addressing the impacts identified. In addition to providing details of the mitigation measures to be implemented for the impacts, the responsible institutions to implement them are also stated in the IPMP.

It also designs a program for capacity building in Integrated Pest Management, provides a stakeholder consultative and information dissemination arrangement as well as institutional responsibilities for taking actions and responding to IPM needs.

ES7: Adverse Environmental & Health Impacts

Media/Receptor	Potential issues	Mitigation Measures	Monitoring	Responsibility	Frequency	Cost estimate
Surface and ground water	Pesticides may pollute surface water through runoff which transports pesticides to streams, rivers, and other surface-water bodies. Groundwater contamination may occur from pesticide residue in surface water, such as drainages, streams, and municipal wastewater.	Minimize use of chemical pesticides in line with the IPMP. Ban pesticides should not be used	Compliance with LPRES IPMP Monitoring of water quality in project areas	State Ministry of Agriculture/ Department of Animal Husbandry State Ministry of Environment/ Environmental Protection Agency	Annually	\$66,000
Air Pollution	Vapor from sprayed pesticides will be released into the air, and if the chemical compound is very stable, vapor may travel beyond the application location.	Minimize use of chemical pesticides in line with the IPMP.	Monitoring of air quality parameters	State Ministry of Environment/ Environmental Protection Agency	Annually	\$44,500
		Adequate equipment should be used to minimize aerosols	Adequate training on pesticides application	State Ministry of Agriculture/ Department of Animal Husbandry	As required	\$34,200
Soil Contamination	Pesticides could also enter soil during spraying causing wash-off or run-off into soil. Long-term excessive use of pesticides will cause higher pesticide residues in the soil, which will further cause soil contamination within the area.	Minimize use of chemical pesticides in line with the IPMP. Ban pesticides should not be used	Compliance with LPRES IPMP Monitoring of soil quality in project areas	State Ministry of Agriculture/ Department of Animal Husbandry State Ministry of Environment/ EPA	Annually	\$75,000
Flora and Fauna	Harm to non-target species: sprayed insecticides reach a destination other than their target species, because they are mainly aerosol. Runoff 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.	Minimize use of chemical pesticides in line with the IPMP. Site specific EMPs	Compliance with LPRES IPMP Monitoring of environmental parameters	State Ministry of Agriculture/ Department of Animal Husbandry State Ministry of Environment/ EPA	Annually	\$82,000
	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.	Proper diagnosis of pests issues Minimize use of chemical pesticides in line with the IPMP.				
Human Health	Consumption of crops and plants grown under chemical pest control could cause health		Health plans and programs	Federal/ State Ministry of Health	Periodically	\$40,000

	<p>hazards to humans and animals within and around the project site.</p> <p>Certain kinds of chemicals intoxication especially after drinking pesticide contaminated water is 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.</p> <p>Skin, eye, and nose irritation</p> <p>Possibility of cancers, neurologic, endocrine and reproductive problems form direct and indirect exposure to pesticides</p>	<p>Minimize use of chemical pesticides in line with the IPMP.</p> <p>Public awareness health campaigns</p> <p>Avoid use of ban pesticides</p> <p>Have a plan to recycle/eliminate empty containers and prevent local communities from using them for household chores.</p>	<p>Health plans and programs</p> <p>Emergency Preparedness Plan</p> <p>Health plans and programs</p>	<p>State Ministry of Environment/ EPA</p> <p>Federal/ State Ministry of Health</p> <p>State Ministry of Environment/ EPA</p>	<p>Periodically</p> <p>Periodically</p>	
Occupational Health and Safety	Long term inhalation of toxic pesticides sprayed, could eventually result in respiratory illnesses or disease conditions	Minimize use of chemical pesticides in line with the IPMP Ban pesticides should not be used	Compliance with the LPRES IPMP Health risk assessment on project locations	State Ministry of Agriculture State Ministry of Health	Annually	\$82,000
TOTAL						\$423,700

ES8: Capacity Building and Awareness Raising

Capacity building and awareness raising is very important in the understanding and implementation of this IPMP. Training modules, communication strategy is described in chapter six of this report.

ES9: Stakeholder Consultations

Two rounds of consultation meetings were held as part of the development of this IPMP. The purpose of the meetings were to (i) present the scope of the proposed intervention to stakeholders (ii) identify the potential environmental, health and social issues related to integrated pest management that would need to be addressed through the project (iii) obtain feedback on the proposed scope on LPRES interventions with particular focus on the E & S aspects of the intervention.

While recognizing that only 10 states have been currently admitted into the project during appraisal, the intention of Government to drive the implementation of the National Livestock Transformation Plan through LPRES was reflected in the profile of the participants at the public consultation meetings held. In all 17 states were consulted during the second round of consultation meetings held in December 2021. Six (6) states – 1 from each of the 6 geopolitical zones of Nigeria – had been consulted during the initial consultation round held in 2018. The 6 states also participated in the second round on consultation.

The various stakeholder consulted through the process are;

- Representatives of borrowers;
- Private sector representatives;
- Development-oriented organizations and foundations;
- Academic and applied research institutions;
- Professional organizations and societies;
- Labour organizations;
- Indigenous Peoples representatives;
- Leaders and representatives of a sample of communities affected by Bank operations; and
- Civil society organizations at international, national and local level involved in advocacy or service delivery.

Budget for Implementation

Approximately **US\$ 1,490,700** will be required to effectively implement the IPMP for the L-PRES for a 5-year period as outlined below:

LINE ITEM	Year 1	Year 2	Year 3	Year 4	Year 5	Total
1. Capacity Building & Awareness						
All training programs	200,000	100,000	100,000	75,000	0	475,000
Radio jingles and handbill on IPM	30,000	20,000	10,000	0	0	60,000

<i>Sub-total</i>	230,000	120,000	110,000	75,000	0	535,000
2. Environmental Management						
Equipment; bed nets; improved species	10,000	25,000	10,000	10,000	0	55,000
Support to IPM research and development	20,000	35,000	20,000	10,000	5,000	90,000
Pest/vector surveillance	10,000	10,000	5,000	4,000	4,000	33,000
Mitigation Costs	200,000	100,000	61,850	30,925	30,925	423,700
<i>Sub-total</i>	240,000	170,000	96,850	54,925	39,925	601,700
3. Occupational Health & Safety						
Personal Protective Equipment (Hand gloves, gas mask, safety boot and overall wear)	70,000	70,000	40,000	0	0	180,000
Chemical Neutralizer and first Aid	50,000	30,000	20,000	0	0	100,000
<i>Sub-total</i>	120,000	100,000	60,000	0	0	280,000
4. Project Management						
IPMP coordination	4,000	4,000	4,000	4,000	4,000	20,000
Monitoring and evaluation	10,000	10,000	10,000	12,000	12,000	54,000
<i>Sub-total</i>	14,000	14,000	14,000	16,000	16,000	74,000
Grand total	604,000	404,000	280,850	145,925	55,925	1,490,700

Disclosure Procedures

The Integrated Pest Management Plan will be disclosed in compliance with relevant Nigerian regulations and the World Bank operational policy. Publication will be launched in 2 national newspapers for 21 days according to the Federal Ministry of Environment regulation. It will further be disclosed at designated sites as identified by the Federal Ministry of Agriculture and Rural Development, and at the World Bank external website.

CHAPTER ONE: INTRODUCTION

1.1 Background Information

Nigeria's agriculture sector remains a major contributor to the country's economy. Despite the overall negative growth (-1.92 percent) recorded in Nigeria in 2020, the agriculture sector grew at a rate of 2.17 percent in 2020 with the livestock sub-sector recording a growth rate of 1.91 percent^[1]. The livestock subsector is vital to socio-economic development and key to national food security. Although Nigeria's livestock sector has registered commendable growth over the years, its performance is sub-optimal and has, for several reasons, been a key concern of public policy. Even as Nigeria's population continues to increase, the annual dietary protein supply of animal origin continues to stagnate at 10 g per capita per day. The World Health Organization (WHO) indicates a minimal daily dietary animal protein intake of 30 g per capita to assure minimum health. Food importation amounts to about 3-5 billion USD per year, out of which milk accounts for 1.3 billion USD^[2]. The levels of consumption of milk and meat, about 8 litres and 9 kg, are lower than the continental averages of 44 litres and 19 kg, respectively^[3]. More details are provided in the Project Appraisal Document (PAD). To close this gap, livestock production and productivity would have to triple, with most production focusing on improving the situation of small holders and connecting them better with the market.

The Government of Nigeria has requested the assistance of World Bank for the development of Livestock Productivity and Resilience Support (L-PRES). Specific project locations are yet to be determined. However, The Project locations would be selective with focus on regions where it can demonstrate high potential of impact. About 28 states in Nigeria have expressed interest to participate in LPRES. The final selection of states will depend on meeting technical and implementation readiness criteria. The technical eligibility criteria include the states' commitment to the program, their livestock production capacity, existing policy and institutional reforms in the sector, and prevailing conflict intensity related to pressures on natural resources. Implementation-readiness criteria include the presence of foundational institutions necessary for livestock development (including supportive livestock infrastructure), allocation of funds to the project and the livestock sector more generally by the state, whether implementation already commenced with states' own resources, establishment of SCOs, preparation of procurement plans, and completion of fiduciary assessments.

1.2 Project Description and Objectives

The proposed Livestock Productivity and Resilience Support Project (LPRES) is designed to support GoN's priorities as reflected in the APP, NLTP, and INDC. Specifically, LPRES will focus on:

- i. strengthening sector policy and institutional foundations for improved sector productivity
- ii. improving value chain performance for increased smallholder market orientation and private sector investment; and
- iii. mitigating the farmer-herder conflict in selected areas.

These investments are expected to help build the resilience of livelihoods dependent on livestock and in the long term, improve Nigeria's trade balance due to reduced reliance on livestock imports, create jobs and improve food security. Generally, the interventions will enhance youth and women employment and contribute to improving the overall productivity and resilience in livestock production and thereby increasing household incomes. More details are documented in the Project Appraisal Document (PAD).

1.2.1 Project Development Objective

The Project Development Objective (PDO) is to improve productivity and commercialization of targeted livestock production systems and strengthen the resilience of livelihoods affected by farmer-herder conflicts. .

1.2.2 Lending Instrument

The lending instrument is an Investment Project Financing (IPF), thus the project will be structured as an Investment Project Financing (IPF) funded by an IDA credit of US\$500 million. However, component 2.2 of the project will be managed through financial intermediaries for on-lending to end-borrowers.

1.3 Project Components

The Project will have three inter-related technical components:

- i) Support to Institutional and Innovation System Strengthening.
- ii) Support to Livestock Value Chain Enhancement; and
- iii) Support to Crisis Prevention and Conflict Mitigation.

Details of the project components derived from the Project Appraisal Document are summarized below:

Component 1: Institutional and Innovation System Strengthening (US\$95 million IDA)

The objective of this component is to strengthen the policy and institutional foundations for improving the performance and governance of the livestock sector in Nigeria, with due regard to the needs for climate change adaptation and mitigation. Project support will focus on (i) strengthening the livestock policy and regulatory framework, planning, and monitoring at the federal and state levels; and (ii) improving the capacity and capability of key institutions in the livestock innovation system to deliver public goods and services essential for improving sector productivity, increasing the resilience of the livelihoods anchored in the sector (including livelihoods in pastoral systems), reducing competition for natural resources, and reducing the sector's negative externalities.. Project support will be provided through three synergistic subcomponents. .

Subcomponent 1.1: Support to Policy Formulation, Planning and Capacity Strengthening (US\$15 million IDA):

This subcomponent aims to strengthen the policy environment, knowledge base, and human resource capacity of the livestock sector as a springboard for enhancing livestock productivity, resilience, and value chain performance. It will finance five activities, beginning with preparation of a comprehensive Livestock Master Plan ¹ and follow-up analyses to guide the development of a sustainable, efficient livestock sector in the short to medium term. The Livestock Master Plan will address the spectrum of ruminant production systems (pastoral, mixed, intensive) and their trade-offs in terms of economic, social, environmental, and public health risks and opportunities, in the context of a changing climate. Second, Subcomponent 1.1 will finance feasibility studies of cost-efficient tools and systems (such as digital technologies) to improve the collection, analysis, and dissemination of data adapted to public and private stakeholders' needs, including data on herd population characteristics and dynamics, productivity trends, animal movements (linked to transhumance and trade), market prices, and other variables. Based on those studies, the third activity under this subcomponent is to develop and pilot promising prototypes of data tools and systems in selected states. The fourth activity is to develop sub-sector policies related to feeding, breeding, dairy and animal health and roll out a competitive scholarship program for postgraduate studies (targeting at least 50 percent women beneficiaries), as well as continuing education and capacity-building programs for key stakeholders at the federal and state levels to improve livestock policy and regulation formulation, enforcement, monitoring and evaluation (M&E), and technical knowledge related to the different production systems. Lastly, this subcomponent will provide financing to explicitly mainstream climate change adaptation and mitigation objectives across all relevant policies (including the Livestock Master Plan and NLTP) and regulations to strengthen the foundation for addressing climate change challenges in the sector.

The sub-component will disburse through inputs-based financing and results-based financing based on achievement of Performance Based Conditions (PBCs). The PBCs under this sub-component are: (i) preparation of a comprehensive Livestock Master Plan, and (ii) development of national livestock sub-sector policies on feeding, breeding, dairy, and animal health. Progress towards achieving the PBCs under the project will be measured using indicators that combine actions and outputs, and project funds will be disbursed up to capped amounts conditional on achievement of the agreed targets for the indicators. .

Subcomponent 1.2: Support to Animal Husbandry and Advisory Support Services (US\$40 million):

This subcomponent will build producers' resilience to climate change and reduce the sector's GHG emissions and other negative environmental externalities by improving the availability and adoption of superior livestock breeds, Good Animal Husbandry Practices (GAHPs), and feed resources adapted to the diversity of ruminant production systems. It will finance four sets of activities that contribute directly to climate change adaptation and mitigation by reducing methane emissions per unit of meat or milk produced (based on improved feeding and manure management) and by increasing carbon sequestration (based on improved pasture and rangeland management).

The first set of activities will support the development and implementation of a genetic resource management strategy, with large ruminants as a priority. Aside from traits preferred by producers (increased productivity, early maturity) and markets, breed improvement and selection will emphasize traits that confer resilience to climate-induced stresses, enabling livestock performance to improve as the climate changes. This strategy will be supported through corresponding investments in building (or rehabilitating) and equipping artificial insemination (AI) and breed multiplication centers, and in strengthening the technical capacity of AI extension agents to guide breed selection and improvement

¹ Livestock Master Plans are developed through a systematic process using global reference tools available in the Livestock Sector Investment and Policy Toolkit (LSIPT). See <https://www.fao.org/3/ca7635en/CA7635EN.pdf> and <https://www.ilri.org/livestock-master-plans>.

and increase access to services for farmers. Second, Subcomponent 1.2 will finance the development of user-friendly, comprehensive extension training materials (including digital guides) on GAHPs. These materials will cover the range of ruminant production systems and incorporate approaches for climate change adaptation and mitigation. Farmer Field Schools will also be supported to facilitate applied research and learning for groups of herders. Technical support for breed improvement and the introduction of GAHPs will give preference to female producers and be adapted to their needs, to overcome the challenges and risks that often limit women's experimentation with new technology.

The third set of activities under this subcomponent is the promotion of improved feed production techniques (the use of agricultural by-products, composition of balanced feed, feed storage technologies); improved feeding practices adapted to animal needs, with potential to reduce methane production; and improved grazing and rangeland management practices (individual or community based) that increase soil carbon stocks and reduce erosion. Fourth, this subcomponent will finance training of state-level extension agents to use the new materials, guides, and approaches to improve service delivery. Extension agent training, extension protocols, and extension and advisory services for livestock producers will incorporate content and approaches to close gender gaps in livestock ownership and value-chain position, such as training in socio-emotional skills to support women's successful entrepreneurship, or adjustments in training content, delivery modalities, and timing to accommodate gender differences in digital literacy, digital access, and household responsibilities. This sub-component will disburse through input-based financing.

Subcomponent 1.3: Support to Animal Health Services Strengthening (US\$40 million IDA):

Subcomponent 1.3 will strengthen the delivery of livestock health services and improve the coordination between animal, human, and wildlife health services, as embodied in the One-Health concept. Improvements in the delivery of animal health services will increase productivity by reducing livestock morbidity and mortality, in turn improving the resilience of livestock and livestock-based livelihoods² to climate shocks, including diseases induced by climate change. By contributing to greater efficiency (increased milk yield, daily weight gain, reproductive performance, feed conversion ratio), improvements in animal health will also reduce the intensity of GHG emissions from the livestock sector and help to mitigate climate change. Expanding the capacity of animal health services and improving their coordination with human health services is also the key to preventing and responding to public health threats such as AMR and zoonotic diseases, including those with pandemic potential.

In this context, Subcomponent 1.3 will strengthen national animal health services, building on the recommendations of the 2019 OIE PVS report through several activities. First, it will improve the organization and procedures of the national Veterinary Services by establishing a sanitary mandate to delegate official tasks to private veterinary professionals for the prevention and control of regulated diseases of economic and public health importance. Second, it will finance infrastructure and equipment (including solar-powered cold chains, which contribute to climate change mitigation), inputs, training, communication/awareness, and operating costs of selected nationwide programs for disease surveillance, clinical and laboratory diagnostics, and disease control and eradication, with Peste des Petits Ruminants (PPR) as a priority.³ The third activity under this subcomponent is to improve quality control for veterinary medicines (including antimicrobial agents) and ensure their

² Over 25 percent of smallholder stock is lost to preventable and treatable diseases.

³ Nigeria participates in the global PPR eradication program, and under the Regional Sahel Pastoralism Support Project, Phase 2 (PRAPS-2) will receive support to develop national strategic plans for PPR eradication and Contagious Bovine Pleuropneumonia (CBPP) control, harmonized with plans developed by other PRAPS-2 countries.

prudent use to reduce risks to public health. Fourth, Subcomponent 1.3 will finance the establishment of One-Health platforms at the subnational level to increase collaboration and encourage the development of joint programs with other sectors and disciplines (human health, environmental health). This activity will complement and be implemented in coordination with the WBG-financed Regional Disease System Support Enhancement (REDISSE) Project in Nigeria.⁴ The fifth activity focuses on working with the private sector to expand the national capacity to produce and commercialize vaccines and other biologicals.

The sub-component will disburse through inputs-based financing and results-based financing based on the achievement of one PBC – the establishment of sanitary mandate program. .

Component 2: Livestock Value Chain Enhancement (IDA US\$275 million): Component 2 builds on herd-level improvements in productivity arising from investments under Component 1 (improved breeds, animal health, and GAHPs) to expand overall production of meat and milk and reduce imports of those commodities. To that end, it will enhance and modernize the value chain for livestock products, promote a stronger commercial/market orientation among small and medium producers, and encourage increased private investment in priority segments of the value chain, while mainstreaming climate change adaptation and mitigation measures. In addition to augmenting national production, these activities will build more resilient livelihoods, create jobs, promote rural economic growth, and improve food safety. An enhanced value chain will help to ensure the sustainability of project investments and foster intensification, which will reduce the environmental (and carbon) footprint of the livestock sector. Project support will be provided under four subcomponents. .

Subcomponent 2.1: Support to Markets and Market Linkage Development (IDA US\$160 million): Subcomponent 2.1 will foster a market orientation among small and medium producers by ensuring: (i) market access/availability; (ii) that producers capture a fair share of product/commodity value; (iii) transparency in market prices; and (iv) the highest level of appropriate value addition at the farm level through primary processing (bulking, cooling, sorting, packing, and so on) to increase profits and reduce food loss and waste. The demand-supply balance for meat (beef) and milk in Nigeria, as well as consultations held during project preparation, indicate that prospective off-takers and markets for these commodities abound in the country, including small and medium agribusinesses working or seeking to work in partnership with organized livestock producers. In this context, Subcomponent 2.1 will support and strengthen collective action by small-scale producers to “create volume,” add value, reduce transaction costs, and increase their bargaining power in identified commodity markets. Concurrently it will raise producers’ awareness of modern, climate-smart production technologies to increase efficiency (for example, in using land and feed, reducing feed loss along the value chain, and managing manure and waste) while reducing emissions and mitigating the negative ecosystem effects of livestock production.

To achieve these objectives, this subcomponent will finance: (i) the organization of livestock producers/herders into viable groups (cooperatives, associations, organizations, and the like) or the strengthening of existing groups; (ii) training and advisory services; and (iii) common assets for value

⁴ This regional program supports a coordinated approach among countries in West and Central Africa to detect and respond to disease outbreaks and public health threats of regional and international importance (P154807: Guinea, Sierra Leone, Senegal; P159040: Guinea-Bissau, Liberia, Nigeria, Togo; P161163: Benin, Mali, Niger, Mauritania; P167817: Angola, the Central African Republic, Chad, the Republic of Congo, and the Democratic Republic of Congo).

addition (milking equipment, cooling centers, transport, services, and so on) that also serve to increase resilience and mitigate climate change. To facilitate women's progression within value chains where they already participate—such as dairy—or their entry into traditionally male-dominated livestock value chains, activities under this subcomponent will take care to avoid reinforcing gender segregation in the value chains. The project will consider men's engagement programming designed to ease restrictive social norms and promote women's entry into higher-value livestock value chains.⁵ Support for value addition will be coordinated with related activities implemented under the WBG-financed Agro-Processing, Productivity Enhancement and Livelihood Improvement Support Project (P148616) to ensure synergies and avoid duplication. Women borrowers seeking to enter value chains for large ruminants will be connected with livestock extension services and receive soft-skills training to facilitate success.

This subcomponent will also finance complementary activities to support market linkages and development, including an online market information system capable of reaching widely dispersed producer populations with information on buyer preferences, commodity prices, livestock supply and demand at the national and regional level, and other market variables. In tandem, it will support climate-smart upgrading/establishment of livestock markets with perimeter fencing, simple administrative buildings, water sources, weighbridges (to sell animals by actual weight rather than the more common visual estimates of size and weight), paddocks, loading ramps, and veterinary clinics, all with the aim of improving animal welfare and marketing efficiency. The establishment of markets closer to production areas is a mechanism to prevent conflict, as herders will not have to move stock over such long distances. Livestock markets will be equipped with biogas and/or manure composting facilities as a climate mitigation measure to reduce GHG emissions. Data recording systems at livestock markets will contribute to emerging traceability activities of the Federal Ministry of Agriculture and Rural Development (FMARD).

Most public abattoirs operating in Nigeria lack cooling facilities, sufficient water, and proper waste/effluent management systems, in violation of public health regulations. Working with local governments, Subcomponent 2.1 will provide support to rehabilitate/upgrade a network of strategically located abattoirs that will be operated under improved food safety, environmental, and public health regulations. Based on assessments to be conducted during implementation, new models for operationalizing these abattoirs—for example, concessions,⁶ public-private partnerships (PPPs), or fully private operators—will be explored and adapted to specific contexts. Special care will be taken to ensure that abattoir rehabilitation/upgrading is climate smart. The project will provide capacity building on slaughter processes, including aspects of health and hygiene, sanitary and phytosanitary regulations, and adherence to food safety standards. State Veterinary Departments will ensure compliance with animal and public health regulations through regular pre- and post-mortem inspections. The abattoirs will also be used for traceability and disease surveillance to promote improved animal and human health.

Finally, Subcomponent 2.1 will support the provision of business development services to enable value chain actors (producers, producer organizations, small aggregators, and others) to develop their entrepreneurial capacity, develop business plans that build climate resilience into their operations, and

⁵ A recent impact evaluation documented the potential of light touch interventions: a couples training and planning intervention targeting the rubber value chain yielded significant agricultural productivity increases.

⁶ Following the example of the NGN 66 billion publicly financed silo complexes, grain aggregation centers, and Blumberg warehouses, which have been privatized through concessionary arrangements.

improve their access to finance and markets. This sub-component will disburse through input-based financing.

Subcomponent 2.2: Support to Increased Access to Finance (US\$ 70.00 million IDA):

This subcomponent builds on activities under Component 1 and Subcomponent 2.1 to further de-risk the livestock value chain, expand commercial lending in the livestock sector, and promote climate adaptation and mitigation. It will address critical challenges in providing credit to livestock value chains, particularly loan duration and realistic risk-adjusted pricing. Accordingly, Subcomponent 2.2 will finance three main activities: a credit line, risk-sharing facility, and technical assistance – all implemented through input-based financing.

Credit line (US\$50.0 million). The credit line will enable viable and bankable firms across the livestock value chain to boost the value chain’s productivity, enhance its resilience, reduce its emissions footprint, and upgrade its performance through access to long-term debt. This type of financing will facilitate long-term investments, particularly in fixed assets, advanced technology, or equipment that can also serve as security for the financing.⁷ The Development Bank of Nigeria (DBN), a public wholesale bank for small and medium enterprises (SMEs), will be the implementing partner for managing and disbursing the line of credit to participating financial institutions (PFIs) for on-lending to end-borrowers. DBN is equipped with a strong governance structure and operational capacity, as proven under past and current WBG-funded projects (for details on DBN’s principles and performance, see Annex 6).

DBN will select PFIs pursuant to criteria agreed upon with WBG, which will be defined and reflected in the Project Implementation Manual (PIM) and ensure compliance with OP10. The criteria will prioritize and ensure that every eligible investment takes climate adaptation and mitigation considerations into account, in line with DBN’s increased attention to climate change. PFIs are expected to offer term loans for capital investments as well as working capital loans for business expansion. Loan appraisals will follow each PFI’s normal credit policies and appraisal procedures. PFIs will be encouraged to set loan durations in accordance with the cashflow projections of the end-borrowers’ subprojects. In addition, technical assistance for financial institutions (discussed below) will promote asset-lending products and structures that circumvent excessive collateral requirements. Funds offered by DBN will reflect DBN’s cost of funds and a spread to cover DBN’s cost of operations plus a risk premium. The interest rates offered by PFIs to end-borrowers will not be subsidized or capped; rates will be market based and will include, at a minimum, the cost of the project funds provided from DBN to PFIs, plus an on-lending margin reflecting PFIs’ administrative costs, and a credit risk margin. Since the PFIs will use their normal credit policies to conduct loan appraisals, they will assume the end-borrowers’ credit risk.

To be eligible for financing, the PFI must: (i) be duly licensed and at least two years in operation; (ii) have “fit and proper” owners and board of directors; (iii) have qualified and experienced management, adequate organization and institutional capacity for its specific risk profile; (iv) be in “good standing” with its supervisory authority (i.e. it should meet all prudential and other applicable laws and regulations) and remain in compliance at all times; (v) have well defined policies and written procedures for management of all types of financial risks (liquidity, credit, currency, interest rate and market risk, as well as risks associated with balance sheet and income statement structures); (vi) maintain capital adequacy as prescribed by prudential regulations (vii) have adequate liquidity; (viii)

⁷ Empirical evidence from cross-country and within-country studies suggests that long-term finance has a positive effect on firm investment and performance. See Chapter 2 of World Bank (2019), *Global Financial Development Report 2019/2020: Bank Regulation and Supervision a Decade after the Global Financial Crisis*. Washington, DC (<https://www.worldbank.org/en/publication/gfdr/gfdr-2016/report/chapter-2>); see also <https://documents1.worldbank.org/curated/en/576961468197998372/pdf/101769-REVISED-ENGLISH-Principles-CGS-for-SMEs.pdf>; and <https://thedocs.worldbank.org/en/doc/304771507314954144-0340022017/original/productnotefinancialmobilizationtomeetdevelopmentneeds.pdf>.

have positive profitability and an acceptable risk profile; (ix) have adequate portfolio quality; (x) have adequate internal audits and controls for its specific risk profile; (xi) have adequate management information systems; and, (xii) demonstrate commitment to serving the MSME sector and have in place satisfactory MSME loan approval processes and risk management procedures. These minimum PFI eligibility criteria will be confirmed in an annual due diligence process conducted by DBN.

Eligible end-borrowers will be medium-sized agribusiness companies and producers, primarily in the beef, dairy, and poultry value chains—in other words, value chain actors such as off-takers, processors, transporters, and input suppliers. These borrowers will present financially viable expansion plans involving linkages to smaller businesses and producers in their value chains that meet the eligibility criteria for MSMEs defined by the Development Finance Project (P146319). For the purposes of the LPRES Project, medium-sized companies will be defined as firms satisfying the following criteria including a maximum loan size:

# Employees	Annual Turnover	Total Assets	Max. Loan Size
< 500	< US\$15million	< US\$15million	< US\$2million

The project will introduce viable value chain actors from Subcomponent 2.1 to PFIs, capitalizing on the technical assistance linking small-scale livestock producers and other value chain actors. Such linkages will extend the benefits of greater access to finance to smaller players in the value chains, while supporting the expansion of climate-smart livestock production and markets in the country. The credit line would also support medium-sized companies in the livestock sector beyond project beneficiaries.

Risk-sharing facility (US\$15 million IDA). To moderate perceptions that lending to the livestock sector is highly risky, this activity will finance a sustainable risk-sharing facility that provides first-loss coverage to PFIs that extend loans to commercially viable firms across the livestock value chain. The IMPACT credit guarantee fund, a subsidiary of DBN, will administer and issue partial credit guarantees to banks and financial intermediaries that will support the livestock value chain. The implementation arrangements for this activity will be identical to those under the Development Finance Project (P146319). The eligibility criteria will be the same as for the credit line and will include climate change adaptation and mitigation considerations. The level of loan loss coverage and pricing of the guarantees will be defined in consultation with the market players through technical assistance, discussed next.

Technical assistance for commercial banks and other non-bank financial institutions and lenders (US\$5.0 million). Both the credit line and risk-sharing facility will be complemented by technical assistance for implementing partners and PFIs to: (i) dimension the underlying credit risks of financing this value chain; (ii) structure and price the financial products; (iii) develop the capacity to implement the credit line and risk-sharing facility effectively; and (iv) acquire an understanding of climate risks, resilience planning, and climate-smart livestock production systems. While some commercial banks have relatively high exposure to livestock borrowers, their lending appears to favor poultry businesses, which have a well-known risk profile. The growing livestock market in Nigeria will most likely allow banks to continue accumulating knowledge and expertise focused on this narrow subsegment, but they may fail to capture business opportunities in other livestock subsegments. Technical assistance provided under this subcomponent will enable PFIs and other lenders to assess the risks of lending to subprojects and companies in the beef and dairy value chains, with the aim of expanding PFIs’ outreach and widening access to finance across the livestock sector. Training will provide a general overview of livestock businesses, review case studies of lending products from other countries, and introduce the credit line and risk-sharing facility and their

beneficiaries, including value chain actors. As noted, technical assistance will also support the development and introduction of new asset-based lending products for capital investments that can circumvent excessive collateral requirements. DBN will manage this technical assistance, maximizing synergy with the Development Finance Project.

The technical assistance provided to PFIs will address gender gaps in access to finance in the livestock value chain. It will support the development of financial products that use alternative credit scoring methods based on psychometric testing to lift the collateral constraints facing women. A psychometric testing platform will be developed and linked with the risk-sharing facility described earlier to cover potential losses from loans issued in the learning phase, while the psychometric testing instrument is being refined to successfully identify predictors of loan performance.⁸

Subcomponent 2.3: Support to Selected Livestock Service Centers (LSCs) (US\$45million IDA):

Activities under this subcomponent will complement activities under Subcomponents 2.1 and 2.2 by accelerating the momentum of smallholder commercialization and private sector investment in the livestock value chain, while scaling up climate-smart livestock production systems. In line with the NLTP, this subcomponent will provide support to create Livestock Service Centers (LSCs) in selected areas to promote commercialization, reduce open grazing, and attract private investment in the livestock sector. Conceived as pilots and modelled along the lines of agri-parks, the LSCs will be a community of businesses with a common interest in livestock and livestock products, situated in gazetted grazing reserves or other such land with unencumbered titles provided by the relevant states. The LSCs will complement the technical activities of federal and state entities and promote better integration of their services at the local level, supporting the broader territorial development needs of local livestock communities.

In line with the findings of detailed engineering and financial feasibility studies⁹ conducted during implementation, as well as the outcomes of demand-driven planning processes involving local communities, potential private sector investors, and other stakeholders, Subcomponent 2.3 will finance: (i) the detailed design and supervision of works, including verification that they are climate-smart; (ii) the development of the sites and construction of the essential infrastructure, based on the masterplan of the LSCs; (iii) the provision of selected climate-smart goods and services to catalyze intensification and increase the livestock product production, handling, processing, and marketing (knowledge and training centers, veterinary facilities, livestock breeding services, livestock markets, market information systems, milk collection and cooling facilities, water points, input outlets, rotational grazing areas, and others); and (iv) tailor-made technical assistance to bring the LSCs to full operational capacity. The design and construction of the LSCs will incorporate Eco-Industrial Park Guidelines¹⁰ and focus on mitigating climate change through resource-efficient technologies (for example, photovoltaic energy) and buildings that reduce GHG emissions. The gender gap in access to services will be reduced by ensuring that LSC facilities are designed to accommodate women's requirements (for example, with street lighting throughout the planned infrastructure, and separate women's and men's restrooms). The LSCs will also prioritize accessibility to women by establishing

⁸ Preliminary results from an impact evaluation in Ethiopia suggest that psychometric testing reliably predicts whether an entrepreneur will repay a loan. Customers who scored at a high threshold on the test were seven times more likely than other customers to repay their loans.

⁹ These studies will include: (i) market assessment; (ii) preliminary design, including programming of climate-proof and energy-efficient construction; (iii) the study of options for optimal financing and management models—PPPs, build-operate-transfer (BOT) arrangements, or other concessionary agreements; and (iv) related Environmental and Social Impact Assessments (ESIAs).

¹⁰ See Kechichian, E., and M.H. Jeong (2016), *Mainstreaming Eco-Industrial Parks*. World Bank, Washington, DC. <https://openknowledge.worldbank.org/handle/10986/24921>.

service hours, such as weekend hours, that recognize women's disproportional household responsibilities.

The LSCs will be accessible to both sedentary and transhumant livestock keepers (with a focus on smallholders). Beyond promoting commercialization and private investment, these centers are expected to mitigate conflict through multi-stakeholder inclusive participation, discussions, and planning. The project will pilot LSCs in seven states in areas where livestock are concentrated, with scope to expand the model if it proves successful. The pilot states are key corridors for livestock movement within Nigeria and the region.

The establishment of LSCs will be through both input-based financing and results-based financing upon achievement of PBCs. In particular, the establishment of 2 LSCs in Kano and Bauchi states will be based on PBCs while the rest (5 LSCs) will be implemented through input-based financing. Kano and Bauchi LSCs were selected for results-based financing because implementation readiness of these LSCs is more advanced than the rest. The project will initially focus on these 2 LSCs that are PBCs based to ensure that proper attention is paid to the core aspects of establishing LSCs, including feasibility studies and design, management structure, and installation of infrastructure and facilities to crowd-in private sector agribusinesses. The experiences and lessons learned will be transferred to the implementation of the 5 LSCs that will be delivered through inputs-based financing..

Component 3: Crisis Prevention and Conflict Mitigation (US\$100 million IDA)

While improved provision of animal husbandry, animal health, and animal identification and traceability services under Component 1 will indirectly help to mitigate herder-farmer conflict (mainly through improved productivity, reduced resource-use intensity, and livestock security) thereby contributing to improved resilience of communities affected by conflict, Component 3 will address the most proximate causes of herder-farmer conflict: the declining quantity and quality of resources (water and rangeland), constrained access to resources, and declining social cohesion. In line with the NLTP, support will be channeled through two subcomponents, presented below.

Subcomponent 3.1: Support to Natural Resource Management and Pasture Improvement (US\$70 million IDA):

Subcomponent 3.1 will finance investments to improve the quantity and quality of water and rangeland—resources that are critical for productive pastoral systems with increased climate resilience and carbon sequestration. It provides support to assess the current status of water and feed (including forage and fodder) using remote sensing technologies and tools such as the FAO feed balance methodology. The resulting information will be disseminated to guide decisions on improved feed and water management, utilization, and access. Subcomponent 3.1 will also finance the establishment and implementation of an inclusive, community-driven process for climate-smart, sustainable rangeland/landscape management. All key users of grazing reserves and water will be involved in this process, which will establish clear conditions for accessing these natural resources and develop sound governance mechanisms to manage them. Support will also be available for constructing and rehabilitating stock routes and water points, with the goal of improving this network and including areas that offer new rangeland/pasture. Committees will be established and supported to manage these investments sustainably. Subcomponent 3.1 will also finance the development of cultivated pasture, including facilities for irrigation in water-scarce environments.

Investments under this subcomponent will rely on community-driven development approaches. These investments will be coordinated with related/complementary activities under the proposed WBG-financed Agro-Climatic Resilience in Semi-Arid Landscapes Project (ACRESAL-P175237) where implementation areas overlap, particularly in rangeland improvement (as part of broader watershed management) and the provision of fodder from restored landscapes. All activities will be implemented through inputs-based financing. Besides increasing the amount and quality of grazing resources, which is a climate change adaptation measure, support for improved rangeland/pasture management will contribute to climate change mitigation through increased carbon sequestration above and below ground, as well as through reduced methane emissions from enteric fermentation, largely owing to improved pasture quality.

Subcomponent 3.2: Support to Conflict Mitigation (US\$30 million IDA)

This subcomponent provides support to increase capacity for conflict prevention and resolution, focusing initially on herder-farmer conflicts. Through activities at the local, national, and transnational level, this subcomponent seeks to: (i) mitigate the resource-based drivers of conflict; (ii) increase local capacity for conflict resolution; and (iii) facilitate policy dialogue to address the underlying drivers of conflict.

Local level. Subcomponent 3.2 will finance the establishment and support of local committees for conflict resolution and prevention and facilitate investments to alleviate pressure points. Local committees will build on existing formal and informal institutions and mechanisms of conflict resolution and receive training in conflict dialogue and resolution. Facilitators will support committees in mapping stakeholders, identifying sources of conflict, and drawing on local ideas and knowledge to address them. In partnership with community committees, the LPRES Project will support community dialogue and activities to promote social cohesion between herders and farmers, anticipate and resolve potential conflicts, and strengthen peacebuilding. Herders and farmers will jointly identify potential pressure points to help prioritize investments and data needs. Small-scale investments prioritized through this dialogue will be financed under this subcomponent in consultation with communities, local authorities, and representatives of both farmer and pastoral communities. Examples of investments include the construction and rehabilitation of critical infrastructure to secure mobility and access to pastoral areas/grazing reserves along transhumance corridors and stock routes (for instance, the marking of corridors, development of rest areas, provision of shelters and feed storage facilities) and mechanisms to enforce regulations, which are all essential to support productive and resilient pastoral systems.

National level. The project will support the creation of early warning systems using remote sensing and spatial analysis to forecast forage conditions and water availability, enabling pastoralists and the government to take preemptive action to prevent conflicts. This information will be disseminated through local committees to allow timely community responses. Under this subcomponent, the project will also support dialogue on gazetted grazing reserves¹¹ and transhumance corridors to strengthen their management and statutory protections against encroachment. Financing will be provided to prepare feasibility studies on livestock insurance mechanisms to indemnify producers against livestock losses (through theft, for example), which are known to trigger conflict.

¹¹ The Government of Nigeria has approximately 415 grazing reserves, but only one-third are used, and intrusion by local farmers is common.

Transnational level. The project will finance the organization of a high-level dialogue on transboundary agreements on animal movement. The objective is to ensure a coherent spatial approach and agreement between Nigerian states and between Nigeria and neighboring countries, including high-level dialogue with ECOWAS to establish consistent and coherent rules on transhumance. All activities will be implemented through inputs-based financing.

Component 4: Project Coordination and Management (US\$30 million IDA)

This component aims to ensure that programmed project activities are implemented in a timely and appropriate manner, with adequate support to overall project management, M&E, and communication. It will finance the creation and operation of a National Coordination Office in FMARD with the following main objectives: (i) ensuring effective strategic and operational planning, implementation, and M&E of the project, beginning with a baseline assessment to measure the project’s progress and impacts; (ii) ensuring that all project funds are used efficiently, and coordinating project interventions implemented by participating stakeholders and partners; (iii) evaluating the project’s mid-term and final results, outcomes, and impacts on beneficiaries; (iv) supporting states to meet the eligibility criteria for joining the project; and (v) supporting and ensuring efficient knowledge management and effective communication to various public and private entities on project activities, outcomes, best practices, and lessons learned. Staff training will include sessions on national climate change policies. Financing under this component will also be used to create State Coordination Offices (SCOs) to lead project implementation at the state level. All activities will be implemented through inputs-based financing.

Component 5: Contingency Emergency Response Component (US\$0.00 million)

Given Nigeria’s vulnerability to shocks, the proposed project includes a Contingency Emergency Response Component (CERC) with a zero-dollar allocation. The CERC provides a mechanism within the project to finance a response to a natural disaster, disease, or other eligible emergency, should one occur. This CERC is particularly critical in light of the unpredictable trajectory of the COVID-19 pandemic, the continuing threat of a desert locust invasion in West Africa, and the potential for drought or floods. If a crisis develops, FGN may request WBG to reallocate project funds to cover some of the costs of emergency response and recovery. All expenditures under this CERC will be in accordance with paragraphs 11, 12, and 13 of WBG OP10.00. Expenditures will be appraised and reviewed to determine if they are acceptable to the World Bank before disbursement is made. Disbursements will be made against an approved list of goods, works, and services required to support crisis mitigation, response, recovery, and reconstruction.

Table 1: LPRES Project by Component, Subcomponent and Activity.

Component	Subcomponent	Activities	Potential Infrastructure Items
1.0: Institutional and Innovation	1.1: Support to Policy Formulation, Planning and	Preparation of Livestock Master Plan	None expected under this sub-component
		Strengthening policy and regulation formulation, harmonization, and enforcement in the sector	

System Strengthening	Capacity Strengthening	Establishment of a livestock data and market information system	
		Undertake preparatory activities for a national livestock census	
		Mainstreaming climate change adaptation and mitigation objectives across relevant policies	
		Undertaking studies to improve selected value chains' regulatory and incentive framework	
		Capacity strengthening of FMARD and relevant institutions	
		Strengthening of national livestock inputs and products quality control facilities	
	1.2: Support to Animal Husbandry and Advisory Support Services	Development of a genetic resource management strategy	None
		Establishment of artificial insemination and breed multiplication centers	Upgrade of existing facilities with Artificial Insemination and Breed Multiplication facilities
		Development of livestock extension protocol	None
		Training and capacity building of state-level extension agents	None
		Establishment of Farmer Field Schools	None
		Development of tools and mechanisms to facilitate digital extension services	None
	1.3: Support to Animal Health Services Strengthening	Improving the organization and procedures of national veterinary services	None
		Development of Disease surveillance, and control/eradication programs	None
		Control of veterinary medicinal products quality	None
		Implementation of disease surveillance, and control/eradication programs	None
		Establishment of One-Health platforms at sub-national level	None
		Creation of enabling environment for private veterinarians	None
	2.0: Livestock Value Chain Enhancement	2.1: Support to Markets and Market Linkage Development	Organization and capacity strengthening of producers for improved market access
Development of an online market information system			None
Upgrading of livestock markets			Perimeter fencing, Simple administrative buildings, Water sources, Weighbridges, Paddocks, Loading ramps, and Veterinary clinics
Upgrading a network of strategic abattoirs			Buildings, Sanitary facilities, Water sources
Support to BDS			None
		Line of credit	Cannot be determined at the preparatory stage. However,
		Risk sharing facility	

	2.1: Support to Increased Access to Finance	TA for commercial banks and other non-bank financial institutions and lenders	the exclusion list of the DBN and PFIs will apply
	Support to Selected Livestock Service Centers	Conducting detailed LSC engineering and financial feasibility studies	
		Design and supervision of works on LSCs within gazetted reserves with unencumbered titles.	Knowledge and training centers, veterinary facilities, livestock markets, milk collection and cooling facilities, abattoirs, water points, input outlets, rotational grazing areas, and others)
		Provision of selected catalytic goods and services	None
3.0: Crisis Prevention and Conflict Mitigation	3.1: Support to Natural Resource Management and Pasture Improvement	Assessment of state of natural resources (feed and water) in the country	None
		Implementation of local community-driven sustainable rangeland management	None
		Construction and rehabilitation of water points	Water points
		Cultivated pasture development	None
	3.2: Support to Conflict Mitigation	Development of governance mechanisms for accessing grazing areas	None
		Establishment of national and local level committees for conflict mitigation	None
		Capacity building for livestock and farmer community leaders in conflict resolution	None
		Organization of dialogue on trans-boundary agreements on animal movement	None
		Construction and rehabilitation of critical infrastructure along stock routes	Stock routes, Water points, Irrigation facilities
		Development of early warning systems for crisis prevention	None
	Feasibility studies on livestock insurance mechanisms	None	
4.0: Project Coordination and M&E	Communication		None
5.0: Contingency Emergency Response Component		Unknown	Unknown

1.4 Participating States

Given the livestock sector's development needs across all of Nigeria, and the objectives and scope of the proposed project - strengthening sector institutions, disease control and prevention, enhancing livestock value chains, and mitigating climate change mediated conflict—FGN regards LPRES Project as a national program, to which all 36 states are technically eligible¹². To encourage efficient implementation and attain the desired outcomes, however, the project will prioritize states that have demonstrated commitment to project outcomes throughout and beyond the life of the project and are ready to effectively implement the project. Criteria to assess state commitment include: (i) conducive enabling environment necessary to facilitate attainment of project objectives (e.g., legal framework for PPPs to facilitate post-operation management of markets and abattoirs, policies/regulations/laws on grazing, on-going animal disease prevention and management program, existing livestock marketing infrastructure); (ii) sector strategy (e.g. sector road map, plan, policy aligned with national policy objectives); (iii) overall financing/budget allocation to the sector; and (iv) counterpart financing (e.g., that which is expected for resettlement purposes in line with the safeguards requirements). Implementation readiness criteria include: (i) institutional capacity (including technical, fiduciary, and safeguards); (ii) preparation of Procurement Plans, and completion of fiduciary assessments; (iii) implementation plan for the first year of the project; and (iv) execution readiness of planned activities (e.g., presence of vaccination rollout plans, already identified sites for construction of new, or existing infrastructure to be rehabilitated, lists of extension agents to be trained, lists of communities where the project will be implemented, feasibility/technical assessments for proposed investments, etc.). Once selected, states will be expected to sign a participation agreement detailing their implementation responsibilities as well as other terms and conditions for participating in the project.

1.5 Project Beneficiaries

Project activities will particularly lead to the following benefits in the Livestock sector:

Direct Benefits:

- The proposed project is expected to directly benefit 1.43 million individuals¹³ (30 percent will be women), including livestock producers benefiting from animal husbandry, advisory support, and animal health services; pastoral and sedentary farm households benefiting from improved rangeland resources and reduced conflict; and smallholder producers and other value chain actors (off-takers, processors, transporters, and input suppliers, among others) benefiting from the strengthened livestock value chains. Technical and managerial staff of government agencies that implement project activities—FMARD, the National Animal Production Research Institute

¹² Project support for conflict mitigation is restricted to states where there is herder-farmer conflicts.

¹³ A total of 285,700 benefiting households, each with an average of 5 individuals.

(NAPRI), and state ministries, among others—will benefit from training and capacity building provided under the project.

Target production systems and value chains. The project will preferentially target the value chain for large and small ruminants, albeit with flexibility to consider other value chains based on market demand and private-sector interest. Large and small ruminants take precedence for several reasons. This subsector accounts for the largest share (58 percent) of TLUs, provides more than 70 percent of the meat consumed in Nigeria,¹⁴ and sustains the economically important leather industry.¹⁵ Poverty is higher, and livelihoods are more vulnerable in this subsector. Climate change is compounding this vulnerability and implicating the subsector in conflict and violence. The characteristically low productivity of the subsector offers considerable scope for productivity improvements and for reducing the wide supply-demand gaps for milk and meat products, with benefits for the balance of trade. At the same time, the subsector can contribute significantly to climate change mitigation through efforts to reduce GHG emissions from enteric fermentation; improve the management of manure, pasture, and rangeland; and support better ruminant nutrition and health. As part of the implementation of the Livestock Productivity and Resilience Support Project (L-PRES) activities, the Integrated Pest Management Plan (IPMP) is required to minimize potential harmful effects on human and animal health and on the environment, which may arise particularly in the context of vector control, and to promote the integrated pest management. The World Bank operational policy 4.09 is triggered by 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. The L-PRES, therefore should allow for these predictable negative impacts in the planning, and implementation of these investments.

1.6 Rationale for the IPMP

Integrated Pest Management (IPM) brings together, into a workable combination the best strategies of all control methods that apply to a given problem 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 magnitude of the L-PRES which is expected to improve livestock production in the country, there is undoubtedly the likelihood of infestation by pests, currently within the proposed area or migratory pests. In line with World Bank Environmental and Social Safeguard Policies, OP 4.09 (Pest Management) is triggered by the project, hence the need for an Integrated Pest Management Plan (IPMP) which is the suitable safeguard instrument for tackling pest management issues.

¹⁴ Haruna, U., and N. Murtala (2005), "Commodity Chain Analysis of Cattle Marketing in Nigeria: A Case Study of K.R.I.P Area of Kano State." Report submitted to Adeni Project/NAERLS, Zaria. 38p.

¹⁵The leather industry represents 26 percent of total non-oil exports and is the second largest non-oil foreign exchange earner after cocoa. It generates between US\$600–800 million annually and is projected to grow to US\$1 billion by 2025.

1.6 Scope of the IPMP

Integrated Pest Management Plan (IPMP) represents one of the frameworks for screening, monitoring, and mitigating potential impacts as stipulated in World Bank O.P 4.09. The IPMP shall complement the Environmental and Social Management Framework (ESMF) and other safeguards instruments of the project. Accordingly, this IPMP covers the existing national and international legislations on the use of chemicals for pest management. It also assesses the Nigerian experience in pest management and capacity on integrated pest management approach. Other areas addressed by it include training and awareness raising 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.

1.7 Methodology

The consultancy delivery approach was centered around the following: literature review/ desktop studies to obtain relevant information on livestock pest issues and management around the country, and baseline information on the potential participating states;

- Field visit to selected sample locations (States) spread across the six geo-political zones to obtain primary data and consult with stakeholders including industry experts;
- Consolidation of information and articulation of integrated pest management strategies;
- Inclusion of supporting documentation – stakeholder consultation minutes, pictures and required annexes.

CHAPTER TWO: PEST MANAGEMENT CONCERNS AND CONTROL MEASURES IN NIGERIA

Baseline Information on livestock pests and diseases in Nigeria, general control methods and their efficacy. It further outlines the constraints to effective utilization of local pest control methods. A capacity assessment of integrated pest management is also discussed in this chapter.

2.1 Performance of Health Systems and Infectious & Communicable Diseases

The performance of health systems in many countries in West Africa including Nigeria is weak. They suffer from chronic insufficient financial and human resources, limited institutional capacity and infrastructure, weak health information systems, prevailing inequity, and discrimination in availability of services, absence of community participation, lack of transparency and accountability, and a need for management capacity building. Public sector spending on health is generally low.

The animal health sector in the ECOWAS region is characterized by a high incidence and prevalence of infectious diseases, communicable diseases, both zoonotic and non-zoonotic, impacting veterinary and public health, trade, rural development, and livelihoods. Orthodox animal health care in Nigeria is plagued by many problems. These include inadequate manpower and logistics inputs, scarce and erratic supply of veterinary drugs and supplies, high cost of veterinary drugs, poor communication facilities and other modern amenities, counter-productive government policies which do not complement the development of ethnoveterinary medicine and other indigenous systems. The relation between these problems and the current dependence on orthodox veterinary medicine has resulted in a failure to solve most animal health problems.

Improvement of animal health requires increased and sustained investments in national Veterinary Services to meet international standards of quality defined by the World Organisation for Animal Health (Office International des Epizooties (OIE)). Any country failing to prevent, detect, inform, react and control sanitary issues, such as infectious diseases or antimicrobial resistance places other countries at risk, hence the importance of regional approaches. All countries in the region have engaged in the OIE Performance of Veterinary Services (PVS) Pathway, a program which provides independent qualitative (PVS evaluation) and quantitative (PVS Gap Analysis) evaluations of Veterinary Services, identifying their strengths and weaknesses, prioritizing interventions and costing activities needed to address deficiencies. Some countries have also received support to review their veterinary legislation.

2.2 Pest and Diseases Problems of Agriculture in Nigeria

Pests and disease vectors constitute serious hazards to public health, food security and general welfare of the citizenry in Nigeria. It is estimated that agricultural pests destroy about 50% of agricultural products (livestock, crops, fruits and ornamental plants) annually.

These pests which also act as disease vectors transmit several diseases of public health importance in Nigeria. Onchocerciasis (River Blindness), transmitted by black flies, is responsible for the high

incidence of blindness in most rural and remote areas of Nigeria. This disease has resulted in depopulation of many fertile farming areas thus contributing significantly to food insecurity and poverty. Lassa fever and Yellow fever transmitted by *M. natalensis* (rats) and *Aedes* mosquitoes respectively have been reported to occur in epidemic proportions in some parts of Nigeria. Also, malaria, which is transmitted by the *Anopheles* mosquitoes, is responsible for considerable morbidity and mortality particularly among children less than 5 years and pregnant women.

Farmers often respond to pest infestations by heavy applications of pesticides which threaten environmental quality and pose risks to human and livestock health. The incautious dependence on chemical pest control options undermines national 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 are banned for use in Europe, and IPM is a fast-emerging trade policy issue.

2.3 General Control Methods of Pests and Diseases in Nigeria

Pest management methods in Nigeria vary with the type of pests and livestock. Most of the pest control operations in Nigeria today are by pesticides. However, due to the increasing concerns about the environment, the development of pest resistance to pesticides, pesticides residues and the increasing economic pressures on livestock and the food industry are increasingly being seen as just one of a range of control measures available.

Main pest management controls used in Nigeria include:

1. Cultural control

This refers to the adjustment of husbandry techniques by the farmer and include:

- a) **Hygiene:** Maintaining overall good health of the animals by keeping the environment clean, setting fire to warm the environment at cold nights, according to farmers, this keeps the animal healthy which enhances its tolerant level to pests;
- b) **Herbs and local concoction:** This is practiced by majority farmers and involves cutting herbs and boiling them for their animals to drink;
- c) **Change of location:** This method involves leaving an area for another when it is noticed that there is the presence or outbreak of pests or diseases especially in a case of sudden death of cattle;
- d) **Bush burning:** Bush burning is also believed by many farmers as being effective in tackling common pests in cattle such as tick. Burning surrounding bush would reduce the menace of tick infestation by burning of the eggs of the tick, as well as the elimination of possible intermediate host for pests and diseases. In addition, burning of dry materials to produce smoke that chase the pests away from the animal;

- e) **Timing on grazing:** usually during afternoon to allow sun heat to chase the pests.
- f) **Nutrition:** Balanced animal diets provided at consistent intervals and in appropriate portions is believed to build resistance to pests and infections.
- g) **Herd sharing:** This involves the distribution of cattle among relatives and grown up children in other location apart from the area of infestation during emergency disease and pest invasion in order to lessen rate of casualties.;
- h) **Use of holy books:** The use of holy books in controlling diseases and pest by reading of verses from the holy Koran over the animals before leaving the enclosure. Sometimes these verses are even written and wrapped up into amulets to be worn by the animals.

2. Mechanical Tools

Mechanical methods have also been employed which include:

- a) Use of Grooming combs, brushes and flea combs with closely spaced teeth to monitor for insects and ticks;
- b) Use of electronic devices such as lights that attract flying insects around barns or other animal quarters to reduce some nuisance pests;
- c) Use of traps for rodents that may be carriers of pests;
- d) Handpicking of ticks and insect pests from the body of the animal.

3. Physical control

This involves the following measures:

- a) adequate ventilation to prevent heat, stress or the spread of diseases;
- b) avoid over crowdedness of animals to avoid pest outbreaks;
- c) use of sticky flypaper to reduce nuisance flying insects in confined areas;
- d) use of cages that separate animals from contact with one another which reduces the spread of insects from infested animals to non-infested ones;
- e) use of pest resistant breeds and breeds adapted to the climatic conditions of the surrounding environment where they are raised can avoid or reduce the effect of the pests.

4. Biological Control

This involves either encouraging or introducing natural enemies of the pest or interfering with the life cycle of the pest. This area has not been fully harnessed in Nigeria due to inadequate research equipment and facilities but has begun to gain awareness among farmers. This method is predominantly practiced among agricultural research institutions and farmers in agricultural based development projects such as the FADAMA project. The biological approach to pest control is best described under the IPM.

5. Chemical control

This employs the use of pesticides to kill pests. The use of spray for control of pesticides and herbicides has been in long use in Nigeria. It has been estimated that about 125,000 - 130,000 metric tons of pesticides are applied every year in Nigeria (FAOSTAT, 2015). They have been applied to control pests in crop and livestock production.

Pesticide application equipment and pesticides have been introduced into the Nigerian agricultural system ever since they were used in the industrialized world. Practically, all the different techniques available have, at a given time, been introduced successfully along with the screening of new insecticides, fungicides and herbicides, new spraying pumps are usually evaluated for their efficiency before they are recommended for use in the application. However, with the new European Union (EU) Legislation on Maximum Residue Levels (MRLs), some of the pesticides are still undergoing screening and the previously recommended pesticides have been banned. This regulation has left very few pesticides for use in agricultural activities in Nigeria.

2.4 Common livestock pests in the project areas

Table 2: Common livestock pests in the project areas with control measures, level of efficacy and adverse effects

S/N	LIVESTOCK	PESTS	CONTROL METHODS				
			Pesticide Used	Efficacy	Adverse Effect	Other control Methods	Efficacy
1.	CATTLE	Cattle Tail Lice	Diazinon, Amitraz, Cypermethrin, Ivermectin	Very effective	Nausea, dizziness vomiting; loss of consciousness, convulsions, constriction of the pupil; muscle cramps, salivation. A severe exposure may cause inhibition of cholinesterase; Exposure above the Occupational Exposure Limit (OEL) may result in death.	Use of Smoke, Use of oil	Effective
		Deer Flies	Permethrin, Cypermethrin	Effective	Symptoms of acute poisoning include abnormal facial sensations, dizziness, headache, nausea, anorexia and fatigue, vomiting and increased stomach secretion.	Use of smoke	Effective
		Mosquitoes	Permethrin, Cypermethrin	Not so Effective	Symptoms of acute poisoning include abnormal facial sensations, dizziness, headache, nausea, anorexia and fatigue, vomiting and increased stomach secretion.	None	None
		Scabies Mite	Amitraz dip and/or spray, Ivermectin	Effective	Muscarinic, nicotinic and central nervous system manifestations.	Use of Oil	Effective
		Spinose ear tick	Diazinon, Amitraz, Cypermethrin,	Very Effective	Nausea, dizziness, vomiting, cough, loss of consciousness, convulsions; constriction of the pupil, muscle cramps, salivation;	Hand picking, use of smoke	Not so Effective

S/N	LIVESTOCK	PESTS	CONTROL METHODS				
			Pesticide Used	Efficacy	Adverse Effect	Other control Methods	Efficacy
			Chlorpirifos, Ivermectin		A severe exposure may cause inhibition of cholinesterase Exposure above the Occupational Exposure Limit (OEL) may result in death		
2.	SHEEP AND GOAT	Chewing and Sucking Lice	Diazinon, Amitraz, Chlorpyrifos, Cypermethrin, permethrin.	Very Effective	Muscarinic, nicotinic and central nervous system manifestations Nausea, dizziness, vomiting, cough, loss of consciousness, Convulsions, Constriction of the pupil, Muscle cramps, Salivation. A severe exposure may cause inhibition of cholinesterase	Exposure to sunlight	Not so Effective
		Sheep Scabies	Amitraz, Diazinon, Ivermectin	Very Effective	The main symptoms of soft acute diazinon poisoning are headache, nausea, dizziness, pinpoint pupils, blurred vision, tightness in the chest, difficulty in breathing, muscle weakness or twitching, difficulty in walking, vomiting abdominal cramps and diarrhea. Effects on the central nervous system may include confusion, anxiety, drowsiness, depression, and difficulty in concentrating, slurred speech, poor recall, insomnia,	Use of Oil	Effective

S/N	LIVESTOCK	PESTS	CONTROL METHODS				
			Pesticide Used	Efficacy	Adverse Effect	Other control Methods	Efficacy
					nightmares and a form of toxic psychosis resulting in bizarre behaviors.		
		Wool Maggot (Black Blow Fly)	Permethrin, Amitraz, Diazinon, Chlorpyrifos	Effective	Muscarinic, nicotinic and central nervous system manifestations, nausea, dizziness, vomiting, cough, loss of consciousness, convulsions, constriction of the pupil, muscle cramps, salivation.	None	None
		Spinose Ear Tick	Permethrin dusts. Amitraz, Diazinon, Ivermectin	Very Effective	Nausea, dizziness, vomiting, cough, loss of consciousness, convulsions, constriction of the pupil; muscle cramps, and salivation.	Hand picking	Not so effective
3.	SWINE	Flies	Cypermethrin, Permethrin	Not so Effective	Nausea, dizziness, vomiting, cough, loss of consciousness, convulsions, constriction of the pupil, muscle cramps, salivation. A severe exposure may cause inhibition of cholinesterase Exposure above the Occupational Exposure Limit (OEL) may result in death	Use of nets	Effective
		Hog Lice	Permethrin sprays or dusts or in oilers	Effective	Nausea, dizziness, vomiting, cough, loss of consciousness, convulsions, constriction of the pupil; muscle cramp, and salivation. A severe exposure may cause inhibition of cholinesterase	None	None

S/N	LIVESTOCK	PESTS	CONTROL METHODS				
			Pesticide Used	Efficacy	Adverse Effect	Other control Methods	Efficacy
					Exposure above the Occupational Exposure Limit (OEL) may result in death		
		Mange Mites	Cypermethrin, Permethrin, Amitraz, Diazinon	Very Effective	Nausea, dizziness, vomiting, cough, loss of consciousness, convulsions, constriction of the pupil, muscle cramps, salivation. A severe exposure may cause inhibition of cholinesterase Exposure above the Occupational Exposure Limit (OEL) may result in death.	Use of oil, use of smoke	Effective
4.	POULTRY	Lice	Permethrin, Cypermethrin	Effective	Symptoms of acute poisoning include abnormal facial sensations, dizziness, headache, nausea, anorexia and fatigue, vomiting and increased stomach secretion.	None	None
		Mites	Cypermethrin, Permethrin	Effective	Symptoms of acute poisoning include abnormal facial sensations, dizziness, headache, nausea, anorexia and fatigue, vomiting and increased stomach secretion.	None	
		Chiggers	Permethrin, Cypermethrin	Effective	Symptoms of acute poisoning include abnormal facial sensations, dizziness, headache, nausea, anorexia and fatigue, vomiting and increased stomach secretion.	None	
		Fowl Ticks	Permethrin, Cypermethrin, Amitraz	Effective	Symptoms of acute poisoning include abnormal facial sensations, dizziness, headache, nausea, anorexia and fatigue, vomiting and increased stomach secretion.	Hand picking	Not so Effective

<i>S/N</i>	<i>LIVESTOCK</i>	<i>PESTS</i>	<i>CONTROL METHODS</i>				
			<i>Pesticide Used</i>	<i>Efficacy</i>	<i>Adverse Effect</i>	<i>Other control Methods</i>	<i>Efficacy</i>
		Bed Bugs	Amitraz, Permethrin, Cypermethrin	Effective	Symptoms of acute poisoning include abnormal facial sensations, dizziness, headache, nausea, anorexia and fatigue, vomiting and increased stomach secretion.	Exposing to sunlight	Not so Effective
		Flies (house fly and stable fly)	Permethrin, Cypermethrin	Effective	Symptoms of acute poisoning include abnormal facial sensations, dizziness, headache, nausea, anorexia and fatigue, vomiting and increased stomach secretion.	Use of nets	Effective

In general, according to literature and stakeholder consultations in preparation of the IPMP, the most effective local practices for pest management in order of effectiveness are listed as follows:

- i. Herd Sharing – which significantly minimizes outbreaks and transmission. This is especially common amongst cattle herders who mostly practice nomadism.
- ii. Breeding – use of resistance varieties which are able to resist common pests at a very high rate. The drawback is that these varieties are not commonly available to local farmers.
- iii. Hygiene – providing a sanitary environment away from waterlogged areas, poor drainages, waste disposal areas etc. has been reported to significantly reduce incidences and re-occurrence of pests.
- iv. Herbs – have also been reported to be effective, and also cost effective since most of the herbs are locally sourced.
- v. Bush burning – is effective for a period of time when the smoke is still in the air and immediately after the bush is burnt. However, once the environment gets wet, the pests are likely to re-occur.
- vi. Although manual removal of ticks is also widely practiced, it is quite tasking especially when there are many livestock in the area.
- vii. Other methods like local concussion and religious beliefs are becoming less popular which can be attributed to the fact that the efficacy could not be properly documented or embracing modern techniques.

In general, the use of chemicals for pest control has been reported to be effective in handling pests across the country. However, there are growing concerns about the use of pesticides including:

- Potency reduction from cold chain due to inadequate cold storage and irregular electricity supply which causes freeze-thaw cycles
- Increasing rate of pest resistance
- Limited information on usage and side effects
- Growing environmental concerns
- High costs of purchase due to unavailability of Government-subsidized pesticides.

2.5 Constraints to effective utilization of local control methods in cattle farming

i. Cutting of trees

Indiscriminate felling of trees for farming, building of houses, industries and fire wood, usually leads to depletion of trees and herbs that are sources of local medicine and sometime extinction of the herbs.

ii. Bush burning

Most of the shrubs used are being destroyed by bush burning. Indigenous people have to trek long distance that involved risking their lives in search of herbs and other raw materials for parasites control.

iii. Concealing of knowledge/ Improper knowledge of dosage

The variation in prescription such as quantity to administer at a time and for how long is common among the custodians of the knowledge. This leads to improper dosage knowledge of the herbs to be given to infested animal. There are cases of overdose of the herbal medicine, manifested in severe diarrhea or vomiting, shivering and weakened joints. There is also the problem of multiple administrations of herbs that may lead to over dosage. It also sometimes makes it difficult to identify the herbs or single out the role and contribution of each medicinal plant species.

iv. Wrong diagnosis

this is likely to occur because of limited diagnosis and most of the farmers medicate the livestock themselves either from previous knowledge or previous diagnosis, unfortunately, the pest specie may be different thus rendering the treatment ineffective.

v. Flood and drought

This causes changes in environmental balance and also change in pests' species types which the indigenous pest control methods may be ineffective against. Flood also affects the smoke and bush burning practices while drought leads to difficulty in finding the local herbs used.

vi. Lack of government recognition

Most Government interventions have been in the areas of crop agriculture, leaving the livestock farmers with limited support, information and research.

vii. Time consuming and stressful

Manual methods like handpicking of ticks are time consuming especially where there is large number of livestock.

2.6 Assessment of the capacity of Nigeria on Integrated Pest Management

Currently, many farmers in Nigeria use cultural practices and physical control measures for pest control which has been the norm for several farming generations. Nevertheless, some of these methods have not provided sufficient and environmentally friendly options for pest management. Bush burning as a way of controlling pest causes deforestation and loss of biodiversity and therefore should be discouraged. Other practices as outlined in the section 2.4 are not in line with best practices and cannot support large-scale agriculture.

Conventional chemical control methods have been the widespread means generally used to control livestock infestation by pests in Nigeria. It has however been recorded that this method is associated with:

- Emerging cases of numerous intoxications each year;
- Resistance of numerous pests to many chemicals;
- Destruction of useful species;
- Perturbation of the ecological balance;
- Dependence towards synthetic chemical pesticides; and
- Growing debt of farmers compelled to use increasingly expensive products etc.

In order to reduce the incidences of pest in Nigeria a number of project based interventions have been carried out on IPM. They include:

- IPMP for West Africa Regional Disease Surveillance Systems Enhancement (REDISSE) Project;
- IPMP for pest control in the Commercial Agriculture Development Project (CADP);
- IPMP for Youth Employment and Social Support Operation (YESSO);
- Farmer's training on IPM under the Transforming Irrigation Management in Nigeria (TRIMING) project;
- Cocoa farmers training on the use of IPM to pest control;
- IPM for pest control in the National FADAMA Agricultural Development in Nigeria.

There are also other IPM implementation cases amongst the key crops in Nigeria. Some of these include:

- control of root knot nematodes in tomato and okra, farmers are encouraged to integrate resistant crop varieties with seed dressing and compatible crop rotation schemes to prevent build-up of the pests;
- downy mildew control in maize, farmer training by the Rice/Maize center in Ibadan has promoted the integration of resistant crop varieties with seed dressing (using Apron plus), timely identification, rogueing and burning of affected plants and general farm hygiene;
- IPM recommendations for control of the African Rice Gall Midge include combination of resistant crop varieties with seed dressing, timely planting, pest monitoring to guide pesticide applications.

In-country capacity to implement IPM does exist, and is evident from the past and current projects, and outcomes of several IPM programs being implemented through funding from development banks, technical assistance provided by research centres and institutes and from farmer-based programs or initiatives driven by NGOs, communities, cooperatives and the Federal Government of Nigeria. However, it is noteworthy that there is little or no specific training programs on IPM or use of chemicals in livestock production in Nigeria.

CHAPTER THREE POLICY, REGULATORY AND INSTITUTIONAL FRAMEWORK RELEVANT TO PESTICIDES

This chapter presents the applicable policies, regulatory framework and institutional framework that guide pesticide usage and pest control methods in the country. They include National extant laws, International conventions and treaties and the World Bank Operational Policy 4.09. This IPMP has been prepared in compliance with these policies and frameworks.

3.1 Extant Laws of Nigeria on Pesticides Management

A number of legislations and institutional framework exist for the regulation of the distribution and use of pesticides in Nigeria. The existing legislative tools are listed in Table 3 below:

Table 3: Applicable Legislations for Pesticides Management in Nigeria

Legislations	Description
Pesticides Registration Regulations (2006)	<ul style="list-style-type: none"> Prohibits pesticides manufacture, import, export, distribution and usage unless it has been registered with the Agency Procedures for application for the registration of pesticides
The Factories Act 1990	<p>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 worker, thereby providing oversight for the numerous small-scale enterprises that engage the majority of the workforce in Nigeria.</p> <p>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.</p>
The Harmful Wastes (Special Criminal Provision) Act 42 of 1988	<p>This Act which was necessitated by the illegal use and dumping of toxic wastes in the port town of Koko in Southern Nigeria.</p> <p>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 section 1 of the Act, it is an offence to conduct 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.</p>

Table 4: National Policies on Pesticides Management

Policies	Description
Nigerian Agricultural Policy (1988)	<p>The major policy provisions with respect to pest control objectives in the agricultural policy for Nigeria include to:</p> <ul style="list-style-type: none"> Regulate, or completely eliminate, and maintain good surveillance of the major economic pests whose outbreaks are responsible for large-scale damage/loss to agricultural production.

	<ul style="list-style-type: none"> • Provide protection to human health and the environment against vectors of deadly diseases.
Pest Management and Pesticide Use Policy	<p>The general pest control objectives in the existing (1988) agricultural policy for Nigeria are to:</p> <p>(i) Control, and/or eradicate and maintain good surveillance of the major economic pests whose outbreaks are responsible for large-scale damage/loss to agricultural production;</p> <p>(ii) Provide protection to man and animals against vectors of deadly diseases.</p>
National Policy on the Environment (Revised 2016)	<p>The specific policy statement related to pesticide use include:</p> <ul style="list-style-type: none"> • Promote organic and ecologically sound agricultural practices that suit the holistic nature of local agricultural practices that are not disruptive and are inclusive of economic, social, cultural and gender considerations; • Control the reliance of farmers on artificial inputs including herbicides and pesticides that is harmful to the environment. <p>The policy also acknowledges that requirement for chemical inputs such as herbicides and pesticides, pose concerns about environmental health as these may impact soils, water bodies and non-target crops as well as non-target pests.</p>

3.2 Institutional Framework for Pesticides Management in Nigeria

Table 5: Applicable Legislations for Pesticides Management in Nigeria

Institution	Mandate
Nigeria Institute of Animal Sciences establishment (Act 2007)	<p>A regulatory agency for animal science practice with powers to regulate all matters pertaining to Animal husbandry in Nigeria. Part 1 Section 2 (h) & (i) mandates the Institute to regulate all matters pertaining to Animal Husbandry in Nigeria, as well as advising and encouraging enactment of laws and regulations for the industry.</p> <p>The mission of the institute is the regulation of Animal Husbandry practices for increased profitability to all Stakeholders' and guarantee improved Animal Husbandry and Production Systems that will embrace environmental sustainability and ensure high quality and quantity of animal proteins to Nigerians</p>
Nigeria Agricultural Quarantine Service Establishment (Act 2018)	<p>A regulatory agency created for the harmonization of plants, veterinary and aquatic resources (fisheries) quarantine in Nigeria to promote and regulate sanitary (animal and fisheries health) and phytosanitary (plant health) measures in connection with the importation of agricultural products with a view to minimize the risk to agricultural economy, food safety and environment.</p> <p>A major objective is to prevent the introduction, establishment and spread of animal and zoonotic diseases as well as pests of plants and fisheries including their products.</p> <p>NAQS also undertakes emergency protocol to control or manage new pest incursion or disease outbreak in collaboration with key stakeholders. NAQS ensures that our agricultural exports meet with international standards in line with International Plant Protection Convention (IPPC) Office International of the Epizootics (OIE) representing the World Organization for Animal Health, WTO/Sanitary and Convention on International Trade of Endangered Species (CITES) and SPS conditions of the importing countries.</p>

<p>Federal Ministry of Environment</p> <p>(FEPA Act 58 of 1988 as amended by Decree 59 of 1992)</p>	<p>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.</p> <p>The Ministry is the highest policy making body responsible for addressing environmental issues in Nigeria. Specifically, the Department of Environmental Assessment developed guidelines for the agricultural sector including Pest Management guidelines.</p>
<p>National Environmental Standards and Regulations Enforcement Agency (NESREA)</p> <p>(Act 2007)</p>	<p>NESREA is charged with the responsibility for the protection and development of the environment, biodiversity conservation and sustainable development of Nigeria's natural resources.</p> <p>The Agency also coordinates and liaises with relevant stakeholders within and outside Nigeria on matters of enforcement of environmental standards, regulations, rules, laws, policies and guidelines. Specifically, with respect to pest management, section 4.7 of the Act, the Agency is to maintain an up-to-date register of approved agro-chemicals, provide "Safe use of pesticides", and promote integrated pest management.</p>
<p>The National Agency for Food and Drug Administration and Control (NAFDAC)</p>	<p>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.</p> <p>In discharge of its statutory responsibility, NAFDAC has approved the list of chemicals allowed in Nigeria for the control of pest. This list is attached in the annex 3 of this report.</p>
<p>Federal Ministry of Agriculture and Rural Development</p>	<p>Ensures that the citizenry are provided with credible and timely information on government activities, programs and initiatives in the development of agriculture and food production; while creating an enabling technological environment for socio-economic development of the nation.</p> <p>With reference to pest management and potential pest threats to agriculture, the (FMARD) annually purchases and distributes pesticides (through tender) to the States.</p>
<p>State Ministries of Agriculture (Department of Animal Husbandry Services)/ State Ministry of Livestock Production</p>	<p>At the State level, these Ministries are responsible for information and management of livestock pests, distribution of pesticides and provision of veterinary services.</p>

Based on the approval of the agencies mentioned above, Annexes 2 and 3 list current banned and approved Pesticides stocks in Nigeria respectively.

3.3 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 IPMP under study. Some of these conventions pertinent to this study include:

Convention	Description
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, Heptachlor, Hexachlorobenzene, Mirex, Toxaphene, DDT and PCBs. 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, and Toxaphene. The Industrial POPs: Dioxins, Furans, Polychlorinated biphenyls (PCBs).
Rotterdam Convention	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. A major principle with respect to pesticides is the 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.
Basel Convention	The Convention obliges 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 principle outlines the transboundary movement of hazardous wastes.
ECOWAS	<p>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. 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. Its key principles include;</p> <ul style="list-style-type: none"> • Protect the West African populations 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.

3.4 World Bank OP 4.09

This policy provides a basis to minimize potential harmful effects of pesticides and pest management practices on human and animal health and on the environment, whilst promoting integrated pest management. It also supports an assessment of the capacity of the country's regulatory framework and institutions to promote and support safe, effective, and environmentally sound pest management. It ensures that EA covers potential issues related to pest management and considers appropriate

alternative designs or mitigation measures. It prioritizes the use of 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 which will identify risks associated with the transport, storage, handling and use of the pesticides and provide 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 World Bank does not fund the procurement of World Health Organization (WHO) Class IA and IB products or Class II formulations if:

- (i) the country has no restrictions on their distribution and use, or
- (ii) if non-specialists, farmers or other persons are likely to use them or have ready access without the necessary training, materials and infrastructure to handle, store and apply them properly.

For the classification of pesticides or formulas specific to each of the products under consideration, the World Bank refers to the classification recommended by WHO. The classification of pesticides by risk or hazard is based on their acute toxicity expressed as the LD50 oral and intradermal LD50 values (see Table 6 below).

Table 6: WHO Recommended Classification of Pesticides for Hazards

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

These are provided as follows:

3.4.1 ‘Do No Harm’ Principle

All projects: The do-no-harm principle applies to all projects under any circumstances. Its concerns entail that pest management activities in World Bank projects are sustainable and that health and environmental risks of pesticide use are 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.

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 or otherwise of products through selection and procurement of pesticides;
- Identification of risks and risk management to mitigate environmental and health concerns.

3.4.2 ‘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, and degree to which policy reform and capacity building fit in the project.

4.1 Global Concerns on the Use of Pesticides

Pesticides are toxic xenobiotics released most often intentionally into our environment. Pesticides when applied could easily bring adverse effects on environment, as well as human and animal health. This includes substances that kill weeds (herbicides), insects (insecticides), fungus (fungicides), rodents (rodenticides), ticks (acaricides) and others. Pesticides are used almost everywhere not only in agricultural fields, but also in homes, parks, schools, buildings, forests, and roads. The use of toxic pesticides to manage pest problems has become a common practice around the world, though they could be very useful in managing pest problems, they are also a great environmental and health risk.

4.1.1 Persistent Organic Pollutants (POPs)

Nigeria became a signatory to the Stockholm Convention on Persistent Organic Pollutants in May 2001 and ratified in 2004. Under Annex A (listed for elimination) of the convention, parties must 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. Most agricultural pesticides could constitute any of the Persistent Organic Pollutants (POPs) chemicals, which if are in use pose adverse environmental, animal, and human health risks. The country is obligated to stop the use of POPs pesticides if still in use. For other pesticides, which are not POPs, the issue of toxicity, its consequence on livestock and agricultural farmland as well as resultant wider environmental and social impacts still lingers.

4.2 Pesticides and Health Hazards

4.2.1 Effects of Pesticides on Human Health

A wide range of human health hazards have been linked to pesticides, ranging from short-term impacts such as headaches and nausea to chronic impacts like cancer, reproductive abnormalities, and endocrine disruption. Chronic health effects may occur years after even minimal exposure to pesticides in the environment, or result from the pesticide residues, which we ingest through our food and water. Pesticides can cause many types of cancer in humans. Some of the most prevalent forms include leukemia, non-Hodgkin's lymphoma, brain, bone, breast, ovarian, prostate, testicular and liver cancers.

4.2.2 Effects of pesticides on animal health

In general, animals are impacted by pesticides through their direct or indirect application, such as pesticide drift, secondary poisoning, runoff into local water bodies, or groundwater contamination. Some major health hazards associated with pesticides use on animals are as follows:

- Pesticides used could end up in drinking water, hay/ fodder consumed by the animals;
- Pesticides are non-discriminatory chemicals, thus they impact both good bugs and bad ones alike. Some pesticides have devastating effects on honeybees and other pollinating insects. Specifically, imidacloprid they are known to cause symptoms in these insects such as memory loss, navigation disruption, paralysis, and death. In cases when the insects aren't killed or paralyzed, bees are unable to navigate their way back to the hive causing the collapse of the colony;
- Pesticides have an affinity for lipid material and are not biodegradable, accumulate in animal systems, such pesticides are the main cause of contamination of animal products like milk, meat, egg.;
- Pesticides decrease the reproductive rate of birds by causing eggshell thinning and embryo deaths;
- Pesticides are highly toxic to aquatic animals, affecting various systems in aquatic animals including the heart and brain;
- High doses of pesticides are usually related to its effects on the central nervous system. Major symptoms are instability, dizziness, disturbed equilibrium, tremor and convulsions, and also shown to cause immune system damage as well as birth defects.

4.3 Identification of Potential Environmental and Health Risks Associated with Pesticides

Potential adverse environmental and health risks of pesticides applications that are of concern to the L-PRES project are listed in table 7 below:

Table 7: Adverse Impacts and Mitigation Measures

Receptor/Media	Potential issues	Mitigation Measures	Monitoring	Responsibility	Frequency	Cost estimate
Surface and ground water	Pesticides may pollute surface water through runoff which transports pesticides to streams, rivers, and other surface-water bodies. Groundwater contamination may occur from pesticide residue in surface water, such as drainages, streams, and municipal wastewater.	Minimize use of chemical pesticides in line with the IPMP. Ban pesticides should not be used	Compliance with LPRES IPMP Monitoring of water quality in project areas	State Ministry of Agriculture/ Department of Animal Husbandry State Ministry of Environment/ Environmental Protection Agency	Annually	\$66,000
Air Pollution	Vapor from sprayed pesticides will be released into the air, and if the chemical compound is very stable, vapor may travel beyond the application location.	Minimize use of chemical pesticides in line with the IPMP.	Monitoring of air quality parameters	State Ministry of Environment/ Environmental Protection Agency	Annually	\$44,500
		Adequate equipment should be used to minimize aerosols	Adequate training on pesticides application	State Ministry of Agriculture/ Department of Animal Husbandry	As required	\$34,200
Soil Contamination	Pesticides could also enter soil during spraying causing wash-off or run-off into soil. Long-term excessive use of pesticides will cause higher pesticide residues in the soil, which will further cause soil contamination within the area.	Minimize use of chemical pesticides in line with the IPMP. Ban pesticides should not be used	Compliance with LPRES IPMP Monitoring of soil quality in project areas	State Ministry of Agriculture/ Department of Animal Husbandry State Ministry of Environment/ EPA	Annually	\$75,000
Flora and Fauna	Harm to non-target species: sprayed insecticides reach a destination other than their target species because they are mainly aerosol. Runoff 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.	Minimize use of chemical pesticides in line with the IPMP. Site specific EMPs	Compliance with LPRES IPMP Monitoring of environmental parameters	State Ministry of Agriculture/ Department of Animal Husbandry State Ministry of Environment/ EPA	Annually	\$82,000
	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.	Proper diagnosis of pests issues Minimize use of chemical pesticides in line with the IPMP.				
Human Health	Consumption of crops and plants grown under chemical pest control could cause health hazards to humans and animals within and around the project site.	Minimize use of chemical pesticides in line with the IPMP.	Health plans and programs	Federal/ State Ministry of Health	Periodically	\$40,000

	<p>Certain kinds of chemicals intoxication especially after drinking pesticide contaminated water is 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.</p> <p>Skin, eye, and nose irritation</p> <p>Possibility of cancers, neurologic, endocrine and reproductive problems form direct and indirect exposure to pesticides</p>	<p>Public awareness health campaigns</p> <p>Prohibit the use of banned pesticides</p> <p>Have a plan to recycle/eliminate empty containers and prevent local communities from using them for household chores.</p>	<p>Health plans and programs</p> <p>Emergency Preparedness Plan</p> <p>Health plans and programs</p>	<p>State Ministry of Environment/ EPA</p> <p>Federal/ State Ministry of Health</p> <p>State Ministry of Environment/ EPA</p>	<p>Periodically</p> <p>Periodically</p>	
Occupational Health and Safety	Long term inhalation of toxic pesticides sprayed, could eventually result in respiratory illnesses or disease conditions	Minimize use of chemical pesticides in line with the IPMP Banned pesticides should not be financed or used	Compliance with the LPRES IPMP Health risk assessment on project locations	State Ministry of Agriculture State Ministry of Health	Annually	\$82,000
TOTAL						\$423,700

Table 8: Matrix of Some WHO Classified Pesticides and their Effects

Pesticides	Result of Accidental Exposure		
	WHO Class (3)	Effects of acute intoxication	Effects of chronic intoxication
Clorpyriphos ethyle (1)	II (Moderately dangerous)	Nausea, dizziness, vomiting, cough, loss of consciousness, convulsions, constriction of the pupils, muscle cramps and salivation. A severe exposure may cause inhibition of cholinesterase Exposure above the Occupational Exposure Limit (OEL) may result in death	The substance may have effects on the nervous system, cholinesterase inhibitor
Fenitrothion(1)	II (Moderately dangerous)	Cramps, diarrhea, dizziness, headache, nausea, loss of consciousness. A severe exposure may cause inhibition of cholinesterase exposure above the OEL may result in death	The substance may have effects on the nervous system, cholinesterase inhibitor

Pesticides	Result of Accidental Exposure		
	WHO Class (3)	Effects of acute intoxication	Effects of chronic intoxication
Malathion (1)	III (Slightly hazardous)	The substance may have effects on the nervous system, causing convulsions, muscle cramps, vomiting, diarrhea, excessive salivation, sweating, difficulty breathing, and loss of consciousness. A severe exposure may cause inhibition of cholinesterase Exposure above the OEL may result in death.	A prolonged or repeated contact may cause skin sensitization. Cholinesterase inhibitor; possibility of cumulative effects
Dizinin	II (moderately hazardous)	The main symptom of soft acute diazinon poisoning are headache, nausea, dizziness, pinpoint pupils, blurred vision, tightness in the chest, difficulty in breathing, muscle weakness or twitching, difficulty in walking, vomiting abdominal cramps and diarrhea Effects on the central nervous system may include confusion, anxiety, drowsiness, depression, difficulty in concentrating, slurred speech, poor recall, insomnia, nightmares and a form of toxic psychosis resulting in bizarre behavior.	Cholinesterase inhibitor. Accumulation of acetylcholine at junctions between nerves and glands results in gland secretion; and accumulation between nerves in the brain causes sensory and behavioral disturbances.
Cypermethrin	II (moderately hazardous)	Symptoms of acute poisoning include abnormal facial sensations, dizziness, headache, nausea, anorexia and fatigue, vomiting and increased stomach secretion	Chronic symptoms include brain and locomotory disorders, polyneuropathy and immuno-suppression and resembles the multiple chemical sensitivity syndrome
Carbosulfan	II (Moderately hazardous)	The acute symptoms of carbosulfan in humans are characteristics of other organophosphate and carbamate insecticides. Signs include dizziness, salivation, excess salivation, nausea, abdominal cramps, vomiting, diarrhea, blurred vision, pi-point pupils, difficulty breathing and muscle twitching	-
Carbaryl	II (Moderately hazardous)		
Profenofos	II (Moderately hazardous)	Muscarinic, nicotinic and central nervous system manifestations	There is no available data concerning chronic toxicity of profenofos

4.4 Impact Mitigation through IPMP

Integrated Pest Management (IPM) is an important aspect of sustainable agriculture. It is based on the planned and strategic use of pest control methods (including chemicals and a range of other methods) – not simply using chemicals as part of a routine. It is an effective and environmentally sensitive approach to pest management that relies on a combination of multiple practices with a view to reduce reliance or use of pesticides. IPM programs use current, comprehensive information on the life cycles of pests and their interaction with the environment.

The above information, in combination with available pest control methods, is used to manage damage by pests through 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 that affects animal health and causes disease out breaks in poultry and livestock will be subdued in an environmentally safe manner that may arise from the L-PRES, thus reducing increased dependency on pesticides or other environmentally unsafe approaches.

Knowledge on biological, cultural and mechanical control measures that have been used in other agricultural programs in Nigeria other projects and Organisations (e.g. Avian Influenza, Polio Control Project, FADAMA, IITA, FAO, TRIMING etc.) will provide a strong platform for proffering practicable safe measures towards mitigating adverse impacts of identified pests in the project area.

Compared to traditional pesticide applications which pose immeasurable health and environmental risks, and may result in severe current and future losses (environmental, public, health, occupational health, social and financial), an Integrated Pest Management Plan (IPMP) will be the most appropriate pest management approach for the L-PRES project. The IPMP for the project will lay down mitigation measures, institutional responsibilities, and capacity building needs.

This chapter presents a robust plan for pest management in Nigeria including the methodology for establishing an IPM. It further provides information on classes of pesticides that can be used and banned pesticides.

5.1 Introduction

The IPMP for the L-PRES project is developed to reduce dependency on pesticides and encourage integrated pest control methods such as biological, cultural, physical, chemical methods and design a program for capacity building in IPM. By identifying institutional responsibilities, the IPMP also provides an information basis for stakeholder groups to establish functional mechanisms which will help L-PRES actors and Partners understand and respond to IPM needs.

Most importantly, considering that the L-PRES project is seeking financial support from the World Bank, it is of essence to note that World Bank lending operations are performed in line with the Bank's environmental and social safeguard policies. The policies recommend that certain safeguard instruments are prepared to proactively manage projects which may trigger safeguards. This Integrated Pest Management Plan (IPMP), therefore, is intended to help manage the adverse effects of identified pests and pesticides on the value chains in the L-PRES project to acceptable levels.

5.2 IPMP Objectives

The specific objectives of the L-PRES IPMP include:

- Assist the target state governments to plan and design location specific IPM activities.
- Promote participatory approaches in IPM to learn, test, select and implement “best-bet” IPM options.
- Promote biodiversity monitoring to serve as early warning systems on pest status, alien invasive species, beneficial species, and migratory pests.
- Establish linkages to drive the draft policy document for L-PRES in Nigeria and ensure compliance with national and international conventions and guidelines on pesticide use in agriculture.
- Monitor and evaluate the benefits of IPM including its impact on the environment and health.

5.3 Steps Involved in Establishing an IPMP for L-PRES

Establishing an IPMP for Livestock pests is a function of the following 5 steps depicted in fig 1 below:



Figure 1: Steps for Establishing an IPM

- 1. Detection:** Pest detection requires thorough and regular monitoring of animals for pest invasions and/or other signs and symptoms that indicate a pest is present on the animal or in the environment where animals live (Walker & Stacheki, 1996). This is done by observing an animal's body, stool, living quarters, bedding, surroundings and behaviours. Under LPRES project, any unusual change noticed in an animal shall be recorded and brought to the attention of a veterinarian.
- 2. Identification:** Identification step is required to determine if the pest detected is actually the organism causing the discomfort or disorder in the animal. This is best performed by a trained farm manager or a veterinarian.
- 3. Economical or Medical Significance:** Medical judgements of the state of health of an animal is made on the basis of symptoms caused by pests. On the economic side, estimated losses which the pest has caused such as reduction in diary, meat production and egg production are the variable indicators, but high economic loss can be a function of duration of pest invasion or period within which it took for effective mitigation response to take place.
- 4. Method Selection:** This involves selecting a method or methods for managing the observed pests such as are contained in this IPMP.
- 5. Evaluation:** It is necessary under L-PRES project to evaluate the effectiveness of the applied pest management procedures. Keeping records and evaluating pest control techniques will be followed as monitoring task for the L-PRES IPM outcome evaluation.

5.4 Classes of Insecticides/Acaricides used in Livestock Pest Management in Nigeria

- 1. Chlorinated Hydrocarbons:** This class includes lindane and methoxychlor. Lindane has become a restricted use pesticide for *mange mites and lice*.
- 2. Organophosphates (OP):** Organophosphate compounds inhibit cholinesterase. Cholinesterase is a chemical catalyst found in mammals that helps regulate the activity of nerve impulses. It is a synthetic organic pesticide containing carbon, hydrogen and phosphorus. Cholinesterase includes a broad range of insecticides such as chlorpyrifos, malathion, DDVP, runnel, stiriphos, etc.

Organophosphates have been found to be effective against a wide range of insects including but not limited to fleas and ticks.

Other classes of insecticides/acaricides that may be used in this project are:

- c) *Carbamates*
- d) *Synthetic pyrethroids*
- e) *Botanicals*
- f) *Lime sulfur (Calcium polysulfide)*
- g) *Mineral oil*
- h) *Amitraz*
- i) *Ivermectins and*
- j) *Insect growth regulators and hormone mimics*

Annexes 4a and 4b provide a list of WHO pesticides in Classes 1a, 1b and 2 and must not be used

5.5 Formulations that are allowed for Managing Livestock Pests for use in L-PRES

Insecticides and acaricides formulations vary widely and must be selected to fit the particular situation. Noted below are various formulations that may be used but their applications must be based on effectiveness, cost, practicality and relative safety to human, the animal being treated and the environment.

1. **Ready to use (RTU):** RTU formulations require no mixing or combining with other ingredients or diluents. They come in containers that serve as the application device, such as an aerosol can, pour-on bottle, roll-on, spot-on or spray bottle.
2. **Wettable powders (WP):** This type must be mixed with water before application. They are concentrated in solid, powdered form and can be sprayed after mixing.
3. **Emulsifiable concentrates (EC):** Emulsifiable concentrates are liquids that must be mixed with water before application. They can be sprayed after mixing or sponged on the animal being treated.
4. **Shampoo:** A shampoo is a formulation of insecticide and other ingredients that is applied to an animal's wet haircoat and worked into a lather. Label direction should be looked out for to determine the length of time that the shampoo must remain on the animal to achieve effective pest control before being thoroughly rinsed.
5. **Dust:** A dust is a ready-to-use dry formulation. The following safety caution must apply:
 - a. protect the animal and applicator's eyes from the dust.
 - b. applicators must wear appropriate personal protective equipment to protect exposed skin, the respiratory tract and eyes
6. **Baits:** Baits are either commercially prepared as dry granules or made as mixes of insecticides.

7. ***Pastes, liquids, powders, tablets/pellets and injectables:*** These formulations should be given orally or injected into animals to control internal parasites.

Only licensed or qualified veterinarians shall administer this on the animal.

5.5.1 General guidelines to be followed for insecticides/chemical use for animal pest control

- Read labels before using any pesticide, and follow strictly label instructions;
- Use only products labeled for use on animals or in animals' environments
- Do not exceed label dosages; measure carefully and know the animal's exact weight;
- Provide adequate ventilation while using pesticides;
- Remove animals from buildings if it is an area or premise spray;
- As much as possible, use dust formulation instead of spray on outdoor animals on cold days
- Use all appropriate personal protective equipment during applications of any pesticide;
- Do not add new insecticides to old, previously used dipping water, but start with fresh water.
- Avoid using pesticide when an animal has been, will be or is anesthetized;
- Keep records of pesticides applications.
- Always store and dispose of pesticide containers according to label directions (or see attached animal waste management protocol).

5.6 Integrated Pest Management Methods Suitable for the Value Chains Within the Project Areas

In implementing IPMP for L-PRES, the use of highly persistent and highly toxic chemicals must be avoided in pest management. Natural pest control methods can be employed to effectively reduce or eliminate pest or disease infestation without harming humans, animals and crops. Tables 9 and 10 below present effective control methods (chemical, cultural and biological) for managing common pests and diseases of the value chains within the project area.

Table 9: Livestock Value Chain Pest and Control Methods for L-PRES

S/N	LIVESTOCK	PESTS	CONTROL METHODS		
			CHEMICAL	CULTURAL	BIOLOGICAL
1.	CATTLE	Cattle Tail Lice	Tail louse control can be readily achieved by timed treatments with insecticides like permethrin.	Applications for tail lice should be timed to obtain control of both flies and lice. This optimum timing of proper pesticides can result in the control of more than one pest for the cost of controlling one species.	--
		Deer Flies	Application of Emulsified GardStar spray	Traps have been effective when used around cattle that are confined to manageable areas	There are no effective biological control programs for controlling tabanids. There are native beneficial insects that target tabanids. Eggs are parasitized by such Hymenopteran families as Trichogrammatidae, Scelionidae, and Chalcididae. Diapriidae and Pteromalidae (Hymenoptera), and Bombyliidae and Tachinidae (Diptera) parasitize the larvae and pupa. Tabanid adults are used as provisions for nest building wasps. Cattle egrets and killdeer are also tabanid feeders
		Mosquitoes	Application of Emulsified Permethrin spray	The most effective control method available is source reduction by removing or draining mosquito breeding sites. Daily fogging or aerosoling for adult mosquitoes may provide relief, but only as temporary control measure.	--
		Scabies Mite	Application of Amitraz dip (Tactic)- One can (760 ml) mixed with 50 gal water by thorough wetting of animals to the point of runoff.	Good hygiene of the pen by regular cleaning and drying.	--

S/N	LIVESTOCK	PESTS	CONTROL METHODS		
			CHEMICAL	CULTURAL	BIOLOGICAL
		Spinose ear tick	Application of Amitraz spray. Direct low-pressure spray toward the head, ears, shoulders, and neck	Prevention of contact between healthy and ill animals. Avoid places with high infestation of ticks. Animals were fed with plants containing a high level of salt, thus the ticks fall off. Ticks can also be collected from the animals and throw into a fire burning near the entrance to the enclosure Shady trees can be avoided in case of tick infestation Tick eradication by burning the infested pasture can also be highly effective.	--
2.	SHEEP AND GOAT	Chewing and Sucking Lice	This can be achieved by timed treatments with insecticides like permethrin.	Outdoor grazing can be timed to be in the afternoon where sunlight will chase the lice away from the animals.	-
		Sheep Scabies	Application of Amitraz in the recommended dilution will be desirable. This can be by spray or deep.	Good hygiene of the pen by regular cleaning and drying.	-
		Wool Maggot (Black Blow Fly)	Insecticide sprays, dips, or smears are effective in controlling this pest	Early shearing before blow fly season is an effective preventive measure. Clipping and cleaning the fleece will help prevent infestations.	
		Spinose Ear Tick	Application of insecticide dusts or liquid insecticides in oil to the inner folds of the sheep's ear.	Use primarily local breeds which are more resistant than exotic breeds, or cross breeds. Hand picking of ticks, spreading ashes or diatomite in nesting sites can control or greatly reduce the number of ticks. Also dry leaves of eucalyptus, neem, pyrethrum and tephrosia added to the ashes and or diatomite in nests and dust bath areas will further reduce numbers of soft ticks.	
3.	SWINE	Flies	Application of Emulsified Permethrin spray	Use of sticky flypaper to reduce nuisance flying insects in confined areas.	There are no effective biological control programs for controlling tabanids. There are native beneficial insects that target

S/N	LIVESTOCK	PESTS	CONTROL METHODS		
			CHEMICAL	CULTURAL	BIOLOGICAL
					<p>tabanids. Eggs are parasitized by such Hymenopteran families as Trichogrammatidae, Scelionidae, and Chalcididae. Diapriidae and Pteromalidae (Hymenoptera), and Bombyliidae and Tachinidae (Diptera) parasitize the larvae and pupa. Tabanid adults are used as provisions for nest building wasps</p>
		Hog Lice	<p>Pesticides can be applied as sprays or dusts or in oilers. Treatment must be repeated periodically for effective control. Granular formulations applied to bedding may also provide control.</p>	<p>Animal diets should be well balanced and provided at consistent intervals and in appropriate portions. Adequate ventilation should be provided for animals kept indoors to prevent heat, stress or the spread of diseases Ensure that animals are not over crowded to avoid pest outbreaks.</p>	-
		Mange Mites	<p>This can be controlled by insecticide spray or deep at the recommended dosage.</p>	<p>Animal diets should be well balanced and provided at consistent intervals and in appropriate portions. Adequate ventilation should be provided for animals kept indoors to prevent heat, stress or the spread of diseases Ensure that animals are not over crowded to avoid pest outbreaks.</p>	-
4.	POULTRY	Lice	<p>Insecticides can be applied by dusting or spraying the bird or providing self-treatment devices such as dust boxes.</p>	<p>Animal diets should be well balanced and provided at consistent intervals and in appropriate portions. Adequate ventilation should be provided for animals kept indoors to prevent heat, stress or the spread of diseases Ensure that animals are not over crowded to avoid pest outbreaks.</p>	-
		Mites	<p>The chicken (red) mite can be controlled by spraying pesticide into the cracks and crevices of the</p>	<p>Animal diets should be well balanced and provided at consistent intervals and in appropriate portions.</p>	-

S/N	LIVESTOCK	PESTS	CONTROL METHODS		
			CHEMICAL	CULTURAL	BIOLOGICAL
			poultry house. Spray the pesticide directly on the birds will be effective for the control of northern fowl mite. Retreatment may be required for effective control.	Adequate ventilation should be provided for animals kept indoors to prevent heat, stress or the spread of diseases Ensure that animals are not over crowded to avoid pest outbreaks.	
		Chiggers	Apply approved pesticides to the ground as sprays or dusts. Repeated applications may be necessary	Animal diets should be well balanced and provided at consistent intervals and in appropriate portions. Adequate ventilation should be provided for animals kept indoors to prevent heat, stress or the spread of diseases Ensure that animals are not over crowded to avoid pest outbreaks.	-
		Fowl Ticks	Control is by spraying pesticide in the poultry houses and directly on the birds.	Spreading ashes or diatomite in nesting sites can control or greatly reduce the number of ticks. Also, dry leaves of eucalyptus, neem, pyrethrum and tephrosia added to the ashes and or diatomite in nests and dust bath areas will further reduce numbers of soft ticks.	-
		Bed Bugs	Spraying recommended insecticides into cracks and crevices and wall voids in poultry houses and surrounding areas is the best method of control.	Animal diets should be well balanced and provided at consistent intervals and in appropriate portions. Adequate ventilation should be provided for animals kept indoors to prevent heat, stress or the spread of diseases Ensure that animals are not over crowded to avoid pest outbreaks.	-
		Flies (house fly and stable fly)	Application of Emulsified GardStar spray	Good sanitation is important for successful fly control Traps (nets) have been effective when used around poultry houses	There are no effective biological control programs for controlling tabanids. There are native beneficial insects that target tabanids. Eggs are parasitized by such Hymenopteran families as Trichogrammatidae, Scelionidae, and Chalcididae. Diapriidae and Pteromalidae (Hymenoptera), and Bombyliidae and

S/N	LIVESTOCK	PESTS	CONTROL METHODS		
			CHEMICAL	CULTURAL	BIOLOGICAL
					Tachinidae (Diptera) parasitize the larvae and pupa. Tabanid adults are used as provisions for nest building wasps

Table 10: Value Chain Diseases and Control Methods in Nigeria

S/N	LIVESTOCK	DISEASES	CONTROL METHODS		
			CHEMICAL	CULTURAL	BIOLOGICAL
1	CATTLE	Tetanus	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 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	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.	--
		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 Sudangrass to thoroughly dry before pasturing	--

S/N	LIVESTOCK	DISEASES	CONTROL METHODS		
			CHEMICAL	CULTURAL	BIOLOGICAL
				Dilute intake of infected material with hay and other forages	
		Acetonaemia (ketosis)	A quick-acting glucose supplement is required immediately. Follow-up treatment is aimed at providing a long term supply of glucose.	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
		Tick-Borne Diseases (Anaplasmosis, Babesiosis, Heartwater)	Use of broad-spectrum Antibiotics will be recommended as well as	Animal diets should be well balanced and provided at consistent intervals and in appropriate portions. Adequate ventilation should be provided for animals kept indoors to prevent heat, stress or the spread of diseases. Ensure that animals are not over crowded to avoid pest outbreaks.	-
		Contagious Bovine Pleuropneumonia	There is no specific treatment for this disease. Post-exposure therapeutic approaches for PPR infections is by administration of antibiotics (long acting oxytetracycline, chlortetracycline) to prevent secondary bacterial infections and anti-diarrheal medicines with supportive therapy (B-complex and Dextrose saline) for 5-7 days, which may be useful to reduce the severity of the disease.	Proper hygiene and isolation of infected animals from healthy ones.	-
		Foot and Mouth Disease	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	As a result of the loss of production and the infectious state of the disease, infected animals are usually culled	--

S/N	LIVESTOCK	DISEASES	CONTROL METHODS		
			CHEMICAL	CULTURAL	BIOLOGICAL
			the same serotype. Currently, there is no universal FMD vaccine.		
		Leptospirosis	Management methods to reduce transmission include rat control, fencing cattle from potentially contaminated streams and ponds, separating cattle from pigs and wildlife, selecting replacement stock from herds that are seronegative for leptospirosis, and chemoprophylaxis and vaccination of replacement stock	Antibiotic therapy should be prescribed for animals with leptospirosis. Antibiotics can also eliminate persistent 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 centers.
		Parasitic Gastroenteritis	Use of Anthelmintics is recommended at the right dosage.	Enclosed housing of cattle will help reduce the spread and infestation of the causative parasite. Good nutrition will also aid in developing resistance against the causative parasites.	
	SHEEP AND GOAT	Small Ruminants Pests	Since PPR is a viral disease, there is no specific treatment for this disease. Post-exposure therapeutic approaches for PPR infections is by administration of antibiotics (long acting oxytetracycline, chlortetracycline) to prevent secondary bacterial infections and anti-diarrhea medicines with supportive therapy (B-complex and Dextrose saline) for 5–7 days, which may be useful to reduce the severity of the disease.	Proper hygiene and isolation of infected animals from healthy ones.	-
		Parasitic Gastroenteritis	Use of Anthelmintics is recommended at the right dosage.	Enclosed housing of cattle will help reduce the spread and infestation of the causative parasite. Good nutrition will also aid in developing resistance against the causative parasites.	
		Contagious Caprine Pleuropneumonia	Since the disease occurs in epidemics, antibiotic treatment, as the only control measure would be very uneconomical. Therefore, efforts should be directed towards controlling the disease by vaccination.	Proper hygiene and isolation of infected animals from healthy ones.	
		Foot rot	Footbaths/Footsoaks: There are two different types of solutions commonly used in foot baths: zinc sulfate and copper sulfate. For treatment, they should be used 1-2 times per week for several weeks.	Foot trimming reduces the number of cracks and crevices where bacteria can hide, removes infected hoof, and exposes the organism to air and various medications.	

S/N	LIVESTOCK	DISEASES	CONTROL METHODS		
			CHEMICAL	CULTURAL	BIOLOGICAL
			Penicillin and streptomycin combinations used either as a one-shot treatment (1 ml/8 pounds) or every day up to ten days has been proven to be effective in treating foot rot. Procaine Penicillin G or long-acting penicillin products at the same dosage may also be effective. Single injections of long-acting tetracycline have also been successful in some cases		
		Trypanosomiasis	A small number of curative and prophylactic drugs have been developed and can be employed. Drugs include Isometamidium chloride, Pyrithidium bromide, Quinapyramine sulfate, Homidium bromide and Diminazene aceturate	Bush clearing is one of the main technique used to control tsetse populations Under zero-grazing systems, susceptible livestock can be protected from trypanosomiasis risk by keeping them in fly-proof shelters	Control of tsetse populations by eliminating their wildlife hosts has been attempted Sterile Male Release This technique involves releasing large numbers of male tsetse flies which have been sterilized by radiation or exposure to chemicals. Because the female tsetse apparently mate only once, if the sterile males reach them before the males in the natural population they will not reproduce.
	SWINE	Hog Cholera	-	Infected animals are usually culled and pen disinfected	-
		Foot and Mouth Disease	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.	As a result of the loss of production and the infectious state of the disease, infected animals are usually culled	

S/N	LIVESTOCK	DISEASES	CONTROL METHODS		
			CHEMICAL	CULTURAL	BIOLOGICAL
			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 universal FMD vaccine.		
		Transmissible Gastroenteritis	No recommended treatment	Infected animals are culled, and pen disinfected.	-
		Swine Dysentery	Some herbal medicines can be used to relieve the symptoms of diarrhea and dehydration, Tylosin injection into the hip or neck. Repeat injection for 3 4days		
	POULTRY	Newcastle Disease	The disease can be prevented through vaccination and adaptation of strict bio-security measures by use of disinfectants	Strict isolation and quarantine, high standard of hygiene, good management, housing and nutrition. During the outbreak of disease proper disposal of dead birds and zoning of the area can help to control the disease in surrounding flocks.	-
		Infectious Bursal Disease (IBD)/Gumboro	There is no treatment for IBD but support therapies such as vitamin and electrolyte supplements and antibiotics to treat any secondary bacterial infection may reduce the impact of the disease.	Strict isolation and quarantine, high standard of hygiene, good management, housing and nutrition. During the outbreak of disease proper disposal of dead birds and zoning of the area can help to control the disease in surrounding flocks.	-
		Fowl pox	Live virus vaccines both from lentogenic (La Sota, F, B1) and mesogenic (H, R2B, Mukteshwar) strains are used for induction of good immune response. Regular disinfection of farm premises and equipment with potassium permanganate (1: 1000), sodium hydroxide (2%) or Lysol (1: 5,000) are useful in preventing this disease.	Strict isolation and quarantine, high standard of hygiene, good management, housing, and nutrition. During the outbreak of disease proper disposal of dead birds and zoning of the area can help to control the disease in surrounding flocks.	-

S/N	LIVESTOCK	DISEASES	CONTROL METHODS		
			CHEMICAL	CULTURAL	BIOLOGICAL
		Chronic Respiratory Disease	Antibiotics can help to control the disease but reducing stress is an essential component to managing the disease once it is in the flock.	Management issues must be addressed before the birds arrive. Ensure birds are free of M. Gallisepticum on introduction. An all-in, all-out system with thorough cleaning down between batches and acquiring vaccinated birds helps. Ensure the nutrition and flock dynamics (size, age distribution, presence of roosters etc) are also optimal. Housing that is difficult to clean and thus accumulates manure, dust and vermin leads to many common ailments in poultry During the outbreak of disease proper disposal of dead birds and zoning of the area can help to control the disease in surrounding flocks.	-
		Coccidiosis	Drugs that can be effective are sulphonamides, amprolium and toltrazuril as well as other anticoccidial agents.	-	-

The L-PRES project will interface with the FADAMA offices in the project states. A lot of experience and success has been gained in Nigeria under FADAMA II and III projects including application of IPM operations. Therefore, the L-PRES stands to gain from shared experience and capacity of these existing projects in terms of challenges and success drivers of IPM operations and other similar areas. That way, the L-PRES beneficiaries would not require much experimentation time lag in the implementation of this IPM.

5.7 Personal Protective Equipment (PPE)

It is vital that the people who will be involved in the application and handling of pesticides under the L-PRES 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 to use when applying pesticides include the following:

- Chemical: It is important to use chemical goggles, which are specially developed to prevent chemical related accidents, rather than general safety goggles;
- Gloves: Unlined, full-length plastic or rubber gloves should be used. If gloves are lined residue can become trapped in the lining and is hard to remove;
- Hat: The absorption rate of pesticides is also very high on the scalp and forehead. Plastic caps are recommended as they are waterproof and prevent absorption;
- Boots: Rubber overshoes are suggested since they prevent absorption and are easy to clean.
- Coverall or long sleeved shirt and full trousers made from closely woven fabric;
- Respiratory masks;
- Ear protection: Earplugs prevent pesticide exposure via the ear canal.

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

5.8 Guide responsible use and storage of pesticides

- Do not store pesticides in unlocked cabinets that are within the reach of children. Pesticides are extremely toxic to children.
- Do not transfer pesticides into containers that could be associated as something else such as food.
- Do not use empty pesticide containers for chores or other household purposes
- Properly store and eliminate empty pesticides containers
- Do not apply insect repellents over cuts, irritated skin, eyes, mouth, hands, or directly over the face.
- Do not store unnecessary amounts of pesticides. Purchase only what you need at that time.

- Apply an appropriate level of caution to those who might come into contact and become exposed
- Look for pesticide alternatives.

5.9 Pest Management Planning Matrix for the L-PRES Project

Table 11 below outlines the planning matrix of activities, its components, expected results, milestones, and performance indicators of the L-PRES IPMP.

Table 11: Planning matrix for the L-PRES Project

Narrative summary	Expected results	Performance indicators	Assumptions/risks
<p>Goal: Enhance the capacity of Veterinarians and health workers to contribute to human and animal health disaster reduction through environmentally friendly pest management practices.</p>	<ul style="list-style-type: none"> • Improved public and animal health; • Increased national and community surveillance and preparedness on human and animal health risk disaster management; • Increase capacity of institutions to manage health emergencies/outbreaks in environmental and socially safe manner; • Increase number of private laboratories for diagnosis of infectious human and animal health. 	<ul style="list-style-type: none"> • Evidence of the number of persons and institutions trained on safe pest management practices • Increase in number of accredited private laboratories for diagnosis of infectious human and animal diseases. • Evidence of reduction in use of pesticides. • Evidence of increase in use of non-chemical or safe chemical applications on crop production and even mosquito control around human settlement. 	<ul style="list-style-type: none"> • National security remains stable • Government commitment to implement national regulations and conventions on pesticides/chemical application, transportation and storage
<p>Purpose (i) improvement in efficiency of specimen transport and disposal system; ii) increase awareness on use and safety of application of chemicals for pest/vector control; (iii) document and disseminate key lessons to users and stakeholders; iv) reduction in the use of harmful or banned chemicals/pesticides in growing foods for human and animal consumptions.</p>	<p>Medium-term results/outcomes</p> <ul style="list-style-type: none"> • Health institutions and those that control/use pesticides can prioritize pest problems, specifically with the L-PRES and identify IPM opportunities to mitigate negative environmental and social impacts associated with pesticides. • Health institutions and those that control/use pesticides can adopt ecologically sound options to reduce cassava crop losses with minimal personal and environmental health risks; • Policy makers in Health institutions and agric. Organizations and associations are strengthened and provided with guidelines enabling them to promote IPM approaches and options in animal health management; • Collaborate with established linkages to develop a national IPM policy that promotes compliance with international conventions and guidelines on safe pesticide use. 	<ul style="list-style-type: none"> • Commitment of government to implement IPM across the national health and agricultural sector spread. • Level of compliance with World Bank safeguards, and compliance parameters of other donors etc. • Level of chemical control practices • Types and level of use of alternatives to synthetic pesticides 	

5.10 Patterns of functional Surveillance in LPRES States

Patterns of the functional surveillance for early warning on alien invasive species and migratory pests for L-PRES IPM is as shown in Table 12 below:

Table 2: Patterns of Functional Surveillance

Activities	Expected results	Milestones	Performance indicators	Assumptions/risks
<ol style="list-style-type: none"> 1. Record stakeholders' overviews on Livestock pests. 2. Conduct field diagnosis to specify pests that undermine Livestock production. 2. Identify livestock farmers' coping mechanisms and researcher recommended IPM options against the pests. 3. Develop and explain historical profile of pesticide use and other pest control practices in the project states. 5. Specify partnership opportunities at local, national and international levels to assist in the implementation of the PMP 	<p>Result 1: Livestock producers/breeders and other relevant stakeholder groups develop common understanding of key pest problems and agree on corrective action.</p>	<ul style="list-style-type: none"> • Pest problems diagnosed and related IPM opportunities identified. • Potential constraints livestock farmers may face in the use of the technologies specified. • Pest lists including quarantine pests and alien invasive species developed. • Potential for improving existing pest control practices assessed. • Pest monitoring schemes for early warning on alien invasive species and migratory pests are organized and functional. • Action plan for location-specific IPM activities developed. • PMP implementation mechanism developed by all L-PRES states. 	<ul style="list-style-type: none"> • Type and nature of participatory methods for problem analysis • Documented information on the status of pests and natural enemies of pest and pollinators in the L-PRES States. • Inventory of alien invasive species and quarantine pests • Types and availability of natural enemies for use in biological control of named pest • Types and availability of microbial pesticides and botanical pesticides to replace chemical pesticides • Type and number of livestock breeding schemes to reduce build-up of named pest species • List of principal actors and of partners 	<p>Social, economic and political situation remain stable</p>
<ol style="list-style-type: none"> 1. Develop participatory learning modules (PLM) in line with identified training needs 	<p>Result 2: Human resource capacity for IPM delivery and implementation developed.</p>	<ul style="list-style-type: none"> • PLM for livestock pest management practices developed and adapted to suit local needs • training of trainers' programs is completed • At least 3 sets of study visits organized 	<ul style="list-style-type: none"> • Type and number of PLMs developed • Type of IPM skills covered in study visits by L-PRES staff 	<p>State PIUs of L-PRES adopts and apply new improved technologies.</p>

<p>2. Conduct short to medium term training of beneficiaries, potential L-PRES staff and support groups on skills relevant to the PLMs</p> <p>3. Organize international study visits on specialized IPM skills of relevance to the PLMs</p> <p>4. Intensify training of men and women livestock farmers in IPM knowledge and skills.</p> <p>5. Promote farmer-led extension to increase secondary adoption of proven IPM options</p> <p>6. Strengthen researcher-farmer-extension linkages through participatory research on issues emerging from training</p> <p>7. Develop/disseminate IPM decision-support information resources for field agents, farmers, policy makers, and the public</p>		<p>for technical support staff</p> <ul style="list-style-type: none"> • Personnel of the L-PRES accurately relate pests to respective damage symptoms; • recognize natural enemies/biological control agents against the pests; test a range of IPM options and select “best-bet” options to implement and adopt. • Trained farmers undertake participatory extension; and adopt new IPM options • At least 80% of information materials developed is disseminated and used by extension agents and farmers. • Significant reduction in pest damage 	<ul style="list-style-type: none"> • Number of farmers’ learning groups implemented • Gender and number of extension agents and of farmers trained. • Gender and number of trained farmers engaged in participatory extension • Extent to which new knowledge/skills are used by extension agents & farmers to promote adoption of IPM options • Number & type of IPM information materials developed/disseminated • Number and type of new IPM options introduced and adopted. • Gender and number of beneficiaries adopting IPM technologies. • Incremental benefits due to pest control • Type and number of user-friendly taxonomic keys for pest and natural enemy recognition by farmers and extension workers 	<p>Farmers, beneficiary states and its counterparts comply with international conventions guiding pesticide use and MRLs in trade, critical mass of staff trained remain within the communities</p>
<p>1. Test and promote botanical alternatives to synthetic pesticides.</p>	<p>Result 3: Harmful pesticide regimes replaced by environmentally</p>	<ul style="list-style-type: none"> • Local commercial enterprises initiated and/or strengthened to produce and/or market botanical pesticides 	<ul style="list-style-type: none"> • Level of reduction in chemical pesticide use; type and number of pesticides replaced by botanical or microbial pesticides 	<p>Government and development partners remain committed to</p>

<p>2. Test and promote microbial alternatives to synthetic pesticides</p> <p>3. Develop/update a national IPM policy including legislation to govern the manufacture, importation, distribution and use of pesticides</p> <p>4. Establish a state IPM advisory and oversight committee to guide national and local compliance with World Bank safeguard Policies, OP 4.09; OP 4.01, O P 4.12 and other international conventions concerning pesticide use</p> <p>5. Sensitize the population on IPM issues and activities through formal and informal educational channels and public awareness campaigns</p>	<p>friendly alternatives</p> <p><i>In partnership with the:</i></p> <p>1. <i>SP-IPM for sustainable access to microbial pesticides.</i></p> <p>2. <i>Nigeria node (at IAR/ABU) of the West African Network for Taxonomy (WAFRINET) and IITA biodiversity center for identification services.</i></p>	<ul style="list-style-type: none"> • At least one botanical pesticide widely used in place of chemical pesticides • At least one microbial pesticide registered and widely used in place of chemical pesticides • Surveillance systems to protect the beneficiary states from banned/harmful pesticide regimes is fully operational • Existing pesticide regulations are fully enforced • A multi-stakeholder State/National IPM advisory and oversight committee established to guide compliance with international conventions and guidelines on pesticide use, and promote the IPM development • Radio and other public campaigns on impact of pesticides in agriculture, environment and health conducted through radio and TV spots, mass field days, rural market days, information workshops, and focus groups discussions 	<ul style="list-style-type: none"> • Number of commercial enterprises engaged in the production of botanical pesticides; and quality of the products • Volume of sale of microbial and botanical pesticides • Level of compliance with World Bank safeguard policies by PIU of the L-PRES project and pesticide dealers/service providers • Effectiveness of the IPM advisory and oversight committee • Number of pest surveillance groups and pesticide law enforcement mechanisms • Effectiveness of public awareness of campaign 	<p>international conventions and guidelines on safe pesticide use</p> <p>critical mass of staff trained remain within the L-PRES communities</p>
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CHAPTER SIX

IMPLEMENTATION STRATEGY FOR THE L-PRES IPMP

This chapter contains the strategies to be adopted in effective implementation of the IPMP including capacity building needs on IPMP, institutional arrangements, responsibilities of different stakeholders involved in the project and a framework for monitoring and evaluation. A budget for implementing the IPMP is also stated in this chapter.

6.1 Context

To ensure that this IPMP is optimally implemented several steps are required to be taken. These include:

1. measures that will ensure capacity building among stakeholders that will implement the IPMP as well as beneficiary associations and youth expected to be involved in livestock production under the L-PRES project;
2. measures to ensure that POPs pesticides and WHO class 1 and 2 pesticides considered highly hazardous are not procured and/or used;
3. measures that will ensure that livestock farmers get the relevant technical aids and education on the implementation of safe and alternative pest control measures rather than the use of chemicals
4. measures that ensure that pest resistant varieties of livestock are procured as a better pest control alternative
5. need to ensure that funding and approval process for IPMP implementation are well coordinated and effective
6. monitoring and evaluation resources should be provided in due time to ensure no set back in monitoring activities.

6.2 Capacity Building

There is need to train and enlighten stakeholders on different aspects of the IPMP requirements necessary for their project support. Although, there exists capacities in Nigeria for implementation of IPMP, such capacities are minimal and in small scale to cover the geographic spectrum and healthcare facilities needed to effectively implement IPMP. Furthermore, there is the need for farm owners, animal scientists, extension workers, farm workers, herdsmen, veterenarians, health facility based environmental officers, health care workers and MDAs to have proper insight into the need for IPMP and World Bank template for mainstreaming best practices in IPM. Based on the above, training therefore is fundamental for the IPMP for L-PRES project.

Table 13 identifies series of trainings that have been proposed for the L-PRES project.

Table 13: Capacity Building Plan and Cost estimate for the L-PRES Project

Modules	Targets	Responsibility Arrangement	Budget in USD
Overview of World Bank Environmental and Social Safeguards (emphasis on OP 4.09)	Animal scientists, veterinarians, extension workers, HCF health workers, livestock farmers, L-PRES staff, members of disease surveillance committee (train 361 persons @ \$138 per person across the LPRES states: 181 in year 1, 72 in year 2, 72 in year 3 and 36 in year 4)	Safeguards Consultant	50,000
Occupational Health and Safety (OHS): Basics in Chemical Pest Control	Animal scientists, extension workers, veterinarians, HCF health workers, livestock farmers, L-PRES staff, members of disease surveillance committee (train 505 persons @ \$138 per person across the LPRES states: 217 in year 1, 108 in year 2, 108 in year 3 and 72 in year 4)	Independent Consultant	70,000
Safe Chemical Pesticide Management (transportation, storage, handling, storage and disposal of empty pesticide containers)	Animal scientists, extension workers, veterinarians, HCF health workers, livestock farmers, L-PRES staff, members of disease surveillance committee (train 326 persons @ \$138 per person across the LPRES states: 181 in year 1, 72 in year 2, 72 in year 3 and 0 in year 4)	Independent Consultant	45,000
Decision making on the selection of IPM approaches or options	Animal scientists, extension workers, veterinarians, HCF health workers, livestock farmers, L-PRES staff, members of disease surveillance committee (train 433 persons @ \$138 per person across the LPRES states: 289 in year 1, 144 in year 2)	Independent Consultant	60,000
IPM Implementation and Monitoring	Animal scientists, extension workers, veterinarians, HCF health workers, livestock farmers, L-PRES staff, members of disease surveillance committee (train 577 persons @ \$138 per person across the LPRES states: 289 in year 1, 130 in year 2, 115 in year 3 and 43 in year 4)	Independent Consultant	80,000
Small group consultations	Animal scientists, extension workers, veterinarians, HCF health workers, livestock farmers, L-PRES staff, members of disease surveillance committee L-PRES beneficiary state PCU; State MARD, farmers (train 360 persons @ \$138 per person across the LPRES states: 144 in year 1, 72 in year 2, 72 in year 3, 72 in year 4)	Independent Consultant	50,000

Modules	Targets	Responsibility Arrangement	Budget in USD
Environmental management in pest control	Animal scientists, extension workers, veterinarians, HCF health workers, livestock farmers, L-PRES staff, members of disease surveillance committee (train 220 persons @ \$250 per person across the LPRES states)	Independent Consultant	55,000
Breeding of natural enemies of pests	Animal scientists, extension workers, veterinarians, HCF health workers, livestock farmers, L-PRES staff, members of disease surveillance committee (train 100 persons @ \$650 per person across the LPRES states)	Independent Consultant	65,000
Total			475,000

6.3 Institutional Arrangements and Framework for Implementation

6.3.1 National Steering Committee (NSC)

The NSC shall exist at the Federal level. With respect to the IPMP, it shall:

- Provide technical advice to the FMARD;
- Approve annual work plan and budgets
- Provide technical support to and build capacity of states and LGAs on disease surveillance and response;
- Monitor L-PRES implementation at all levels;
- Review periodically health-related data to determine the frequency of occurrence of communicable diseases particularly epidemic prone diseases;
- Provide feed back through quarterly epidemiological bulletin, monthly news letter and meetings.

6.3.2 National Coordination Office (NCO)

At the National level, the national coordination office will oversee the Project coordination and management under the responsibility of FMARD in Abuja. The NCO will also be staffed with a Procurement Specialist, Finance Management Specialist, Environment and Social Safeguards Specialists, Monitoring and Evaluation Specialist, Gender Specialist, Communications Specialist, as well as other technical experts in line with the technical breadth of the project. Among others, the NCO will be responsible for:

- a) Developing and coordinating with the states the targeting approach of project beneficiaries.
- b) Developing the consolidated national Annual Work Plan and Budget (AWPB) and Procurement Plan.
- c) Managing project funds, including disbursing, accounting, and preparing interim financial reports (IFRs) and financial Statements for Auditing (FSA); and
- d) Managing the M&E system.

6.3.3 L-PRES State Coordination Offices

State Coordination Offices (SCOs) will be responsible for state-level project coordination and implementation. They will be responsible for:

- a) Developing State AWP&B and Procurement Plan;
- b) Managing Project funds, including disbursing, accounting, and preparing interim financial reports (IFRs) and financial statements for auditing;
- c) Managing the state M&E system; and
- d) Managing human resources, (HR) particularly contracted staff.

6.3.4 State Technical Committee (STC)

STC will be chaired by the Permanent Secretary of the State Ministry of Agriculture, and will meet every six months, and/or at any other time determined by the Chair to assess progress of implementation, and review and approve work plans and budgets..

6.3.5 Roles and Responsibilities of L-PRES Host Communities

Host communities would be adequately sensitized and organized to perform the following roles:

- a) Integrate community developmental goals with those of the L-PRES for economic and social transformation;
- b) Promote group formation and establishment of relevant security personnel for safeguarding the activities within the zone and its environs;
- c) Provision of appropriate security measures to protect lives and properties of investors;
- d) Cooperate with the EMC and other partners to ensure that activities carried on in the ABIR are consistent with the goals of the L-PRES states;
- e) Organization of farmers into cooperatives for easy access to loan facility for production and processing facilities.

6.3.6 Roles and Responsibilities of Non-Governmental Organizations (NGOs)

The roles of NGOs in the L-PRES locations and to the benefiting communities would include the following:

- a) Encouragement of marketing of processed goods of the L-PRES;
- b) Participation in identification of beneficiary communities' project needs;
- c) Assistance in funding community development projects.

6.3.7 Roles and Responsibilities of Donor Agencies (World Bank)

The role of donors shall include:

- a) Assisting in providing financing and technical assistance toward the establishment and sustainability of the L-PRES states and ensuring implementation of the IPMP to meet the donor's safeguard requirements;
- b) The donor will also ensure that other safeguard instruments prepared for the L-PRES Project are implemented and used to complement each other where appropriate.

6.4 Responsibilities of Federal Ministries

6.4.1 Federal Ministry of Agriculture and Rural Development (FMARD)

The FMARD, through its Animal Husbandry Services will provide overall leadership and direction to the other Ministries in the facilitation of the desired operational environment for the L-PRES states.

Specific roles will include:

- a) Provision of the policy and legal framework for L-PRES states in Nigeria with a view to ensuring stability and sustainability;
- b) Facilitating the provision of funding to support the development and sustenance of L-PRES states;
- c) Engaging all the critical stakeholders and securing their support, cooperation and participation in the implementation of this policy;
- d) Establishing, through the APP, FMARD's Development Partnership Projects like the CADP, FADAMA and other donor Projects, a sustainable system of support to production activities.

6.4.2 Federal Ministry of Works

- a) Facilitate the rehabilitation of existing/construction of new access roads/road infrastructure to link the L-PRES states to major road networks;
- b) Rehabilitation/expansion of feeder roads connecting major clusters of agricultural production;

6.4.3 Federal Ministry of Water Resources

- a) Assist in the determination of hydrology potentials of L-PRES sites;
- b) Exploration and utilization of appropriate technologies to provide potable water to L-PRES beneficiary communities.

6.4.4 Federal Ministry of Environment

- a) Establishment of L-PRES specific environmental and social policy guidelines to reduce delays in obtaining approvals for L-PRES development;
- b) Ensuring compliance of L-PRES states to specific environmental and social policy guidelines.

6.4.5 Federal Ministry of Health

The Federal Ministry of Health with the support of partners shall:

- a) Provide technical guidelines, set regulations and ensure quality control for laboratory services in the country;
- b) Provide prompt and efficient response mechanisms for emergencies including epidemics and notify appropriate authorities;
- c) Conduct health risk assessments for workers in the livestock subsector;
- d) Provide feedback to States and the stakeholders involved in disease surveillance.

6.5 Monitoring and Evaluation

6.5.1 Objectives of IPMP Monitoring and Evaluation

The objectives of monitoring and evaluation for the IPMP are as follows:

- Providing timely information about the success or otherwise of the IPM operation process outlined in this report. This will ensure continuous improvement in the L-PRES states;
- To make a final evaluation in order to determine whether the mitigation measures incorporated in the IPMP have been successful.

This section sets out requirements for the monitoring of the environmental and health impacts of the pesticides management activities. Monitoring and evaluation of the agricultural support IPM will be mainstreamed into the overall monitoring and evaluation system for the L-PRES ESMF. The key issues to be considered in the monitoring process are whether a pesticides procurement checklist is available and used during procurement and screening to 1) ensure that POPs pesticides and WHO class 1A and 1B pesticides are not procured or used. 2) monitor the progress of the IPM implementation vis-à-vis the results.

Specifically, the following are monitoring indicators required to achieving IPM project development objectives:

- Reduction in the use and application of pesticides in the area;
- Performance ratings in pest management using proffered IPM controls;
- Number of farmers and stakeholders aware of the pollution, contamination and toxicity associated with pesticides;
- Decline or increase in livestock pests/diseases within the L-PRES beneficiary states;
- The number of farmers or farmers association using biological methods of pest control;
- Number of persons trained in the method of spraying and handling of chemical pesticides;
- The reported incidences of pest and herbicides concerns among farmers;
- The level of use of resistant and improved species of livestock;
- Improvement in livestock production from use of IPM vis-à-vis the pre-IPM baseline;
- Level of understanding of IPM processes;
- Level of understanding of World Bank operational policy on pest management among SPCUs and livestock farmers' associations;
- Level of involvement of youth and women in livestock production activities;
- Level of unemployment/employment especially in project communities.

Towards the course of the above monitoring indicators the following action indicators will be incorporated into a participatory monitoring and evaluation plan.

Capacity to inform: Types and number of Participatory Learning Modules (PLM) delivered; category and number of extension agents and livestock farmers trained and reached with each PLM; category and number of participants reached beyond baseline figures; practical skills/techniques most frequently demanded by extension agents and farmers; and livestock management practices preferred by farmers.

Capacity to motivate: Category and number of farm workers and farmers who correctly apply the skills they had learnt; new management practices adopted most by farmers; category and number of

other farmers trained by project trained farmers; types of farmer-innovations implemented; level of pest damage and losses; rate of adoption of IPM practices; impact of the adoption of IPM on production performance.

Major benefits: Increase in livestock production among the L-PRES beneficiaries; increase in farm revenue; social benefits: e.g., improvement in the health status of farmers; level of reduction of pesticide purchase and use.

6.5.2 Sustainability of Process and Results

Short-term technical study visits FADAMA agriculture projects and other ADP projects with proven success in IPM development and implementation will help to create favorable conditions for continuity of IPM processes and results. Scientific information adapted into user-friendly format will strengthen training and extension delivery and increase IPM literacy in L-PRES beneficiary groups.

6.5.3 Evaluation of Results

The evaluation of results of IPM in the L-PRES program can be carried out by comparing baseline data collected in the planning phase with targets and post project situations.

6.6 Budget for IPMP Implementation

Table 14 provide indicative budget for implementation of the L-PRES IPMP over a 5-year period. Approximately **US\$ 1,490,700** will be required to effectively implement the IPMP for the L-PRES over this period.

Table 14: Summary Budget for LPRES IPMP Implementation

LINE ITEM	Cost Estimate (US\$)					
	Year 1	Year 2	Year 3	Year 4	Year 5	Total
1. Capacity building & Awareness						
All training programs	200,000	100,000	100,000	75,000	0	475,000
Radio jingles and handbill on IPM	30,000	20,000	10,000	0	0	60,000
<i>Sub-total</i>	<i>230,000</i>	<i>120,000</i>	<i>110,000</i>	<i>75,000</i>	<i>0</i>	<i>535,000</i>
2. Environmental management						
Equipment; bed nets; improved species	10,000	25,000	10,000	10,000	0	55,000
Support to IPM research and development	20,000	35,000	20,000	10,000	5,000	90,000
Pest/vector surveillance	10,000	10,000	5,000	4,000	4,000	33,000
Mitigation Costs	200,000	100,000	61,850	30,925	30,925	423,700
<i>Sub-total</i>	<i>240,000</i>	<i>170,000</i>	<i>96,850</i>	<i>54,925</i>	<i>39,925</i>	<i>601,700</i>
3. Occupational Health & Safety						

Personal Protective Equipment (Hand gloves, gas mask, safety boot and overall wear)	70,000	70,000	40,000	0	0	180,000
Chemical Neutralizer and first Aid	50,000	30,000	20,000	0	0	100,000
<i>Sub-total</i>	120,000	100,000	60,000	0	0	280,000
4. Project management						
IPMP coordination	4,000	4,000	4,000	4,000	4,000	20,000
Monitoring and evaluation	10,000	10,000	10,000	12,000	12,000	54,000
<i>Sub-total</i>	14,000	14,000	14,000	16,000	16,000	74,000
Grand total	604,000	404,000	280,850	145,925	55,925	1,490,700

CHAPTER SEVEN SUMMARY OF PUBLIC CONSULTATIONS

An integral part of preparing the IPMP is stakeholders' consultation which is necessary to obtain relevant information at all levels of the project, ensure stakeholder buy-in, promote implementation success and project sustainability. A summary of consultations held is presented in this section.

7.1 Consultations Meetings

Consultation meetings were held with the client to obtain relevant information needed for the prompt execution of the project, information about the livestock sector and the value chains of importance to the L-PRES.

Two rounds of consultation meetings were held as part of the development of this ESMF. The purpose of the meetings were to (i) present the scope of the proposed intervention to stakeholders (ii) identify the potential environmental and social issues that would need to be addressed through the project (iii) obtain feedback on the proposed scope on LPRES interventions with particular focus on the E & S aspects of the intervention.

While recognizing that only 10 states have been currently admitted into the project during appraisal, the intention of Government to drive the implementation of the National Livestock Transformation Plan through LPRES was reflected in the profile of the participants at the public consultation meetings held. In all 17 states were consulted during the second round of consultation meetings held in December, 2021. Six (6) states – 1 from each of the 6 geopolitical zones of Nigeria – had been consulted during the initial consultation round held in 2018. The 6 states also participated in the second round on consultation.

7.2 Groups and Persons Consulted

Groups consulted for the purpose of developing the IPMP include:

- a) Livestock farmers, retailers, product processors, consumers;
- b) Value chain farmers association (cattle, dairy, pig, poultry, sheep & goat, hides & skin, micro livestock);
- c) Groups: women farmer groups and youth farmer groups;
- d) State Ministry of Agriculture;
- e) State Ministry of Livestock/ Department of Animal Husbandry Services;
- f) Other State MDAs (Environment, Health Agencies, Land etc.);
- g) Federal Ministry of Agriculture and Rural Development (FMARD);
- h) Pest Product Retailers;
- i) Veterinarians/ Veterinary Health Centers;
- j) FADAMA;

- k) Non-Governmental Organizations
- l) Agricultural Development Projects.

The consultations held with the different stakeholders were to inform and listen to them regarding the project development, objectives of the projects as well as document their perceptions and concerns. Specifically, the consultations were aimed at obtaining information of livestock pests, pest management practices, efficacy and adverse reactions. In addition, it provided a platform to inform stakeholders on the concept of IPMP and the need to embrace and promote environmentally friendly pest management, which is the core value of the IPM. The gain of the consultations is the gathering of local data and information on the use of pesticides, common animal pests and diseases, prevailing culture of pest control and concerns of the livestock and crop farmers. Thus, this IPMP benefited immensely from the contributions of stakeholders. *(Full details of consultations are provided in Annex 8 and 10).*

7.3 Disclosure of Safeguard Instrument

In accordance with the Nigerian EIA Law and the World Bank Disclosure Procedures, this IPMP will be disclosed by the NPCO at public locations, in National Dailies and the World Bank's external website for a period of 21 days, in order to receive review and inputs from stakeholders.

CHAPTER EIGHT RECOMMENDATIONS AND CONCLUSION

This IPMP addresses the LPRES Project’s need to monitor and mitigate negative environmental and social impacts of the project and promote ecosystem management. The IPMP provides an information basis for stakeholder groups to establish functional mechanisms enabling project beneficiaries to identify, understand and manage pest and vector problems in the further development of agriculture, reduce personal and environmental health risks associated with pesticide use, and protect beneficial biodiversity such as natural enemies of pests and pollinators in the farmers’ efforts to increase productivity. Collaborative linkages between the project and international IPM groups will help to bring relevant expertise and supporting IPM resources developed elsewhere to strengthen national and local capacity to address pest problems faced by farmers.

This IPMP has established that there are some initiatives in the use of indigenous knowledge and non-chemical practices for pest management, among other things. The IPMP has also proposed activities that need to be carried out to set up IPM practices in the LPRES Project locations.

It is noted that not all IPM practices would be applicable for the LPRES in the short term. Specifically, mechanical methods may be difficult to implement in small scale farming communities where heavy machinery for weeding will be inappropriate. Biological methods are a possible option under the L-PRES but they take a long time and they need technical know-how as well as patience to adopt. Generally, IPM practices take some time to adopt and to bear the required results. However, IPM practices are highly recommended for long term and sustainable agricultural productivity. L-PRES should therefore:

- Introduce the IPM in the LPRES Project locations by using the systematic approach presented in Chapter 5. This will ensure application of all appropriate alternatives prior to resorting to chemical pesticides as remedy for pests;
- Adopt a collective community effort and dissemination of appropriate tools and training. This will maximize IPMP implementation and accelerate progress towards reaching both measurable and tangible results in pest management;
- Adopt a use of chemicals as a last resort approach to prioritize IPM remedies, consistent with sound environmentally sustainable practices;
- Set up a team that incorporates L-PRES PIU with the FMARD Pest Control Services so that inspections are jointly conducted, permitting instantaneous discovery of illicit pesticides, followed by immediate impounding and appropriate legal action;
- Train farmers in (a) identifying approved pesticide; (b) acceptable disposal practices for expired chemical pesticides; and (c) the general environmental risks associated with the use of expired chemical pesticides;
- Adopt a “safety is the number one priority” approach in IPM approach

- Equip the farmers with “safety packages” to be made available to farmers to the farmers by the State PIUs. Packages must include the minimum requirements for pesticide application such as gloves and eyewear, nose mask; and
- Thoroughly inform farmers on the dangers of handling chemical pesticides and equipment without sufficient and appropriate protective gear.

In addition, the project should assist with the disposal of the farmers and household’s pesticides related waste by establishing infrastructures for the collection and appropriate management of small quantities of pesticides and contaminated materials.

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ANNEX ONE

TERMS OF REFERENCE FOR THE IPMP

Terms of Reference for Conduct of Integrated Pest Management Plan for Livestock Productivity and Resilience Support Project

1.0 Introduction and Background

The Government of Nigeria has requested the assistance of World Bank for the preparation of Livestock Productivity and Resilience Support. The Project Development Objectives (PDO) is to improve productivity, resilience[11] and commercialization of producers and processors in selected livestock value chains and to strengthen institutional capacity in service delivery.

2.0 Project locations

Specific project location is yet to be determined, However, The Project locations would be selective with focus on regions where it can demonstrate high potential of impact. The Project will target selected states and value chains based on comparative advantages, subsector growth prospect in the states, formal expression of interest by states, existing value chains and markets, and states' performance in ongoing externally financed projects in the states. Selectivity will also take into account other donors' interventions in the livestock sub-sector. These criteria would be refined during the preparation phase.

3.0 Project Components

COMPONENTS	SUB-COMPONENTS	DESCRIPTION	AMOUNT
1: Strengthening National Institutions for Improved Service Delivery	1.A: Support to livestock policy and Institutional environment	Support national institutions to develop policy Provide support for conducting an evidence-based technical review of current policies identified in the Livestock Industry Transformation Plan Provide support for training and implementation of Strategic National Programs Undertake sector studies including thorough review of climate issues and options and mainstream climate change resilience objectives across all relevant policies	US\$10 million

	1.B: Improving Service Delivery Systems	<p>Improve service delivery to enhance livestock productivity and quality and contribute to its resilience</p> <p>Increase availability and access to high quality services and inputs for livestock producers</p> <p>Support the adoption of enhanced productivity livestock breeds for better growth rate, higher fecundity, better adapted to the prevailing climate, linked closely to improved feed and forage supplies while ensuring the conservation of the genetic value of the national herd.</p>	US\$30 million
	1.C: Strengthening of animal health and veterinary public health Services	Enhance the reduction of mortality and morbidity losses due to animal diseases and generally improve public health.	US\$20 million
2: Strengthening the performance of selected value chains	2.A: Productive alliances for selected Value chains	Establish sustainable commercial business relations and amalgamating platforms for joint participation of stakeholders	US\$114.6 Million
	2.B: Enhancing the performance of selected value chains	<p>Identify the bottlenecks that hamper the performance of the livestock value chains and take necessary actions to address them.</p> <p>Coordinate livestock value chains and enhance market efficiency.</p>	US\$10 million
3: Enhancement of Livestock Community Resilience	3.A: Enhancement of Natural Resource and Livestock Service Management	<p>Support the strengthening of natural resource and livestock service management to improve livestock system resilience, and to achieve production and market growth</p> <p>Support critical investments and diversification to enable farmers and pastoral communities</p> <p>Withstand shocks and to maintain and increase the supply of quality live animals and animal products</p> <p>Support the establishment of Livestock Service Centers (LSC)</p> <p>Support early warning systems for climatic events</p>	US\$30 million

	3.B: Enhancement of national capacity for conflict mitigation peace building and conflict risk monitoring	Increase capacity of institutions involved in preventing and managing pastoral crisis and improving resilience by establishing and strengthening early warning and rapid response mechanisms.	US\$8 million
	3.C: Contingency emergency response	Draw resources from the unallocated expenditure category and/or allow the government to request the Bank to re-categorize and reallocate financing from other project components to partially cover emergency response and recovery costs	US\$2 million
4: Project Coordination, Monitoring & Evaluation and Communication	4.A: Project coordination	Support project implementation activities which includes operating costs of the National and States Project Coordination Office and Project Steering Committee	US\$10 million
	4.. B: Monitoring &evaluation	Ensure monitoring of project activities and coordination of reports from agencies, organizations and beneficiaries that will be part of project execution or implementation	US\$5 million
	4.C: Communication and knowledge management	Create a nation-wide awareness on the relevant project activities and knowledge dissemination especially best practices.	US\$2 million

4.0 Purpose of IPMP

As part of the implementation of Nigeria Livestock production and resilience support project activities, the PMP is designed to minimize potential harmful effects on human and animal health and on the environment which may arise particularly in the context of vector control, and to promote the integrated pest management.

In accordance with the operational guidelines of the World Bank, the project is classified in category “B” of projects subjected to a prior environmental impact assessment. The implementation of project activities will, of course, benefit the local population, but in some cases, this could result in negative environmental and social impacts if appropriate measures are not taken. The project should allow for these predictable negative impacts in the planning, and implementation of these investments.

5.0 Aims and 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. 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 IPM."The IPMP shall complement the Environmental and Social Management Framework (ESMF) and other safeguards instruments of the project.

6.0 The Scope of Work

To prepare a Pest Management Plan (PMP) which represents a framework for screening, monitoring, and mitigating potential impacts, with a process for triggering subsequent sub-projects. Two other safeguards instruments; the Resettlement Policy Framework (RPF) Environment and social Management framework (ESMF) will be prepared as separate stand-alone documents. These safeguards instruments (ESMF, PMP and RPF) will be disclosed before appraisal of this project. The activities relating to the preparation of the PMP are set out in the procedures manuals of the World Bank on this matter and consultants should get familiar to these (see list of documents to be consulted). The PMP must be understood and accepted by the authorities and other national stakeholders.

7.0 Specific Tasks

The consultant should realize the following:

- Description of the legal framework and institutional capabilities for pesticide management (i) explaining the content of applicable national laws and regulations and implications to the project,
- Conduct an initial reconnaissance to identify the main pest problems and their contexts (ecological, agricultural, public health, economic, and institutional) and to define broad parameters.
- The consultant will review existing Bank documents regarding the project/program (PCD, PID, EA, PAD, according to availability). She/he will also 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.)
- Assessment of capacity development needs and support needed (organizational and operational)

- Review existing Integrated Pest Management (IPM) initiatives, achievements, constraints/gaps and pest management practices and challenges in Nigeria
- Present an overview of the potential impacts of pest and pest management activities as well as mitigation measures for the negative impacts identified
- Public 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;

8.0 Expected Outcome:

- Baseline information that can be tracked for monitoring the impact of the project on pests, soil, water, air and humans
- Institutional Arrangement for implementing the IPMP in the LPRES
- Integrated Pest management plan
- IPMP Monitoring Framework

9.0 Deliverables and Timing:

The assignment shall be completed within six (6) weeks after signing of contract. The expected number of consultancy fee days is 25.

Note: This work will not be certified as complete until it is acceptable to the World Bank for the purposes of the Livestock Productivity and Resilience Support Project.

10.0 Expected Output/Deliverables and Reporting Format

The Consultant is expected to have the following deliverables:

- (i) Inception report (that will include the table of content of the final report) in five (5) hard copies and one (1) electronic copy within **three (3) days** from commencement date.
- Draft report in electronic version to the LPRES team within 20days.
 - Draft Final report in five (5) hard copies and one (1) electronic copy (CD) within 22 days from commencement date. On submission of the draft report, the client shall be allowed 8 days to review the draft and compile comments;
 - Final report in ten (10) hard copies and one (1) electronic copy (CD) with comments incorporated within **30 days** from the commencement date.

Reporting: The consultant will report to National Project Coordinator, Fadama III – Additional Financing but will work under the guidance and supervision of the L-PRES Project Desk Officer.

11.0 Payment Schedule

- Submission of Inception Report 10%
- Submission of Progress Report 30%
- Submission of Draft Report 35%
- Submission of Final and acceptable Report 25%

12.0 Qualification and Experience of the Consultant

Qualifying Criteria for the IPMP Consultant:

The ideal candidate should possess the following qualifications and experience:

- Masters or PhD in Environmental Management, Sciences or Social Science Extensive knowledge but not less than 10 years' development experience (7 years for Pest Control and Management) 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

13.0 Reference materials

- World Bank Operational Manual: Operational Policies OP 4.09 - Pest Management (December 1998)
- World Bank Operational Manual: Bank Procedures BP 4.01-Annex C - Application of EA to Projects Involving Pest Management (January 1999)
- World Bank Pest Management Guidebook (2002)
- World Bank Environmental Assessment Handbook - Chapter 8: Agriculture and rural development
- 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)

14.0 Reporting format

The consultant will prepare an IPMP that will be used by project implementers at the planning stage of the planned project activities.

ANNEX TWO

LIST OF BANNED PESTICIDES

- 1. Aldrin**
- 2. Chlordane**
- 3. DDT (Dichlochphenyl trichloroethane)**
- 4. Dieldrin**
- 5. Endrin**
- 6. Heptachlor**
- 7. Toxaphene**
- 8. Chlordimeform**
- 9. Mercury Compounds**
- 10. Lindane**
- 11. Parathion**
- 12. Methyl Parathion**
- 13. Methyl bromide**
- 14. Hexachlorobenzene**

ANNEX THREE: LIST OF LIVESTOCK AND CROP PROTECTION PRODUCTS APPROVED FOR USE BY NAFDAC

a) Insecticides

Organochlorines insecticides	Organophosphorus insecticides	Carbamates	Pyrethroids
1. Endosulfan 2. Helptachor 3. Lindane (Restricted to use on Cocoa only)	<u>Organophosphorus</u> <i>i</i> 1. Diazinon 2. Dichlorvos (DDVP) 3. Chlorpyrifos 4. Chlorpyrifos – Methyl 5. Dicrotophos 6. Dimethoate 7. Monocrotophos 8. Perimiphos – Ethyl 9. Perimiphos – Methyl 10. Ethion 11. Rugby (Cadusofas) 12. Malathion 13. Temeguard (Temephos) 14. Isazofos 15. Parathion – Methyl 16. Phosphamidon 17. Methidathion	1. Carbaryl 2. Carbofuran 3. Propoxur 4. Carbosulfan 5. Furathiocarb 6. Temik (Aldicarb)	1. Lambda – Cyhalothrin 2. Cypermethrin 3. Deltamethrin 4. Phenothrin 5. Permethrin 6. Tetramethrin 7. Cyfluthrin 8. Allethrin

b) Herbicides and fungicides

<u>Organophosphorus</u>	<u>Carbamates</u>	<u>Other herbicidas</u>	<u>Fungicides</u>
<u>Organophosphorus</u> 1. Anilofos 2. Piperophos 3. Glyphosate 4. Glyphosate Trimesium (Touchdown or Sulfosate) 5. Amideherbicides (Acetochlor; Alachlor; Propanil; Butachlor; Metalochlor) Triazines and Triazoles (Atrazine; Ametryn; Desmetryn; Terbutalazine; Terbutrex Terbutryne) Chlorophenoxyherbicides (Prometryn; Simazine; 2.4-D (2.4 Dichlorphenoxy acetiacid) 7. Urea and guadinidines ; (Diuron ; Linurex (=Linuron); Fluometurone; Chloroxuron; Neburon) Quaternary nitrogen compounds (paraquat; diquat)	1. Asulam	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	1. Benomyl (Nitroheterocyclic Compound) 2. Dazomet (Thiadiazine Fungicide) 3. Folpet (Phthalimide Fungicide) 4. Metalaxyl (Acylalamine Fungicide) 5. Cyproconazole (Alto – 100SL) 6. Bavistin (Carbon) – Benzimide 7. Triadmenol (Bayfidon GR Conzole Fungicide)

ANNEX 4A: EXTREMELY HAZARDOUS (CLASS 1A) PESTICIDE

Common name	CAS no	UN no
Aldicarb [ISO]	116-06-3	2757
Brodifacoum [ISO]	56073-10-0	3027
Bromadiolone [ISO]	28772-56-7	3027
Bromethalin [ISO]	63333-35-7	2588
Calcium cyanide [C]	592-01-8	1575
Captafol [ISO]	2425-06-1	
Chlorethoxyfos [ISO]	54593-83-8	3018
Chlormephos [ISO]	24934-91-6	3018
Chlorophacinone [ISO]	3691-35-8	2588
Difenacoum [ISO]	56073-07-5	3027
Difethialone [ISO]	104653-34-1	2588
Diphacinone [ISO]	82-66-6	2588
Disulfoton [ISO]	298-04-4	3018
EPN	2104-64-5	2783
Ethoprophos [ISO]	13194-48-4	3018
Flocoumafen	90035-08-8	3027
Hexachlorobenzene [ISO]	118-74-1	2729
Mercuric chloride [ISO]	7487-94-7	1624
Mevinphos [ISO]	26718-65-0	3018
Parathion [ISO]	56-38-2	3018
Parathion-methyl [ISO]	298-00-0	3018

Common name	CAS no	UN no
Phenylmercury acetate [ISO]	62-38-4	1674
Phorate [ISO]	298-02-2	3018
Phosphamidon	13171-21-6	3018
Sodium fluoroacetate [C]	62-74-8	2629
Sulfotep [ISO]	3689-24-5	1704
Tebupirimfos [ISO*]	96182-53-5	3018
Terbufos [ISO]	13071-79-9	3018

ANNEX 4B: HIGHLY HAZARDOUS (CLASS 1B)

Common name	CAS no	UN no
Acrolein [C]	107-02-8	1092
Allyl alcohol [C]	107-18-6	1098
Azinphos-ethyl [ISO]	2642-71-9	2783
Azinphos-methyl [ISO]	86-50-0	2783
Blasticidin-S	2079-00-7	2588
Butocarboxim [ISO]	34681-10-2	2992
Butoxycarboxim [ISO]	34681-23-7	2992
Cadusafos [ISO]	95465-99-9	3018
Calcium arsenate [C]	7778-44-1	1573
Carbofuran [ISO]	1563-66-2	2757
Chlorfenvinphos [ISO]	470-90-6	3018
3-Chloro-1,2-propanediol [C]	96-24-2	2689
Coumaphos [ISO]	56-72-4	2783
Coumatetralyl [ISO]	5836-29-3	3027
<i>Cyfluthrin [ISO]</i>	<i>68359-37-5</i>	
<i>Beta-cyfluthrin [ISO]</i>	<i>68359-37-5</i>	
Zeta-cypermethrin [ISO]	52315-07-8	3352
Demeton-S-methyl [ISO]	919-86-8	3018
Dichlorvos [ISO]	62-73-7	3018
Dicrotophos [ISO]	141-66-2	3018
Dinoterb [ISO]	1420-07-1	2779

Common name	CAS no	UN no
DNOC [ISO]	534-52-1	2779
Edifenphos [ISO]	17109-49-8	3018
Ethiofencarb [ISO]	29973-13-5	2992
Famphur	52-85-7	2783
Fenamiphos [ISO]	22224-92-6	2783
Flucythrinate [ISO]	70124-77-5	3352
Fluoroacetamide [C]	640-19-7	2588
Formetanate [ISO]	22259-30-9	2757
Furathiocarb	65907-30-4	2992
Heptenophos [ISO]	23560-59-0	3018
Isoxathion [ISO]	18854-04-8	3018
Lead arsenate [C]	7784-40-9	1617
Mecarbam [ISO]	2595-54-2	3018
Mercuric oxide [ISO]	21908-53-2	1641
Methamidophos [ISO]	10265-92-6	2783
Methidathion [ISO]	950-37-8	3018
Methiocarb [ISO]	2032-65-7	2757
Methomyl [ISO]	16752-77-5	2757
Monocrotophos [ISO]	6923-22-4	2783
Nicotine [ISO]	54-11-5	1654
Omethoate [ISO]	1113-02-6	3018
Oxamyl [ISO]	23135-22-0	2757
Oxydemeton-methyl [ISO]	301-12-2	3018
Paris green [C]	12002-03-8	1585
Pentachlorophenol [ISO]	87-86-5	3155

	CAS no
Propetamphos [ISO]	31218-83-4
Sodium arsenite [C]	7784-46-5
Sodium cyanide [C]	143-33-9
Strychnine [C]	57-24-9
Tefluthrin	79538-32-2
Thallium sulfate [C]	7446-18-6
Thiofanox [ISO]	39196-18-4
Thiometon [ISO]	640-15-3
Triazophos [ISO]	24017-47-8
Vamidothion [ISO]	2275-23-2
Warfarin [ISO]	81-81-2
Zinc phosphide [C]	1314-84-7

Common name	CAS no	UN no		CAS no	UN no		CAS no	UN no
Acephate [ISO]	30560-19-1		Butoxydim [ISO]	138164-12-2		Cypermethrin [ISO]	52315-07-8	3352
Acifluorfen [ISO]	50594-66-6		Butylamine [ISO]	13952-84-6	1992	Alpha-cypermethrin [ISO]	67375-30-8	3349
Alachlor [ISO]	15972-60-8	2588	Carbaryl [ISO]	63-25-2	2757	Cyphenothrin [(1R)-isomers] [ISO]	39515-40-7	3352
Alanycarb [ISO]	83130-01-2		Carbosulfan [ISO]	55285-14-8	2992	Cyproconazole	94361-06-5	
Allethrin [ISO]	584-79-2		Cartap [ISO]	15263-53-3		2,4-D [ISO]	94-75-7	3345
Ametryn [ISO]	834-12-8		Chloralose [C]	15879-93-3		Dazomet [ISO]	533-74-4	
Amitraz [ISO]	33089-61-1		Chlordane [ISO]	57-74-9	2996	2,4-DB	94-82-6	
Anilofos [ISO]	64249-01-0		Chlorfenapyr [ISO]	122453-73-0		DDT [ISO]	50-29-3	2761
Azaconazole	60207-31-0		Chlormequat (chloride) [ISO]	999-81-5		Deltamethrin [ISO]	52918-63-5	3349
Azamethiphos [ISO]	35575-96-3		Chloroacetic acid [C]	79-11-8	1751	Diazinon [ISO]	333-41-5	3018
Azocyclotin [ISO]	41083-11-8	2786	Chlorophonium chloride [ISO]	115-78-6	2588	Dicamba [ISO]	1918-00-9	
Bendiocarb [ISO]	22781-23-3	2757	Chlorpyrifos [ISO]	2921-88-2	2783	Dichlorobenzene [C]	106-46-7	
Benfuracarb [ISO]	82560-54-1	2992	Clomazone [ISO]	81777-89-1		Dichlorophen [ISO]	97-23-4	
Bensulide [ISO]	741-58-2	2902	Copper hydroxide [C]	20427-59-2		Dichlorprop [ISO]	7547-66-2	
Bensultap [ISO]	17606-31-4		Copper oxychloride [C]	1332-40-7		Diclofop [ISO]	40483-25-2	
Bentazone [ISO]	25057-89-0		Copper sulfate [C]	7758-98-7		Dicofol [ISO]	115-32-2	
Bifenthrin	82657-04-3	3349	4-CPA [ISO]	122-88-3		Difenoconazole [ISO]	119446-68-3	
Bilanafos [ISO]	71048-99-2		Cuprous oxide [C]	1317-39-1		Difenzoquat [ISO]	43222-48-6	2588
Bioallethrin [C]	584-79-2		Cyanazine [ISO]	21725-46-2		Dimepiperate [ISO]	61432-55-1	
Bromoxynil [ISO]	1689-84-5	2588	Cyanophos [ISO]	2636-26-2		Dimethachlor [ISO]	50563-36-5	
Bromuconazole	116255-48-2		Cyhalothrin [ISO]	68085-85-8	3352	Dimethipin [ISO]	55290-64-7	
Bronopol	52-51-7		Cyhexatin [ISO]	13121-70-5				
Butamifos [ISO]	36335-67-8		Cymoxanil [ISO]	57966-95-7				
Butralin [ISO]	33629-47-9							

	CAS no	UN no		CAS no	UN no		CAS no	UN no
<i>Dimethenamid [ISO]</i>	87674-68-8		Fentin hydroxide[(ISO)]	76-87-9	2786	Iminoctadine [ISO]	13516-27-3	
Dimethylarsinic acid [C]	75-60-5	1572	Fenvalerate [ISO]	51630-58-1	3352	<i>Indoxacarb [ISO]</i>	173584-44-6	
Dimethoate [ISO]	60-51-5	2783						
Diniconazole [ISO]	83657-24-3		Ferimzone [ISO]	89269-64-7		Ioxynil [ISO]	1689-83-4	2588
Dinobuton [ISO]	973-21-7	2779	Fipronil	120068-37-3	2588	Ioxynil octanoate [(ISO)]	3861-47-0	
Dinocap [ISO]	39300-45-3		Fluchloralin [ISO]	33245-39-5		Iprobenfos	26087-47-8	
Diphenamid [ISO]	957-51-7		Flufenacet [ISO]	142459-58-3		Isoprocarb [ISO]	2631-40-5	2757
Diquat [ISO]	2764-72-9	2781	Fluoroglycofen	77501-60-1		Isoprothiolane [ISO]	50512-35-1	
			Flurprimidol [ISO]	56425-91-3		Isoproturon [ISO]	34123-59-6	
Dithianon [ISO]	3347-22-6		Flusilazole	85509-19-9		Isouron [ISO]	55861-78-4	
Dodine [ISO]	2439-10-3		Flutriafol [ISO]	76674-21-0		Lambda-cyhalothrin	2164-08-1	3349
Endosulfan [ISO]	115-29-7	2761	Fluxofenim [ISO]	88485-37-4		MCPA [ISO]	94-74-6	
Endothal-sodium [(ISO)]	125-67-9	2588	Fomesafen [ISO]	72178-02-0		MCPA-thioethyl [ISO]	25319-90-8	
EPTC [ISO]	759-94-4		Fuberidazole [ISO]	3878-19-1		MCPB [ISO]	94-81-5	
Esfenvalerate [ISO]	66230-04-4	3349	Furalaxyl [ISO]	57646-30-7		Mecoprop [ISO]	7085-19-0	
Ethion [ISO]	563-12-2	3018	Gamma-HCH [ISO], Lindane	58-89-9	2761	Mecoprop-P [ISO]	16484-77-8	
Fenazaquin [ISO]	120928-09-8	2588	Glufosinate [ISO]	53369-07-6		Mefluidide [ISO]	53780-34-0	
Fenitrothion [ISO]	122-14-5		Guazatine	108173-90-6		Mepiquat [ISO]	15302-91-7	
Fenobucarb	3766-81-2		Haloxyfop	69806-34-4		Mercurous chloride [C]	10112-91-1	2025
Fenothiocarb [ISO]	62850-32-2		HCH [ISO]	608-73-1	2761	Metalaxyl [ISO]	57837-19-1	
Fenpropidin [ISO]	67306-00-7					Metaldehyde [ISO]	108-62-3	
Fenpropathrin [ISO]	64257-84-7	3349	Hexazinone [ISO]	51235-04-2		Metamitron [ISO]	41394-05-2	
<i>Fenpyroximate [ISO]</i>	134098-61-6		Hydramethylnon	67485-29-4		Metam-sodium [(ISO)]	137-42-8	2771
Fenthion [ISO]	55-38-9	3018	Imazalil [ISO]	35554-44-0	2588	Metconazole [ISO]	125116-23-6	
Fentin acetate[(ISO)]	900-95-8	2786	Imidacloprid [ISO]	138261-41-3		Methacrifos [ISO]	62610-77-9	

	CAS no	UN no
Spiroxamine [ISO]	118134-30-8	
Sulfuramid [ISO]	4151-50-2	
2,3,6-TBA [ISO]	50-31-7	
TCA [ISO] (acid)	76-03-9	1839
Tebuconazole [ISO]	107534-96-3	
Tebufenpyrad [ISO]	119168-77-3	
Tebuthiuron [ISO]	34014-18-1	
Terbumeton [ISO]	33693-04-8	
Tetraconazole [ISO]	112281-77-3	
Thiacloprid	111988-49-9	
Thiobencarb [ISO]	28249-77-6	
Thiocyclam [ISO]	31895-22-4	
Thiodicarb [ISO]	59669-26-0	2757
Thiram [ISO]	137-26-8	
Tralkoxydim [ISO]	87820-88-0	
Tralomethrin	66841-25-6	3349
Triadimefon [ISO]	43121-43-3	
Triadimenol [ISO]	55219-65-3	
Triazamate [ISO]	112143-82-5	2588
Trichlorfon [ISO]	52-68-6	
Triclopyr [ISO]	55335-06-3	
Tricyclazole [ISO]	41814-78-2	
Tridemorph [ISO]	81412-43-3	
Triflumizole	99387-89-0	

ANNEX FIVE: GOOD MANAGEMENT PRACTICES GUIDE AND PESTICIDES MANAGEMENT MEASURES

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.

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 be 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 vapors, 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 from 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.

ANNEX SIX: WHO PESTICIDES CLASSIFICATION

Pesticides product	Active ingredient	Chemical class	Toxicological class	Main use
BASUDIN	Diazinon	Organophosphate	11	Insecticide
HERBOXONE	2,4-D	Chlorophenoxy-acid	11	Herbicide
TOPIK	Clodinafop-Propargyl	Arylozyphenoxy propionics	111	Herbicide
AATREX	Atrazineq	Triazines	U	Herbicide
MACHETE	Butaclor	Chloroacetanilides	U	Herbicide
CERTAINTY	Sulfosulfurone	Sulfonylureas	U	Herbicide
ERADICANE	EPTC	Carbamides	11	Herbicide
LASSO	Alachlone	Chloroacetanilides	111	Herbicide
DECIS	Deltamethrin	Pyrethroides	11	Insecticide
ALTO	Cyproconazol	Triazoles	111	Fungicide
SENCOR	Metribuzin	Triazines	11	Herbicide
CONFIDOR	Imidacloprid	Neonicotinides	11	Insecticide
GRANDSTAR	Tribenulon-methyl	Sulfonylureas	U	Herbicide

ANNEX SEVEN: INTERNATIONAL CODE OF CONDUCT ON PESTICIDEMANAGEMENT

CODE OF CONDUCT – 2014
10.1 All pesticide containers should be clearly labelled in accordance with applicable guidelines, at least in line with the FAO guidelines on good labelling practice (3).
10.2 Industry should use labels that:
10.2.1 Comply with registration requirements and include recommendations consistent with those of the recognized research and advisory agencies in the country of sale;
10.2.2 Include appropriate symbols and pictograms whenever possible, in addition to written instructions, warnings and precautions in the appropriate language or languages (3);
10.2.3 Comply with national or international labelling requirements for dangerous goods in international trade and, if appropriate, clearly show the appropriate WHO hazard classification of the contents (3,35,36);
10.2.4 Include, in the appropriate language or languages, a warning against the reuse of containers and instructions for the safe disposal or decontamination of used containers;
10.2.5 Identify each lot or batch of the product in numbers or letters that can be understood without the need for additional code references;
10.2.6 Clearly show the release date (month and year) of the lot or batch and contain relevant information on the storage stability of the product (21).
10.3 Pesticide industry, in cooperation with government, should ensure that:
10.3.1 Packaging, storage and disposal of pesticides conform in principle to the relevant FAO, UNEP, WHO guidelines or regulations (27,28, 37, 39, 40) or to other international guidelines where applicable;
10.3.2 Packaging or repackaging is carried out only on licensed premises where the responsible authority is satisfied that staff are adequately protected against toxic hazards, that the resulting product will be properly packaged and labelled, and that the content will conform to the relevant quality standards.
10.4 Governments should take the necessary regulatory measures to prohibit the repackaging or decanting of any pesticide into food or beverage containers and rigidly enforce punitive measures that effectively deter such practices.

10.5 Governments, with the help of pesticide industry and with multilateral cooperation, should inventory obsolete or unusable stocks of pesticides and used containers, establish and implement an action plan for their disposal, or remediation in the case of contaminated sites (41), and record these activities

10.6 Pesticide industry should be encouraged, with multilateral cooperation, to assist in disposing of any banned or obsolete pesticides and of used containers, in an environmentally sound manner, including reuse with minimal risk where approved and appropriate.

10.7 Governments, pesticide industry, international organizations, and the agricultural community should implement policies and practices to prevent the accumulation of obsolete pesticides and used containers (37).

ANNEX EIGHT:

MINUTES OF CONSULTATION MEETINGS

Meeting venue	Conference Room, Ministry of Livestock and Veterinary Services, Adamawa State.
Meeting Date	01 August 2018.
Language of Communication	English and Hausa
Agenda	To obtain information about the pest issues, pest management practices, and pesticides usage in the project area.
Groups Consulted	<ol style="list-style-type: none"> 1. Ministry of Lands and Survey 2. Ministry of Environment 3. Ministry of Livestock and Veterinary Services 4. Association of Dairy Cattle Producers 5. Dairy Breeders Cooperative Society 6. Association of Beef Producers 7. Adambila Farms Executives 8. Hides and Skin Production Association 9. Women Livestock Production Association
Introduction	The meeting commenced at 9:56am with an opening. An introduction of the stakeholders present was made by the Director. Furthermore, the Director gave an overview of Agriculture and livestock production in Adamawa state stating that Agriculture is the main contribution to the state's GDP with about 37.1% being the highest and coming from Livestock production while 16.6% comes from crop production.
Purpose of the consultations	<p>The Government of Nigeria has requested the assistance of World Bank for the preparation of Livestock Productivity and Resilience Support. The Project Development Objectives (PDO) is to improve productivity, resilience, and commercialization of producers and processors in selected livestock value chains and to strengthen institutional capacity in service delivery.</p> <p>The PMP consultant gave an overview of the World Bank Safeguards stating that the L-PRES will involve the supply and use of pesticides. The effect of this decision was a trigger in the World Bank's OP4.09 Projects which required that 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 must introduce new pest management practices. If there are existing pest management practices, they must be expanded or altered to address environmental and health risks. This new requirement has necessitated the development of a Pest Management Plan (PMP). The Pest Management Plan (PMP) to be prepared will represent a</p>

	<p>framework for screening, monitoring, and mitigating potential impacts, with a process for triggering subsequent sub-projects. The PMP shall complement the Environmental and Social Management Framework (ESMF) and other safeguards instruments of the project.</p> <p>The PMP report will be disclosed in a country's two National newspapers, at designated centers for 21 days, and also at the World Bank Infoshop. The purpose of doing these is to give stakeholders the opportunity to access the report and add their inputs for the enhancement of the project's overall value.</p> <p>Having stated these, the consultant sought the opinion of the stakeholders on their perceptions of the project. Mandates or authority to carry out the project as well as their roles and responsibilities in the project were also delineated.</p>
Perception and Remarks	<p>The stakeholders expressed their appreciation to World Bank and the Adamawa State government for the project. They stated that the project will help scale up value chains and encourage those in the livestock sub sector to put in more resources that will create more economic gain and employment. Each stakeholder group described their mandates as well as challenges faced by their institutions and promised to synergize with each other to support the PDO.</p>
Areas of Discussion	<p>The consultant inquired for information and inputs of the stakeholders on several issues including the following:</p> <ul style="list-style-type: none"> • What are the livestock value chains within the state? • What are the Pests/diseases that have been recorded for each of the livestock value chain within the state? • What are the methods used to manage each of these pests? • If chemicals are used, list the chemicals mainly used. • How effective has each of the methods been? • Has there been any recorded adverse reaction resulting from the use of these chemicals? • How and where do you source for pesticides? • Which institutions/units handle pesticide management and distribution in the state? • What is the screening procedure for these pesticides and pest control products? • Are there cultural, social and environmental limitations to any pesticide use?
	<p>The stakeholders made inputs and shared their concerns. They stated that their primary livestock products are beef, dairy, sheep and goat. Poultry is considered secondary as well as piggery which is mainly produced in the Southern part of Adamawa state.</p> <p>GENERAL</p>

Beef Breeders: They stated that the women participate mainly in Beef Fattening and Finishing but in isolated small quantities.

Challenges faced by the beef producers include market for finished products, processing equipment, inputs such as feed/feed mills as well as preservation. Others include good and healthy breeds of cattle, and incessant illegal levies and stoppages along the road during transportation.

Dairy Breeders: They have an existing association that have about 20 members and have plots of land allocated for breeding.

Major challenges faced by the breeders include market and storage for finished products as well as feed for the cow. The women participate mainly in the milking process however, some women breeders also exist. They stated that most of the dairy products within the state are generated by the women as most of them participate in small scale dairy processing wide spread over the state.

Hides and Skin Marketers: They stated that in the past the business of Hides and Skin was lucrative until most of the Tanneries went out of business due to the high consumption of Hides by local consumers as special delicacy called *kpomo* however, Skin is still sold to tanneries. Also, there has not been any intervention by the government to maintain the tanneries. These have been the major challenges. There is need for the government to setup small scale tanneries for vegetable tannery system as well as re-orientation for consumers to aid in reviving the industry.

Sheep and Goat: The association has about 300 members which also include women. Some government interventions through development organizations such as AfDB, Victims Support Funds as well as other NGOs have been assisting production in the state. However, some challenges still exist which include supply of ill/diseased livestock by those engaged to procure these livestock, capacity building, vaccines/medication as well as finance. Also, in some cases people come together as beneficiaries once they hear of such interventions just to collect the funds/proceeds after which they abandon the project.

PEST MANAGEMENT

The pests that infest livestock within the project area are mainly insect pests which include Ticks, Flies, Mites, lice and fleas.

Common diseases include Mange, *Contagious Bovine Pleuropneumonia* (CBPP), Foot and Mouth Disease, *Trypanosomiasis*, *Peste des petie Ruminantes* (PPR) Worm infestation etc.

Methods used in control of these pests is by use of chemicals (Pesticides) and Medications (oral and Injectables). However other methods exist which include;

1. Hand picking of Ticks,
2. Burning of wood/dry dung to chase pests
3. Controlled grazing (mainly in the afternoon so that the heat from the sun will chase the pests away).

These other methods were said to be effective but tedious as it takes longer time to eradicate the pests.

Some adverse reactions such as damage to skin, respiratory distress, and even death have been recorded over the years because of use of these chemicals. This is mainly attributed to wrongful administration with regards to dosage and process.

Pesticides can be procured freely from Agrochemical stores and there is no limitation to access of these chemicals. There is no designated institution in the state for pesticides management and distribution, however, NAFDAC and SON are charged with the duty of ensuring that only approved and standardized chemicals are found within the country for use by livestock farmers. In some occasions Ministry of Agriculture, Ministry of Livestock and Veterinary Services as well as other ADPs through some interventions distribute some of these chemical products to livestock farmers.

Screening of Pesticides and Pest control chemicals are carried out by NAFDAC basically. There are no known cultural, social or environmental limitations known within the state against the use of pesticides. The only known limitation is finance to purchase these products as well as capacity building for the pesticide applicators on the safe use and application of pesticides.

ENVIRONMENTAL MANAGEMENT

Waste management has been an issue within the state as there is no form of segregation between household wastes, healthcare waste as well as veterinary wastes. They are all lumped together.

The Ministry has enough staff however, they lack dumping sites for wastes and also equipment to convey the wastes to the sites

Major concerns that may result from the L-PRES would be increased veterinary waste in the state. This includes mainly ruminant content, blood, bone and carcasses. Though some of these (bone and blood) can be used as feed composition ingredients while the ruminant content can serve as manure, there is a need to properly store these wastes at source of generation.

Other envisaged impacts would be land degradation around the cattle market as there would be increased movement of trucks and trampling by cattle. It will also

	be important that incinerators are provided especially in the abattoirs to help dispose carcasses.
Perceived Project Impacts	<p>Positive impacts expected from the intervention: Creation of employment, increase in income generation, availability of drugs/vaccines for control of disease at a subsidized rate, sensitization and capacity building on proper livestock/waste management, equipping of veterinary labs for efficient research, diagnosis and access to quality veterinary services.</p> <p>Negative Impact: Increase in livestock pests within the project area, increase in livestock waste generated within the project area, possible land acquisition and conflicts resulting from such acquisition.</p>
Concerns and How They Were Addressed	The consultant responded to questions raised and assured the stakeholders that their requests have been properly documented and will form the basis for the PMP report for consideration in the project design and implementation.
Conclusion	All relevant issues were exhausted, documents were collected, and the meeting ended with a closing remark and closing prayer by a member of the stakeholder.

SUMMARY OF CONSULTATION IN IBADAN

Meeting venue	Office of Director Livestock, Ministry of Agriculture, Natural Resources and Rural Development
Meeting Date	26 th July, 2018
Language of Communication	English
Agenda	Articulate pest issues, pest management practices and pesticides usage in the project location
Participants	Director Livestock, Deputy Directors, Assistant Directors, Technical and Admin officers of the Department
Introduction	The meeting commenced at 10.00am. The Director of Livestock introduced the consultant and her team who have been engaged by the Federal Ministry of Agriculture and Rural Development to prepare a safeguard report for the Livestock Productivity and Resilience Support. The safeguard consultants further addressed the stakeholders briefly on the overview of the project.

Purpose of the consultations	<p>LPRES triggered the World Bank’s O 4.09 Pest Management due to the envisaged supply and usage of pesticides:</p> <p>Pest Management - as a result, an Integrated Pest Management Plan will be prepared as a guide to ensure that all available pest control techniques and subsequent appropriate measures that discourage the development of pest population and keep pesticides and other interventions to levels that are economically justified and reduce or minimize risk to human health and environment.</p> <p>Further to the project development objectives as stated, the consultants probed for the stakeholders’ opinions and perceptions towards the project as well as their mandates and roles in the project.</p>
Perception and Remarks	<p>The project is a welcome and much needed development. The Department will ensure that all the information required will be provided to the Consultants.</p>
Areas of Discussion	<p>The consultant inquired for information and inputs of the stakeholders on a number of issues including the following:</p> <ul style="list-style-type: none"> • State Agriculture and livestock policies • Institutional arrangement for the management of the livestock subsector • Mandate of the Department • Extensive stakeholder list for LPRES • Value chains of comparative advantage • Economic contribution of the livestock subsector <p>The main constraints for the department/ Ministry</p>
Concerns expressed by stakeholders	<p>The need for modern equipment and new research/ innovation to help the sector. Training on modern research and techniques is also required. Funding for maintenance of facilities, drugs, vaccines is also an issue.</p>
Perceived Project Impacts	<p>Positive impacts expected from the intervention: Employment, Increase in per capita income and economic growth, increase in production output and control of pest outbreak</p>
How Concerns were addressed	<p>The consultant addressed the concern expressed by the stakeholders and assured them that their requests have been noted, and will be properly documented in the safeguard reports for consideration during project decision formulations.</p>
Meeting venue	<p>Ministry of Agriculture, Natural Resources and Rural Development</p>
Meeting Date	<p>26th July, 2018.</p>
Language of Communication	<p>English and Yoruba</p>

Groups Consulted	Ministry of Agriculture, (Department of Livestock and Veterinary Services), PRS, Farmers Associations (Piggery, Cattle, Poultry, Turkey, Sheep, Goat, Hides, and Skin), Women Farmers group NGO- Patriotic Youth Initiative for Poverty Eradication
Introduction	The meeting commenced at 11.00am. The Director of Livestock introduced the safeguards consultants who have been engaged by the Federal Ministry of Agriculture and Rural Development to prepare safeguard reports for the Livestock Productivity and Resilience Support.
Purpose of the consultations	To engage in interactive discussions with the various stakeholders and obtain information relevant for the safeguard reports
Perception and Remarks	The stakeholders had a good perception of the project. However, they pleaded that the project should commence soon without delays and that it should not be hijacked by the elite
Areas of Discussion	<p>The consultant inquired for information and inputs of the stakeholders on a number of issues including the following:</p> <ul style="list-style-type: none"> • Incidence of pest outbreak in the state • How pest outbreak has been managed over the years. Practices and technologies adopted so far. • The major pesticides used in the state and their screening procedures • Organizations responsible for the distribution of pesticides • Cultural, social, environmental limitations to any pesticide usage and negative impacts recorded with a particular pesticide used • Process within the state for reporting a disease outbreak; and from the State to the Federal Ministry of Agriculture and Rural Development (FMARD) and any previous intervention on pest management • The limitations in providing efficient and sustainable pest management services and Emergency Response and Contingency Plan for pest/ disease control in the State • Knowledge of IPM and the use of PPEs when applying pesticides • Waste management method <p>Activities of veterinary clinics/ Animal health officers in livestock sector</p>
Concerns expressed by stakeholders	<p>The stakeholders made inputs and shared their concerns. Some of the concerns discussed are as follow:</p> <ul style="list-style-type: none"> • Insufficient supply of vaccines, drugs or pesticides by Government • Limited research into local vaccines/ drugs majorly at NVRI • The potency of foreign vaccines drops during the cold chain process, which leads to vaccines failure

	<ul style="list-style-type: none"> Fencing of Livestock farm yards and grazing fields <p>Proper management of Livestock waste streams</p>
Perceived Project Impacts	<p>Positive impacts expected from the intervention:</p> <p>Employment, Increase in per capita income and economic growth, increase in production output and control of pest outbreak</p>
How Concerns were addressed	<p>The consultant addressed the concern expressed by the stakeholders and assured them that their requests have been noted, and will be properly documented in the safeguard reports for consideration during project decision formulations.</p>
Conclusion	<p>The meeting ended with a closing remark by the Director of Livestock, Ministry of Agric. and relevant documents were collected.</p>
Meeting venue	Office of the Deputy Director, Ministry of Lands and Survey, Ibadan
Meeting Date	26 th July, 2018.
Language of Communication	English
Participants	Deputy Director and Officers of the Ministry of Lands and Survey
Introduction	<p>The meeting commenced at 2.00pm. The Director of Livestock (Min. of Agric.) introduced the safeguard consultants. Thereafter the consultants explained the relevance of the Ministry of Lands & Survey to the safeguard mission</p>
Purpose of the consultations	<p>LPRES triggered Environmental Assessment and Involuntary Resettlement, because it may have some negative social impacts involving land acquisition and displacement of persons physically and/ or economically. Though land take is not anticipated to be large scale, Resettlement Policy Framework (RPF) is being prepared at this time to describe the procedures, policies that will be followed in preparing Resettlement Action Plan (RAP) which might be necessary when exact project locations requiring land acquisition or displacement of people would have been determined. The RPF outlines the laws of Nigeria and policies of the World Bank that will be followed to prepare RAPs and also gives indication pertaining to the categories of Project affected Persons (PAPs) and their entitlements.</p> <p>The consultation was necessary to ascertain land acquisition, valuation and compensation process in the State.</p>
Perception and Remarks	<p>The Deputy Director expressed his appreciation to the FMARD and world bank for the project. According to him, the Ministry is accustomed to the World Bank procedures as they have been integral in the IUFMP. Thus he pledged the support of the Ministry to the success of the LPRES.</p>


Areas of Discussion	<ul style="list-style-type: none"> • The land ownership/ tenure system in the state, process of land acquisition for small/commercial land holding, • The right of women to land ownership and challenges to land acquisition • The availability and structure of conflict resolution mechanism at various level (cluster, community and state) and GRM efficiency • If the state have gazette for payment of compensation for economic trees and crops; how land unit is measured, cost of acquiring a unit of land for lease and for outright purchase • The vulnerable groups that may be worse affected by the activities of the project; • The envisaged positive and negative impact of the project. • The capacity of the stakeholders to support environmental and social safeguards. <p>Their experiences in implementing World Bank/donor agencies support project.</p>
Concerns expressed by stakeholder	<p>The need to see that acquisition of land is properly done through the right authority in compliance with the Land use Act</p> <p>Ensure that sensitization is organized prior to compensation so as to avoid grievance that may arise as a result of improper valuation on economic trees and crops</p>
Perceived Project Impacts	<p>Positive impacts expected from the intervention: Enabling environment for livestock production.</p>
How Concerns were addressed	<p>The consultant assured the stakeholders that aforementioned concerns have been properly documented and will be mainstreamed into the ESMF and RPF report for consideration in project decision formulations.</p>
Conclusion	<p>All relevant issues were exhausted, documents were collected and the meeting ended with a closing remark by the Director Livestock</p>
Meeting venue	<p>Office of the Permanent Secretary’s Ministry of Environment and Mineral Resources, Oyo State.</p>
Meeting Date	<p>27th July, 2018.</p>
Language of Communication	<p>English</p>
Participants	<p>Permanent Secretary, Directors, Technical Officers</p>
Introduction	<p>The meeting commenced at 1.00pm. The Director of Livestock introduced the consultants who have been engaged by the Federal Ministry of Agriculture and Rural Development to prepare a safeguard report for the Livestock Productivity</p>

	and Resilience Support. The consultants further addressed the stakeholders briefly on the overview of the project.
Purpose of the consultations	<p>LPRES triggered Environmental Assessment, and as a result, Environmental and Social Management Framework will be prepared as a guide to ensure that the adverse environmental and social impacts that will emanate as a result of civil works carried out during the project implementation are avoided or appropriately mitigated. This ESMF outlines the laws of Nigeria and policies of the World Bank that will be followed to prepare Environmental Impact Assessment (EIA) which will be used to evaluate and examine the likely environmental impacts of the proposed project taking into account inter-related socio-economic, cultural and human health impacts, both beneficial and adverse. Further to the stated project development objectives, the consultant sought the opinion of the stakeholders on their perceptions to the project and their mandates and roles in the project.</p> <p>In addition, LPRES triggered Pest Management which necessitates the preparation of an Integrated Pest Management Plan. It was thus necessary to ascertain the environmental burden from pests and Veterinary waste management on the environment.</p>
Perception and Remarks	The permanent Secretary, Mr. Oguntola Gabriel welcomed the new development by the government of the state and world bank which will reform the operations of livestock production in the state. He further prayed that the project haven recognized the need for environmental assessment will also help to tackle challenges faced by the institution on this regard. He described their mandates and promised to support the project development objectives
Areas of Discussion	<ul style="list-style-type: none"> • If there are legislations/ policies regulating Environmental Assessment, procedures and framework based on Federal EIA act 1992. • The capacity of the personnel for environmental safeguard, the relationship between the state and federal level in livestock productivity • The link between the private firm in compliance with the state regulatory agency in pursuing environmental standard • the environmental risk associated with different livestock value chain and how this risks are mitigated • The type of negative impact that arise from the environmental risk identified and how impacts were addressed • The influence of climate and geography on livestock activities, major environmental/pest challenges associated with livestock activities <p>The major waste streams of different value chain in the state.</p>

<p>Concerns expressed by stakeholders</p>	<p>While the project is envisaged to have an overall positive benefit, some areas of concern were stated as follows:</p> <ul style="list-style-type: none"> • Overgrazing may become an issue • Livestock rearing in residential areas • Increase in waste management burden • Piggery is forbidden in residential areas • Possibility of farmers/ herders clash • Air pollution may increase • Urbanization is encroaching on farm areas • Runoff from fish ponds <p>They also requested for:</p> <ul style="list-style-type: none"> • Training on modern technologies and research • Provision of modern equipment • Refurbish livestock facilities <p>Assistance to the Ministry in integrated solid waste management technique of turning livestock waste into biogas</p>
<p>Perceived Project Impacts</p>	<p>Positive impacts expected from the intervention: Employment, Economic growth, Industrialization, Provision of processing/waste recycling facilities, and Agric sector growth.</p>
<p>How Concerns were addressed</p>	<p>The consultant responded to the stakeholders concerns and assured them that their requests have been properly documented, and will be mainstreamed in the ESMF/IPMP/VWMP reports for consideration in project decision formulations.</p>
<p>Conclusion</p>	<p>All relevant issues were exhausted, documents were collected, closing remarks were made and the meeting ended with a closing prayer by one of the stakeholders.</p>


ANNEX NINE:

ATTENDANCE SHEETS FROM CONSULTATIONS


PREPARATION OF SAFEGUARD INSTRUMENTS FOR THE LIVESTOCK PRODUCTIVITY AND RESILIENCE SUPPORT (LPRES) PROJECT
STAKEHOLDERS CONSULTATION MEETING, OYO STATE
ATTENDANCE SHEET

DATE: 27/7/18 VENUE: Permanent Secretary's office, Ministry of Environment and Water Resources.

NAME	ORGANISATION	DESIGNATION	EMAIL	PHONE	SIGNATURE
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Dr. Kareem AA	Vet. Hospital	Principal	greeniceread@gmail.com	5323378	[Signature]
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PREPARATION OF SAFEGUARD INSTRUMENTS FOR THE LIVESTOCK PRODUCTIVITY AND RESILIENCE SUPPORT (LPRES) PROJECT
STAKEHOLDERS CONSULTATION MEETING, OYO STATE
ATTENDANCE SHEET

DATE: 26/7/18 VENUE: Director's office, Dept of Livestock Services & Animal Husbandry, Ministry of Agric, Ibadan

NAME	ORGANISATION	DESIGNATION	EMAIL	PHONE	SIGNATURE
1. Odedele S. O	Dept of Livestock	Director	odedeles1@gmail.com	08188495564	[Signature]
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13. Ilori F. I.	Dept. of Crop & Farm Settlement	Agric Officer	ilori_f_i@yahoo.com	08059795546	[Signature]
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Federal Ministry of Agriculture
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PREPARATION OF SAFEGUARD INSTRUMENTS FOR THE LIVESTOCK PRODUCTIVITY AND
RESILIENCE SUPPORT (LPRES) PROJECT

STAKEHOLDERS CONSULTATION MEETING, ~~000~~ STATE ADAMAWA

ATTENDANCE SHEET

DATE: 02/05/2018 VENUE: MINISTRY OF LIVESTOCK, TOLA

NAME	ORGANISATION	DESIGNATION	EMAIL	PHONE	SIGNATURE
Abdullahi Umar	SHEED AND CATTLE	Jimata Tola		08039284072	[Signature]
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Federal Ministry of Agriculture
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PREPARATION OF SAFEGUARD INSTRUMENTS FOR THE LIVESTOCK PRODUCTIVITY AND
RESILIENCE SUPPORT (LPRES) PROJECT

STAKEHOLDERS CONSULTATION MEETING, ~~000~~ STATE ADAMAWA

ATTENDANCE SHEET

DATE: 02/05/2018 VENUE: VETERINARY CENTRE, TOLA NORTH

NAME	ORGANISATION	DESIGNATION	EMAIL	PHONE	SIGNATURE
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Federal Ministry of Agriculture
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PREPARATION OF SAFEGUARD INSTRUMENTS FOR THE LIVESTOCK PRODUCTIVITY AND
RESILIENCE SUPPORT (LPRES) PROJECT

STAKEHOLDERS CONSULTATION MEETING, ~~ONE~~ STATE ADAMAWA

ATTENDANCE SHEET

DATE: 02/08/2018 VENUE: MINISTRY OF LIVESTOCK, TOLA

	NAME	ORGANISATION	DESIGNATION	EMAIL	PHONE	SIGNATURE
1.	DR ABDURRAHMAN TUKUR	Min. for Liv. Product	Asst. Dir. Gen.	amtamin@yahoo.co	08033764865	<i>[Signature]</i>
2.	Dr Abubakar Umar Aine	Tahtal Palaatalaf	Secretary Gen	babba0962@gmail.com	08033772616	<i>[Signature]</i>
3.	Usman Liman Demba	Mulaku Jobi Jam	State Secraty	C.0801976211	08036124116	<i>[Signature]</i>
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5.	Regina Sa'sostine	Adama women	member		0813357577	<i>[Signature]</i>
6.	Lyatu V. Kwaga	Agape Women FA	Member		0810910966	<i>[Signature]</i>
7.	Asabe Sanyia	Agape Women Farmers	Member		08135314290	<i>[Signature]</i>
8.	Rebecca TITIS	Amachi Women Farm	Member		08165156496	<i>[Signature]</i>
9.	Hellen Patrick	Amachi woman farmer	Member		08132063121	<i>[Signature]</i>
10.	Halima Yaro	Nikafa Women farmer	secretary		08268346267	<i>[Signature]</i>
11.	Halima John	Nikafa Women Farmer	member		0806500482	<i>[Signature]</i>
12.	Abubakar Suleiman Tahir	Min. for Livestock Prod	Dep. Dir. Gen.	abubakar.suleiman@minilivestock.gov.ng	08039671973	<i>[Signature]</i>
13.	Dr Andrew Surkwa	Min. for Livestock	D. P. S	andrewsurkwa@gmail.com	0804378266	<i>[Signature]</i>
14.	Mustapha Kerz Bulbar	WBA PLC	BRANCH MANAGER	Mustapha.kerz@wba.gov.ng	08036511307	<i>[Signature]</i>
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16.	Glandys Saji	Min. for Livestock prod	Dep. Dir. Gen.	glandys.saji@minilivestock.gov.ng	08037016977	<i>[Signature]</i>
17.	Dr Emmanuel Chinda Mbegu	Min. for Livestock Prod	AD/Dir. Gen.	Chinda855@gmail.com	0803616171	<i>[Signature]</i>

ANNEX TEN: PICTURES OF CONSULTATIONS



Plate 1: Consultation with Livestock Value Chain Farmers in Oyo State



Plate 2: Onsite Storage of Pesticides Spraying Can, Oyo State



Plate 3: Consultation with Ministry of Environment, Oyo State



Plate 4: Consultation with Ministry of Agriculture and Forestry, Kaduna



Plate 5: Consultation with Women Farmers Group in Kaduna



Plate 6: Consultation with Addambilla Farms in Adamawa



Plate 7: Open dumping of on-site dead animals at an Abattoir

Annex 10: Stakeholder Consultation Records (2021)

Date	2 nd December, 2021
Time	4: 30pm – 6:28pm
Venue	Virtual (Zoom)
Attendance	72 (with records of 67 participants)
Stakeholders in Attendance	LPRES Government Preparation Team, 17 State Teams, NGOs and Livestock Breeder Associations, LPRES E & S Consultants, FMEnv
Language	English

Objectives of the meeting: The objectives of the meeting are as follows;

1. To discuss revisions made to the LPRES project and changes made to the safeguard instruments
2. To obtain feedback and input of stakeholders on the instruments

Overview of Discussions: Sequel to the revision of the safeguard instruments prepared for the LPRES project in 2018 and disclosed in-country, some project components and the geographical coverage of the project had undergone some changes.

Following guidance provided by the Bank E&S specialists, the ESMF has been revised in some aspects. Main revisions to the instruments affect the following issues;

1. Occupational Health & Safety
2. Gender-Based Violence
3. Labour Influx
4. Fragility and Ongoing Conflict

The review led to a strengthening of the ESMF by;

1. Improving the analytical work done in the environmental and social baseline around the identified issues
2. Improving the legal framework review
3. Enhancing the mitigation with more action particularly those related to Gender-Based Violence

Feedback from stakeholders

In response to the presentation on the revisions made to the safeguard instruments, participants at the meeting provided feedback which are captured in the discussion log shown in the table below;

Issue/Concern Raised	Issue Raised by	Action Required/Response Provided
Environmental and Social Issues		
Regular conflict between herders and farmers can be reduced if state governments subscribe to agricultural insurance products being designed under the Nigeria Agric Insurance Scheme (NAIS). Does LPRES have plans to facilitate the use of such insurance products to protect farmers and herders who lose crops and their herds because of these conflicts? This will help in managing the potential for conflict which has been	Azubuike Nwokoye (ActionAid, Nigeria)	This is an emerging area that the government preparation team will consider in going forward.

identified as part of the Environmental and Social Assessment		
How would the GBV mitigation component be implemented? It is important that a comprehensive package of GBV mitigation actions including mapping of services and provision of multi-sectoral survivor-centered services should be made available.	Dr. Princess (New Initiative for Social Development)	This has already been included into the ESMF.
LPRES was not prepared under the World Bank Environmental & Social Framework which has more robust provisions on Labour and Working Conditions under ESS2. However, it would have been nice to include Labour Management Procedures into the ESMF.	Mrs. Odetoro (FMEnv)	The ESMF addresses Labour Influx being a relevant social concern of LPRES due to the sensitivity of likely project sites to an incoming population of project workers
Will there be provision for a landscaping program for planting edible grass along highways at state and national level as seen in the Netherlands as a way of also controlling erosion?	Chukwuemeka Ogbuagu	Noted. This would be a suitable mitigation measure for remediating land cleared for construction purposes during the decommissioning phase project activities involving construction work under component 2 and 3.
How would issues of involuntary resettlement and restriction of access and use rights be addressed under LPRES?	Mrs Lai-Solarin (FMARD)	The Resettlement Policy Framework is the instrument which is prepared to address risks related to resettlement and restrictions on land use.
Other issues related to other project areas		
L-PRES should work on educating cattle breeders on the adoption of the use of high yielding breeds of cattle for better productivity	Emmanuel Naandokol (Jos)	Noted
Needed information on the timeline of the project	Emmanuel Kwapdimma	The project is still in the pipeline and is being prepared for approval by the World Bank board. Post-approval, there are still a few processes to be undertaken before the project becomes effective
Needs information as to when the project is commencing, highlighting the need to move from deliberation and consultations to implementation.	Madu Samuel	
Why is the project not focused on ranching? Ranching is a practice that would help to resolve most of the problems related to clashes between herders and farmers	Azubuike Nwokoye (ActionAid, Nigeria)	LPRES is not solely about ranching. The project will support different technologies and practices that could potentially improve the yield and productivity of livestock in different parts of the country.
Does L-PRES cover all livestock or is it cattle-specific?	Paul-Richards Obiora (Pig Farmers Association of Nigeria)	The scope of the project covers all other value chains. The reason why cattle appear to get more attention is because of the volatile nature of cattle rearing in the country.

Attendance

SN	Participants Name	Organization
1	Winnie Lai-Solarin	FMARD
2	Dr. Princess Olufemi-Kayode	New Initiative for Social Development (NISD)

3	Oluwatosin Oso	Consultant, WBG
4	Hamza Sajim	ARDS, SPDO FCT
5	Ezeudegbunam Eucharia	Procurement Unit, LPRES Preparation Team, FMARD
6	Osegbue Anthony Ikechukwu	LPRES HQ
7	Ibitayo Femi James	Animal Husbandry Unit, L-PRES FG Preparation Team
8	Peter Alike	Animal Husbandry Unit, LPRES Preparation Team
9	Adamu Dakogi	Head, Animal Herds Unit
10	Samuel Alabi	Head, M&E Unit, L-PRES FG Preparation Team
11	Kunle Adeoye	Procurement Unit, L-PRES Preparation Team
12	Sawiyu Jimoh	Accounts Unit, LPRES FG Preparation Team
13	Ekene Adokwe	Anambra State
14	Wihioka Stella Nnene	Animal Husbandry Officer, Rivers State FMARD
15	Dr. Junaid	L-PRES Kano State
16	Shehu Ahmed Shehu	SPDO Katsina
17	Mohammed Awwal Abdullahi	Extension Officer Borno State L-PRES
18	Balarabe Karaye	Perm Sec, Kano State MARD
19	Emmanuel Naandokol	Animal Husbandry Officer, Plateau State
20	Busayo Obisesan	WBG
21	Dr. Mustapha Koguna	Animal Health Officer, LPRES Kaduna State
22	Babatobi Olatunde Damola	Senior Livestock Developmet Officer, FMARD, Ekiti State
23	Paul-Richards Obiora	Coordinator, Pig Farmers Asociation, Anambra State
24	Nwankwo Kingsley Chinedu	Health Officer, L-PRES, Anambra State
25	Chukwuemeka Ogbuagu	Extension Officer, Anambra State
26	Dr. Kujumah Wasa	Perm Sec, Niger State Min. of Livestock and Fisheries
27	Dr. Solomon	Vet. Officer, Anambra State
28	Shehu Samaila	Livestock Developmet Officer, Katsina State
29	Zainab Ahmed	M&E, L-PRES, Katsina State
30	Nura Ahmed	M&E, Niger State
31	Makinta Alhaji Ali	PDO, Borno State
32	Hananiah G. Albert	Deputy Director, Livestock, L-PRES SPDO Taraba State
33	Mansur Hamidu	ICT Officer, Niger State
34	Adewale Michael Sunday	Senior Animal Husbandry Officer, Osun State
35	Ajani Lukmon Adekunle	Senior Animal Husbandry Officer, Lagos State
36	Azubike Nwokoye	Food and Agriculture Programme Coordinator, ActionAid Nigeria
37	Adegbulu Foluke Helen	Ondo State
38	Olusegun Alajo	Ondo State
39	Ikpikhumi Betsy	L-PRES, Aimal Husbadry Officer, FMARD. Edo State
40	Amaranjo Eugene	Imo State
41	Iwuoha Agnes	Chief Animal Health Officer, Imo State
42	Adeogun Olufemi	L-PRES Ondo State
43	Tukur Abdullahi	Extension officer, Katsina State
44	Jiya D. Mohammed	SPDO Niger State
45	Mr Aniefiok F. Isong	Director, Animal Husbandry, Akwa Ibom state
46	Ebri Ekpenyong	Nasarawa State FMARD
47	Mrs. Odetoro	FMEnv
48	Prof. Daniel Ezeokoli	President, Anambra State Pig Association
49	Sokari Christian Dearson	FMARD Rivers State DAHS
50	Nnamdi Aforka	Animal Health Unit, FMARD-LPRES FG Preparation Team
51	Engr. Steve Tsado	New Initiative for Social Development (NISD)
52	Mrs. Ono	FMEnv
53	Sani Alexander	National Project Accountant. L-PRES FGPT
54	Madu Samuel	Livestock farming, Anambra State

55	Abubakar Anka Bello	Animal Husbandry Officer (FMARD) Zamfara State
56	Umoh Uwem Sunday	Chief Animal Husbandry Officer, FMARD Kaduna
57	Louis-Marie Anokwu	Operations Unit L-PRES
58	Hassan Adamu Hassan	Livestock officer, Borno State
59	Babaginda Shehu	Communication Unit L-PRES FGPT
60	Isiadinso Raymond O	President, FIPAN, ASAN
61	Emmanuel Kwapdimma	
62	Aminu Jidda	MIS Officer, L-PRES, Borno State
63	Olakitan Oluwagbuyi	
64	Valentine Omeje Ikechukwu	
65	Cordelia Chiagozi	
66	Iwuoha Agnes	
67	Biodun Oyeleye	New Initiative for Social Development

