

**INTEGRATED PEST MANAGEMENT AND VETERINARY MEDICAL WASTE
MANAGEMENT PLAN**

FOR THE

**AGRO-CLIMATIC RESILIENCE IN SEMI-ARID LANDSCAPES (ACReSAL)
PROJECT (P175237)**

OCTOBER, 2021

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EXECUTIVE SUMMARY

ES1. Context

The Agro-climatic Resilience in Semi-Arid Landscapes (ACReSAL) project seeks to address some of the critical challenges in Northern Nigeria. The region is characterized by high poverty rates, low literacy, fragile environment, conflict, and violence, degradation of natural resources, poor agricultural productivity, climate risks, desertification, poor access to modern technology, and weak institutional capacity. Addressing these issues will require many decades of efforts in multiple sectors. There is an increasing focus at National and State levels (many with the financing of international development partners including the World Bank Group) to support activities to address some of these challenges. This proposed project aligns with the Federal Government of Nigeria in restoring one million ha degraded land out of the 4 million ha target set for broader landscape restoration by 2030. The project will also help lift about 10 million people out poverty from the Federal Government of Nigeria target of 100 million Nigerians. The proposed project will target selected States in arid and semi-arid regions. An integrated and participatory water catchment management approach will be the operating framework for project implementation at field level.

Project implementation would follow the Nigeria Erosion and Watershed Management Project (NEWMAP) model and be implemented through existing NEWMAP Project Management Units (PMUs) already in place at the Federal Ministry of Environment and State Ministry of Environments. Appropriate modern technology will be leveraged upon throughout the project activities, including the management of the disruption due to ongoing COVID-19 pandemic. As part of the implementation of Agro-climatic Resilience in Semi-Arid landscapes activities, the integrated pest management (IPM) and veterinary medical waste management (VMWM) plan is designed to minimize potential harmful effects on human and animal health and on the environment and to promote integrated pest management and efficient veterinary waste disposal.

The indiscriminate or intentional use of pesticides has resulted in its persistence in the environment, thereby affecting the ecosystems and non-targeted organisms including humans and animals. About 15,000 metric tons of pesticides comprising about 135 pesticide chemicals are imported annually into the country. These pesticides are major causes of cancers, cardiovascular diseases, dermatitis, birth defects, morbidity impaired immune function, neuro behavioural disorder and allergy which are public healthcare challenges in Nigeria. The implementation of project activities will be of immense benefit to the local population through increasing agricultural productivity. However, these activities may imply negative environmental and social impacts and risks, which will be assessed along with mitigation measures during their planning and implementation.

ES2. Project Components

The Project Development Objective (PDO) is to increase the adoption of climate resilient landscape management practices and enhance livelihoods in targeted arid/semi-arid watersheds in Northern Nigeria. The project objectives will be achieved through the following components:

Component A: Desertification Control and Landscape Management (USD 370 million). This component aims to prepare and implement investments to arrest desertification and improve the sustainable productivity of land in targeted watersheds (about 1,000,000 ha area of degraded and

desert landscapes out of 4,000,000 ha targeted by the Government program). The component includes the following subcomponents

A1: Investment Preparation

A2: Desertification Control

A3: Integrated Watershed Management and Climate Resilient Conservation Works

Component B: Community Livelihoods and Resilience (USD 250 million)

This component aims to support communities with improved capacity and investments to improve sustainable livelihoods. It will finance climate resilient civil works and vegetation interventions identified during the investment preparation and participatory catchment management plans. This component will finance soil conservation works and green infrastructure such as gully plugging, construction and rehabilitation small -medium size dams, contour ripping and water weirs as well as drains for improved flood water management. Interventions will also be aimed at halting and reversing forest and land degradation and promoting more sustainable rangeland and watershed. The component includes the following subcomponents:

B1: Community Empowerment for Peacebuilding

B2: Community Infrastructure and Services

B3: Enhancing Climate Change Resilience at the Farm Level

B4: Livelihood Improvement

Component C: Institutional Strengthening and Project Management (USD 80 million)

This component aims to strengthen capacities of institutions at various levels (e.g. national, selected states) in order to modernize their work for the longer-term on integrated multi-sectoral planning, information management, and building systems for improving land and water management and sustainable agricultural productivity in northern Nigeria. It includes the following subcomponents:

C1: Institutional Modernization

C2: Policy Support

C3: Project Management:

Component D. Contingency Emergency Response Component (CERC) for landscape and community resilience in response to extreme weather, land movement events and other emergencies. The proposed project will further enhance the preparedness of Nigeria to respond to natural hazards, climate risks, desertification and natural disasters by restoring degraded lands in dry semi-arid regions in the north and building government, state and community capacities to mitigate and respond to climate change. The activities in the proposed project are consistent with the four pillars of the country partnership strategy.

ES3. World Bank ESF IPM/VMWM Plan Requirements

The ACREsAL project is a large project whose activities trigger eight (8) out of the ten (10) Environmental and Social Standards (ESSs) including ESS1 (Assessment and Management of Environmental and Social Risks and Impacts), ESS2 (Labor and Working Conditions), ESS3 (Resource Efficiency and Pollution Prevention and Management), ESS4 (Community Health and Safety), ESS5 (Land Acquisition, Restrictions on Land Use and Involuntary Resettlement), ESS6 (Biodiversity Conservation and Sustainable Management of Living Natural Resources), ESS8 (Cultural Heritage) and ESS10 (Stakeholder Engagement and Information Disclosure). Some of the ACREsAL sub-projects are large scale agricultural projects involving crop and livestock, which could lead to increased use of chemicals, Veterinary medicines, reagents and

pesticides with potential negative impacts and risk on the environment and human health. These activities would specifically trigger ESS3 which requires and provides along with ESS1 guidance to the development of dedicated integrated pest management and veterinary waste management plan/s to manage related risks and impacts (see the ESMF document for related details).

ES4. Rationale for the IPM and VMWM Plan

The detection of some pesticides in soil, drinking water and other animals in Nigeria is of great concern. Also, veterinary medical wastes are currently not handled in accordance to global best practices. Indiscriminate disposal of such wastes can lead to pollution of the environment and spread of zoonotic diseases. The activities in ACRoSAL are expected to improve the livelihood of the people by improving land and water management, provision of small-scale community agro- processing which will lead to increase in crop and livestock production. However, this will entail increased use of pesticides and veterinary drugs which would imply potential negative impacts and risk on the environment and human health. 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 Standards ESS3 an Integrated Pest Management (IPM) and VMWM plan to safeguard against the above risks is required.

ES5. Objectives of IPM and VMWM Plan

The specific objectives of the ACRoSAL IPM and VMWM Plan include:

- Acquisition of baseline information on common Animal pests /Diseases in the selected study area and types of veterinary medical wastes generated with a view to plan and design location specific IPM/ VMWM activities.
- Promotion of participatory approaches in IPM/VMWM to learn, test, select and implement “best-bet” practices and options.
- Promotion of biodiversity monitoring to serve as early warning systems on pest status, alien invasive species, beneficial species and migratory birds.
- Determination/appraisal of existing pest management methods and practices for veterinary wastes management in the selected communities with a view to proffering environmentally friendly options.
- Identification of site -specific potential Environmental and Health Risks associated with pesticides and veterinary medical wastes.
- Development of relevant tools for effective monitoring and evaluation of IPM/ VMWM plan including its impact on the environment and health.
- Establishment of linkages to drive the draft policy document for the project and ensure compliance with national and international conventions and guidelines on pesticides use and VMWM in agriculture.

ES6. Scope of the IPM and VMWM Plan

Integrated Pest Management and Veterinary Medical Waste Management plan is a mix of ecologically based pest control Practices that seek to reduce reliance on synthetic chemical pesticides as stipulated in World Bank ESS 3. The IPM and VMWM plan shall complement the

Environmental and Social Management Framework (ESMF) and other safeguards instruments of the project. Accordingly, this covers the existing national and international legislation on the use of chemicals for pest management. It also assesses the Nigerian experience in pest management, veterinary medical wastes management and capacity on integrated pest management approach. Other areas addressed by the plan include training and awareness raising for the public and users of pesticides on safety measures, description of pesticides banned and/ or approved for use in Nigeria as well as veterinary medical wastes handling and management. The activities relating to the preparation of the IPM and VMWM plan are set out in the World Bank Group environmental, health & safety guidelines for pesticide formulation, manufacturing and packaging

ES7. Purpose of IPM and VMWM Plan

As part of the implementation of Agro-Climatic Resilience in Semi-Arid Landscapes activities, the IPM/VMM plan 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 and veterinary medical waste management. The IPM/VMWM plan 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/ VMWM plan.

The IPM/VMWM plan will also satisfy the requirement of ESS3, that requires any project involving significant pest management issues and veterinary medical waste management or any project contemplating activities that may lead to significant pest and pesticide management issues.

ES8. Legislative and Regulatory Framework

A number of legislations, policies and treaties were considered in this study to include National extant laws, international conventions and treaties, and the World Bank Environmental Social Standards ESSs. Comprehensive details are contained in Part 3 of this report.

ES9. Assessment of Capacity of Nigeria on the implementation of IPM and VMWM plan

Currently, many farmers in Nigeria use conventional chemical control methods and cultural methods to control plant and livestock infestation by pests in Nigeria. It has however been recorded that this method is not an environmentally friendly options for pest management. The current method of indiscriminate disposal of pesticides and veterinary medical wastes pose major threat to the environment.

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 impact of IPM on the environment and management of Veterinary Medical Wastes (VMW) in Nigeria. Also, farmers don't have clear knowledge on the effect of pesticides application and poor waste management on climate change and desertification. Hence, there is a need to further strengthen the safeguards capacity to enable the adequate delivery of ACREsAL project.

ES10. Stakeholder's consultation

Consultations were held with the different stakeholders to inform and listen to them regarding the ACREsAL project development, objectives of the projects as well as document their perceptions and concerns. Crop and livestock pests, management practices and Veterinary medical waste management received special attention during these consultations. The consultations provided an opportunity to gather local data and information on the use of pesticides, common animal and crop pests and diseases, prevailing culture of pest control and concerns of the livestock and crop farmers and existing methods of veterinary medical waste disposal.

The information gathered revealed that with respect to pest management, there is indiscriminate sales, handling and application of pesticides in the project areas. These result to environmental pollution during which the atmosphere, water bodies and land get contaminated. Fake or substandard pesticides were observed to have flooded the markets across the study areas, this apart from the environmental contamination also results to low productivity that seriously reduce crop yield. It was further observed that the predominant people involved in the pesticides business are neither certified nor trained on the use of such chemicals, hence pesticides are sold to farmers with no guidance. It was suggested that the IPM should include development of rules and regulations that would govern the sales, handling and application of pesticides and mechanism to ensure that they are strictly observed and adhered to. The monitoring mechanism should also ensure that only the recommended pesticides are used by the farmers. Ministry of Agriculture, ADPs and farmers group are expected to play significant roles to assist in the implementation of the laws.

Based on the consultations, it was also concluded that veterinary medical wastes are disposed indiscriminately across the project targeted areas, which would result to environmental pollutions such as land and water bodies. There is currently no existing policy with regard to the proper handling and disposal of veterinary medical wastes. Accordingly, it was recommended that the veterinary medical waste management plan captures developing viable policies in this regard. There should also be effective monitoring and evaluation exercise on the waste handling and disposal by an active agency. The recommended stakeholders to assist in solving the above-mentioned problems are ACRESAL project as the main driving force, farmers group, Ministry of Agriculture and ADPs.

ES11. Adverse Environmental & Health Impacts

The IPM and VMWM Plan identified the environmental, social and health risks/ impacts associated with the increased and unsafe use and disposal of pesticides, chemicals and reagents for control of crop and animal pest and disease as well as veterinary medical wastes that may be encountered during project implementation. These risks/ impacts are summarized in Table ES1.

ES12. Mitigation of the Environmental and Health Impacts

IPM and VMWM plans is an important instrument for sustainable agriculture. 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 and VMWM plan will be the most appropriate pest management and veterinary waste disposal approach for the ACREsAL project. This plan for the project lay down mitigation measures, institutional responsibilities and capacity building needs. The plan also provides a strong platform for

proffering practicable safe measures towards mitigating adverse impacts of identified pests in the project area. Measures such as proper diagnosis of pests' issues, minimize use of chemical pesticides in line with the IPM/ VMWM plan, Public awareness health campaigns and avoidance use of ban pesticides were outlined in the plan. IPM uses current, comprehensive information on the life cycles of pests and their interaction with the environment, knowledge on biological, cultural and mechanical control measures that have been used in other agricultural programs in Nigeria other projects such as the IFDC, FADAMA, IITA, FAO, TRIMING etc.).The monitoring of the various aspects of the environment for environmental quality as well as compliance with ACREsAL IPM will be the responsibility of the Ministry of Agriculture / Ministry of Environment and will be carried out annually.

Table ES1: Potential Impacts of Pesticides Use and Mitigation Measures.

MEDIA	CONTAMINATION ROUTE	POTENTIAL IMPACTS	MITIGATION MEASURES
Surface and Groundwater	<ul style="list-style-type: none"> • 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. • Pesticides when sprayed on crop plants are able to flow below the surface of the ground reaching water-bearing aquifers thereby contaminating groundwater making it suitable for both human and agricultural uses. 	<ul style="list-style-type: none"> • Pesticides can accumulate in bodies of water at levels that kill zooplankton, the main source of food for young fish thereby disrupting the aquatic food chain. • It can also kill insects on which some fish also feed. • Human poisoning • Crop poisoning/contamination • 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. 	<ul style="list-style-type: none"> • Minimize the use of chemical pesticides in line with the IPM. • The use of banned pesticides should be prohibited
Air	<ul style="list-style-type: none"> • Vapour from sprayed pesticides when released into the air, and if the chemical compound is very stable, vapour may travel beyond the application location. 	<ul style="list-style-type: none"> • Harm to non-target species: sprayed insecticides reach a destination other than their target species, because they are mainly aerosol. • Pesticide' s vapour may settle on crop surfaces or food causing contamination or food poisoning 	<ul style="list-style-type: none"> • Minimize the use of chemical pesticides in line with the IPM. • Adequate equipment should be used to minimize aerosols
Soil	<ul style="list-style-type: none"> • Pesticides could 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 	<ul style="list-style-type: none"> • Possible plant uptake of pesticides residue from the soil which when consumed can lead to pesticides poisoning in humans and animals. 	<ul style="list-style-type: none"> • Minimize the use of chemical pesticides in line with the IPM. • The use of banned pesticides should be prohibited

	area		
Health	<ul style="list-style-type: none"> • Consumption of crops and plants grown under chemical pest control could cause health hazards to humans and animals within and around the project site. • Certain kinds of 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. 	<ul style="list-style-type: none"> • Skin, eye, and nose irritation • Possibility of cancers, neurologic, endocrine and reproductive problems form direct and indirect exposure to pesticides • Long term inhalation of toxic pesticides sprayed, could eventually result in respiratory illnesses or disease conditions 	<ul style="list-style-type: none"> • Minimize use of chemical pesticides in line with the IPM. • Public awareness health campaigns • Avoid use of ban pesticides

ES13. Framework for Implementation

The ACRoSAL project will be implemented through existing Nigeria Erosion and Watershed Management Project (NEWMAP, P124905) Project Management Units (PMUs), which is already in place at the Federal Ministry of Environment and State Departments of Environments. NEWMAP is under implementation since 2013 under WB Operation Policies. The existing PMU is familiar with the Bank E&S requirements and Operation Policies, however, might benefit from capacity strengthening on Bank ESF policy and requirements. Synergy with FADAMA and TRIMING operations/locations will be an important factor in site selection but not necessary. Therefore, the PMUs in participating States and at the national level would need to be strengthened where necessary to deliver all project activities. The World Bank will assist in providing financing and technical assistance toward the establishment and sustainability of the ACRoSAL states and ensuring implementation of the IPM and VMWM Plan to meet the donor’s safeguard requirements

ES14. Capacity Building and Awareness

Capacity building and awareness raising is very important for the adequate implementation of this IPM/ VMWM plan. Training modules and use of personal protective equipment will be delivered to farmer owners, farm workers, health facility workers, health facility based environmental officers. In addition, awareness creation at farm, health care facility and community level using appropriate communication strategy form parts of the plans.

ES15. Budget for Implementation

Approximately US\$ 1,490,700 will be required to effectively implement the IPM/ VMWM plan for the ACRoSAL project for a 5-year period as outlined below:

Table ES2: Summary Budget for the Implementation of IPM and/VMWM Plan

LINE ITEM	Year 1	Year 2	Year 3	Year 4	Year 5	Total
1. Capacity building & Awareness						
All training programs	116,850	175,276	204,488	87,636	0	584,250
Radio jingles and handbill on IPM	30,000	20,000	10,000	0	0	60,000
<i>Sub-total</i>	146,850	195,276	214,488	87,636	0	644,250
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/disease 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,	70,000	70,000	40,000	0	0	180,000

safety boot and overall wear)						
Chemical Neutralizer and first Aid	50,000	30,000	20,000	0	0	<i>100,000</i>
<i>Sub-total</i>	120,000	100,000	60,000	0	0	280,000
4. Project management						
IPM/VMWM plan 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	520,850	479,276	385,338	158,561	55,925	1,599,950

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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
IPM	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 the des 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
VMW	Veterinary Medical Waste
VWMP	Veterinary Waste Management Plan
WHO	World Health Organisation
WB	World Bank
YESSO	Youth Employment and Social Support Operation
WAFRINET	West African Network for Taxonomy

PART 1: INTRODUCTION

1.1 Project Background

The Agro-climatic Resilience in semi-Arid landscapes project seeks to address some of the critical challenges in Northern Nigeria. The region is characterized by high poverty rates, low literacy, fragile environment, conflict, and violence, degradation of natural resources, poor agricultural productivity, climate change risks, desertification, poor access to modern technology, and weak institutional capacity. Addressing these issues concern and require substantive investments and serious efforts and commitment for many decades to come. Accordingly, there is an increasing focus at National and State levels on soliciting financing and support from international development partners including the World Bank Group, to address some of the above issues.

This project seeks to build on the lessons learned and help develop a more integrated, spatial approach to build community resilience as well as improve the sustainable productivity of natural resources. In particular, the project will support activities to develop multi-sectoral approaches for desertification control and landscape management, improve community livelihoods and resilience, and strengthen institutions in northern Nigeria. The proposed project aligns with the Federal Government of Nigeria in restoring one million ha degraded land out of the 4 million ha targets set for broader landscape restoration by 2030. The project will also help lift about 10,000,000 people out poverty from the Federal Government of Nigeria target of 100 million Nigerians. In addition, the program aligns with the Alignment with the Great Green Wall program.

The proposed project will target selected States in arid and semi-arid areas. These States include the Sahel, Sudan Guinea Savanna and Southern Guinea Ecosystem, and are characterized by dry-semi-arid conditions, low precipitation, and sparse vegetative cover. An integrated and

participatory catchment management approach will be the operating framework for project implementation at field level. Appropriate modern technology will be leveraged throughout the project activities, and necessary measures to manage the disruption of the ongoing COVID-19 will be implemented.

Project implementation would follow the NEWMAP model and will hence be implemented through existing NEWMAP Project Management Units (PMUs) already in place at the federal Ministry of Environment and State Departments of Environments. Synergy with FADAMA and TRIMING operations/locations would be an important factor in site selection. The PMUs in participating States and at the national level would be strengthened where necessary to deliver all project activities.

Appropriate modern technology will be leveraged upon throughout the project activities. As part of the implementation of Agro-climate Resilience in Semi-Arid landscapes activities, the integrated pest management and veterinary medical waste management plan is designed to minimize potential harmful effects on human and animal health and on the environment, which may arise particularly as a result of vector control.

About 15,000 metric tons of pesticides comprising about 135 pesticide chemicals are imported annually into the country (Erhunmwunse *et. al.* 2012). These pesticides pose a major public healthcare challenge in Nigeria as they are the main cause for cancers, cardiovascular diseases, dermatitis, birth defects, morbidity impaired immune function, neurobehavioral disorder and allergy sensitization reaction. All the implementation of the ACREsAL project activities will be of immense benefit to the local population, these activities may result in negative environmental and social impacts for appropriate mitigation measures will be taken during the planning and implementation phases of the project.

1.2 Project description and Objectives

The Project Development Objective (PDO) is to increase the adoption of climate resilient landscape management practices and enhance livelihoods in targeted arid/semi-arid watersheds in Northern Nigeria.

Project objectives will be achieved through the following components:

Component A: Desertification Control and Landscape Management (USD 370 million)

This component aims to prepare and implement investments to arrest desertification and improve the sustainable productivity of land in targeted watersheds (about 1,000,000 ha area of degraded and desert landscapes out of 4,000,000 ha targeted by Government program). It will promote an integrated multi-sectoral spatial approach that combines science-based analytical approaches and community perspectives to provide tangible and sustainable impact. This component will include the following subcomponents/ activities:

A1: Investment Preparation: This subcomponent will support the preparation of investments on the ground, including the development of an appropriate knowledge base (generated through existing data, field observation, surveys), watershed analytics for catchment assessments at different scales (for larger watersheds to understand the broader natural resource issues and hydrological relationships in a spatial multi-sectoral context, and identify priority areas and treatments for field interventions), and participatory planning processes using existing institutions wherever possible for targeted micro-watersheds selected in batches to demonstrate a tangible system impact. Appropriate models/decision support systems will be used to analyse the hydrology, water balance and erosion aspects of the targeted catchments. It will also explore and visualize the impact of various structural/vegetative investment, management, demographic, and climate scenarios to support structured stakeholder consultations at community level and prioritize and design

investments. Watershed and micro-watershed plans would be agreed by all relevant sectoral agencies, local governments, and the targeted communities.

A2: Desertification Control: This subcomponent will help control the encroachment of desert into targeted areas and reverse this process wherever possible in strategically selected landscapes. It will build on related successful past and ongoing programs and support efforts to manage water and wind erosion (including soil and water management, dune stabilization, wind breaks/ shelterbelt plantations, improving soil carbon, manage overgrazing, diversification of shrub, tree, and medicinal plant species and agroforestry, etc.), protect surface and ground water sources, and facilitating alternative livelihoods away from water-intensive crops (including photovoltaic agriculture), alternative/sustainable energy systems, and unsustainable land and water management practices.

A3: Integrated Watershed Management and Climate Resilient Conservation Works: The subcomponent will finance climate resilient civil works and vegetative interventions identified during the investment preparation and participatory catchment management plans. It will finance soil conservation works and green infrastructure such as gully plugging, construction and rehabilitation of small -medium size dams, contour ripping and water weirs as well as drains for improved flood water management. Interventions will also include halting and reversing forest and land degradation and promoting more sustainable rangeland and watershed rehabilitation in semi-arid landscapes in selected catchments. It will also provide support for on-the-ground implementation of off-farm soil and water management interventions. These will include investments for soil conservation, community plantations, community water harvesting, managed aquifer recharge, biodiversity conservation, afforestation, and other similar vegetative and small-scale structural interventions.

Component B: Community Livelihoods and Resilience (USD 250 million)

This component aims to support communities with improved capacity and investments to improve sustainable livelihoods. It will include the following subcomponents:

B1: Community Empowerment for Peacebuilding: This will empower communities with the required knowledge and facilitation in order to rebuild from conflict, strife, and more recently, the impact of the COVID-19 pandemic. This sub-component will support the preparation and implementation of community-based land-use and land-cover plans. It will facilitate “stimulus” investments to build back greener and smarter; and build capacity to better plan and manage village infrastructure and systems, improve the prospects of peace and provide more hope to the region to look forward to a brighter future. Small grants would be provided to community groups (with a special focus on women, other vulnerable groups and youth) to undertake activities to improve sustainability (with money released in tranches based on achievement of milestones in an agreed community action plan). This is expected to not only create employment opportunities for a wide range of poor stakeholders, but also support community-prioritized activities to support a “greener” community through small investments for ecological conservation, composting, soak pits, small sustainable community enterprises, etc. Technology would also be leveraged upon to develop content and access mechanisms (e.g., radio, social media, mobile phone alerts) for improved access to knowledge and learning on sustainable agriculture, water, and other natural resources management, relevant innovations and build the capacity of community institutions on conflict prevention and resolution.

B2: Community Infrastructure and Services: This will help provide resources to rebuild and strengthen basic community infrastructure including water point improvement, small-scale solar installations, bioenergy, post-harvest management and shared storage, small-scale community agro-processing, common market infrastructure, shared market transport logistics, and climate resilience. A few villages will also be selected to develop “smart village” models leveraging on appropriate technology (e.g., shared equipment, tele-agriculture support, mobile apps, digital training for youth,

etc.) for learning lessons to scale-up this concept and provide a practical vision of future potential. The scale of additional investments such as community water supply and sanitation small-scale infrastructure and rehabilitation of paths/tracks/roads and other connectivity will also be explored to balance critical needs and implementation complexity.

B3: Enhancing Climate Change Resilience at the Farm Level: This component is aimed at sustainably increasing agricultural productivity and incomes; adapting and building resilience to climate change; and reducing and/or removing greenhouse gas emissions in the project area. Specifically, this project will support climate-smart approaches and practices to support resilience at the farm level in targeted areas. Some of the main examples of on-farm interventions are: (i) Soil and water conservation management practices, including conservation agriculture, minimum tillage, green manure, cover crops, recuperation of degraded areas, restoration and management of riverbanks, reforestation and promotion of agro-forestry and agro-silvo-pastoral systems; (ii) Crop rotation, pasture management, and fodder production; (iii) Improved livestock management such as animal health, genetics, feeding; (iv) improved water harvesting and water storage in ponds; (v) farm drip and sprinkler irrigation technologies; (vi) Low-cost, energy-efficient water pumping systems (including solar powered), based on improved knowledge and management capacities of water resources which consider environmental and water catchment regulatory/planning instruments available in the areas of intervention; (vii) energy-efficient storage, transportation, handling, and processing facilities. This component will include improved drought and flood management using improved crop variety selection, improved seeds, cropping practices, and integrated pest and nutrient management. This will also include improving agriculture and rangeland productivity and incomes through value chain analysis, farmer field schools and dissemination of improved information to farmers on crop suitability, eco-friendly pest and nutrition management, conservation agriculture, water management, emergency preparedness, bushfire and windstorm

management, improved cook stoves, improving carrying capacity for livestock, climate-related social safety nets, and sustainably managing water points and pastoral migration. There will also be an effort to explore improved use of technology for soil and water testing and early alerts.

B4: Livelihood Improvement: This will support improved livelihoods leveraging and contributing to more sustainably managed natural resources (e.g., community nurseries for agro-forestry species, woodlots, beekeeping), including activities that improve incomes based on sustainable practices and provide alternative livelihoods to reduce pressure on degraded land and scarce water supplies. These activities will make special efforts at engaging with women, other vulnerable groups, and youth of the community on the activities, including building capacity on appropriate skills (e.g., planning, bookkeeping, income generating activities, revolving funds, etc.).

Component C: Institutional Strengthening and Project Management (USD 80 million)

This component aims to strengthen capacities of institutions at various levels (e.g., national, selected states) in order to modernize their work for the longer-term on integrated multi-sectoral planning, information management, and building systems for improving land and water management and sustainable agricultural productivity in northern Nigeria. This will include:

C1: Institutional Modernization: This will include investments to improve the monitoring (e.g., in-situ monitoring of hydro-meteorological and other aspects with sensors, 360° cameras and mobile apps, strengthening of laboratories e.g., to test soil and water samples, use of satellite and UAV earth observation monitoring) and improvement of institutional infrastructure (e.g., buildings, IT and office equipment and connectivity, simple online videoconferencing, etc.). These will be balanced by investments to improve capacity and outreach (incl. agro-advisory services) through helpdesk services, mobile apps (e.g., leveraging on global, regional, and local data related to climate, forecasts, markets, access to knowledge, advice, networking), training, student internships, visiting experts (e.g., for improving inter-departmental linkages and links to academia), and

development of interactive data/knowledge dashboards and e-learning (especially as connectivity improves and to manage disruptions such as COVID-19).

C2: Policy Support: This will support policies to create a more enabling policy environment to promote innovative and sustainable approaches to managing the sustainability challenges of northern Nigeria. These could include technical and convening support for policies that address issues such as multi-sectoral coordination, open data access, climate insurance, public-private partnerships, fostering local innovation start-ups, designing operational payment for ecosystem services/eco-compensation schemes, systematic monitoring of indicators that could be used for future performance-based investment approaches e.g. involving disbursement-linked indicators or program for results in future phases. This sub-component will also support formulating a strategic framework for identifying NDC priorities in dry, semi-arid landscapes; d) establishing training programs for landless youth through green jobs; and e) support to Nigeria's climate actions including, financing investments in priority NDCs in these landscapes through pilot and demonstration projects and continued support to government issuance of Green Bonds, focused on Northern States, preparation and dissemination of Nigeria's reporting obligations to international conventions and entities.

C3: Project Management: This will support a package of project management support activities to ensure cost-efficient, timely and quality delivery of project activities and results, and will include strengthening of the designated PMUs at the Federal and State levels, including on technical, procurement, financial management, environmental and social safeguards, citizen engagement, grievance redressal, monitoring and evaluation, and documentation, communication, and outreach aspects. Special emphasis will be placed on developing a modern GIS-based online M&E system that helps benchmark the performance of implementing offices and identifies project progress and challenges to be resolved through adaptive management and oversight at different levels with regular virtual meetings and field visits.

Component D. Contingency Emergency Response Component (CERC) for landscape and community resilience in response to extreme weather, land movement events and other emergencies.

The proposed project will further enhance the preparedness of Nigeria to respond to natural hazards, climate risks, desertification and natural disasters by restoring degraded lands in dry semi-arid regions in the north and increasing government, state and community capacity to mitigate and respond to climate change. The activities in the proposed project are consistent with the four pillars of the country partnership strategy.

1.3 Rationale of the IPM and VMWM Plan

In Nigeria, tests carried out on 217 different food items revealed the presence of some pesticides that are frequently used (such as, DDT, Aldrin and Dieldrin) in concentrations ranging from 1.2 to 2160 µg/kg which were very high above maximum allowable concentration levels of 0.05 - 0.5ppm (www.blueprint.ng/%EF%BB%BFnational-pesticide-policy-prioritising-plant-health-as-...). The detection of these pesticides in soil, drinking water and other animals is of great concern.

Integrated Pest Management (IPM) brings together, into a workable combination the best strategies of all control methods that are applied 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".

The activities in ACREsAL are expected to improve the livelihood of the people by improving land and water management, provision of small-scale community agro- processing which will lead to increase in crop and livestock production. This will definitely lead to increased use of pesticides and veterinary drugs with potential negative impacts and risk on the environment and human health. There is undoubtedly the likelihood of infestation by pests, currently within the

proposed area or migratory pests. In line with the World Bank Environmental and Social Framework, the Environmental Social Standard that addresses pollution prevention and management relating to integrated pest management is ESS3, “Resource Efficiency and Pollution Prevention and Management”. The IPM and VMWM Plan is a suitable Environmental and Social (E&S) instrument for tackling pest management issues and indiscriminate disposal of pesticides containers and veterinary medical wastes.

1.4 Purpose of IPM and VMWM Plan

As part of the implementation of the ACRoSAL activities, the IPM 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 World Bank’s ESF, the project’s risk rating is “Substantial” and is hence subject 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.

1.5 Scope of the IPM and VMWM Plan

Integrated Pest Management (IPM) is a mix of ecologically based pest control Practices that seek to reduce reliance on synthetic chemical pesticides as stipulated in World Bank ESS 3. The IPM shall complement the Environmental and Social Management Framework (ESMF) and other E&S instruments of the project. Accordingly, this IPM and VMWM plan covers the existing national and international legislations on the use of chemicals for pest management. It also assesses the Nigerian experience in pest management, veterinary medical wastes 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. Trainings and awareness creation on medical wastes handling and management.

The scope of the plan is to prepare a framework for screening, monitoring and mitigating potential impacts, with a process for triggering subsequent sub-projects in all cases, as stipulated in World Bank ESS3.

The development of the plan is based on the following:

- literature review/ desktop studies to obtain relevant information on plant and livestock pest issues and management around the country, and baseline information on the potential participating states;
- Field visits to selected sample locations (five States) spread across the northern Nigeria to obtain primary data and consult with stakeholders including industry experts;
- Consolidation of information and articulation of strategies for the integrated pest management and Veterinary medical wastes management;

The PMP/VMWM plan will be reviewed and cleared by World Bank prior to disclosure country wide in Nigeria and on WB website along with the other safeguards' instruments.

PART 2: PEST MANAGEMENT CONCERNS AND CONTROL MEASURES IN NIGERIA

2.1 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 produce (livestock, crops, fruits and ornamental plants) annually (Operators- Punch Newspapers). Household pests also destroy property such a furniture items, clothing.

Pest such as INSECTS (grasshoppers, locust, aphids, weevils etc) BIRDS (Quelea) and WORMS (Insect's larvae) affect Cereals (Sorghum, Millet, Maize, Wheat, Rice etc), legumes and vegetables resulting in reduction in quality (for processing and market) and quantity (yield and total production) of produce. Contagious Bovine Pleuro-Pneumonia, Foot and Mouth Disease and Worms affect cattle. Peste des Petits Ruminants (PPR) affect Small Ruminants (Sheep & Goats) while Flies, Avian influenza (AI) and Exotic Newcastle Disease affect poultry at various stages of their lives causing economic damage. The details pest and disease of crop and livestock is discussed in part 4 of this report.

However, farmers often respond to pest and diseases 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 in pesticides used in Africa will be banned for use in Europe, hence, IPM is a fast-emerging trade policy issue. Main crops grown in northern Nigeria include: Rice, Maize, Groundnut, Cowpea, Millet, Cotton, Onions, Tomato, Sugarcane, Sorghum and Water melon.

2.2 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 depend on pesticides. However, due to the increasing concerns about the environment and pest resistance to pesticides, there is the need to explore other methods of pest control beyond the use of pesticides alone. Generally, in Nigeria there are various methods of controlling pest but the main pest management controls used in Nigeria include:

1. Cultural control: which refers to the adjustment of husbandry techniques by the farmer:
 - 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: These are practiced by majority of 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) providing 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 agriculturally 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 some of the previously recommended pesticides like DDT, dieldrin, aldrin and lindane have been banned. This regulation has left very few pesticides for use in agricultural activities in Nigeria.

In general, according to literature and stakeholder consultations conducted during the preparation of the IPM and VMWM plan, the most effective local practices for pest management ranked in order of effectiveness are listed below:

- i. Herd Sharing –which significantly minimizes outbreaks and transmission. This is especially common amongst cattle herders who mostly practice nomadism.
- ii. Breeding – use of resistant varieties that 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 cost effective since most of the herbs are locally sourced
- v. Bush burning – is effective only time when the smoke is still in the air and immediately after the bush is burnt. 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 tedious, especially when there are many livestock in the area.
- vii. Other methods like local concussion and Holy books. However, these methods are becoming less popular due to the fact that their efficacy could not be properly documented and to use of 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
- 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.

Constraints to Effective Utilization of Local Control Methods for Pest and Diseases Control include:

i. Cutting of trees

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

ii. Bush burning

Most of the shrubs used are being destroyed by bush burning. As a result, Indigenous peoples have to trek long distances that sometimes involve life risks, 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 administration of herbs dosage to infested animal, particularly overdosing, that would result in severe diarrhoea or vomiting, shivering and weakened joints. There is also the problem of multiple administrations of herbs that may lead to over dosage. It is also sometimes 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 due to inadequate diagnosis, as most of the farmers medicate the livestock themselves based on passed previous knowledge. Unfortunately, the pest species may be different and hence would be rendered ineffective.

v. Flood and drought

This causes changes in environmental balance and a in pests' species types for which the indigenous pest control methods against may be ineffective. 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 farming 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.

2.3 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. For instance, use of banned pesticides could run off into water bodies causing harm to water organisms and water users in that environment. Also 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 2.2 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 plant and 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 on synthetic chemical pesticides; and
- Growing debt for farmers compelled to use increasingly expensive products etc.

In order to reduce the incidences of pest in Nigeria, a number of project-based interventions that involve IPM have been carried out. These include:

- IPM for the livestock productivity and resilience support project.
- IPM for West Africa Regional Disease Surveillance Systems Enhancement (REDISSE) Project;
- IPM for pest control in the Commercial Agriculture Development Project (CADP);
- IPM 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.
- IPM for the livestock productivity and resilience support project.

There are also other IPM implementation cases for 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 centre 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 and management of Veterinary Medical Waste in Nigeria. Emphasis on capacity building has always been on pesticides with little focus on Veterinary Medical Waste. Also, there is not enough capacity building on the relationship between pesticides and Veterinary Medical Waste disposal and climate change and desertification. Therefore, farmers do not have clear knowledge on the relationship of pesticides application and climate change and desertification.

PART 3: EXISTING LEGISLATION ON AND POLICIES ON DISTRIBUTION, USAGE AND DISPOSAL OF PESTICIDES AND VETERINARY MEDICAL WASTE

This chapter presents the applicable policies, regulatory framework and institutional framework that guide pesticide usage, pest control methods and disposal of pesticides and veterinary medical waste in Nigeria. These laws include the National extant laws which are based on legislations and institutional frameworks obtained from some relevant organizations (FMEV, FMA &RD, FMH, NAFDAC and FMLP). They also include international conventions and treaties, World Bank Environmental Social Standards, WHO Guidelines and WBG's Environment, Health and Safety Guidelines.

3.1 Extant Laws of Nigeria on Pesticides and Veterinary Medical Waste Management

The existing legislative tools that relate to the regulation of the distribution, usage and disposal of pesticides and veterinary medical waste in Nigeria are:

1. National Policies on Pesticides Management and Veterinary Medical Waste
 - Nigerian Agricultural Policy (1988)
 - Pest Management and Pesticide Use Policy (1988)
 - National Policy on Environment, 1989 (Revised in 2016)
2. Applicable Legislations for Pesticides and Veterinary Medical Waste Management in Nigeria
 - The Factories Act 1990 being implemented by the Factories Inspectorate Division of FMLP.
 - The Harmful Wastes (Special Criminal Provisions etc) Decree of 1988 being implemented by FMEV
 - Pesticides Registration Regulations (2006)

The existing institutional framework for the regulation and management of pesticides and veterinary medical waste in Nigeria include:

- FEPA Decree 58 of 1988 as amended by Decree 59 of 1992 and 1999 but complemented by rules and regulations such as FEPA S.1.5, FEPA S.1.9 dealing with disposal and distribution of pesticides.
- NAFDAC Decree 15 of 1993, as amended by Decree 19 of 1999
- Nigeria Institute of Animal Sciences establishment Act 2007.
- Nigeria Agricultural Quarantine Service Establishment Act 2018
- National Environmental Standards and Regulations Enforcement Agency (NESREA) (Act 2007)
- Federal Ministry of Agriculture and Rural Development
- State Ministries of Agriculture (Department of Animal Husbandry Services)/ State Ministry of Livestock Production.

The above applicable policy and institutional framework requirements are briefly discussed below:

i. Nigerian Agricultural Policy (1988)

The major policy provisions with respect to plant and veterinary pest and disease control objectives in the agricultural policy for Nigeria include to:

- Regulate, or completely eliminate, and maintain good surveillance of the major economic pests whose outbreaks are responsible for large-scale damage/loss to crop and animal production.
- Provide protection to human health and the environment against vectors of deadly diseases.

ii. Pesticides and veterinary medical drug Use Policy

The general pest control objectives in the existing (1988) agricultural policy for Nigeria are to:

- 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;
- Provide protection to man and animals against vectors of deadly diseases.

iii. National Policy on Environment, 1989 (Revised in 2016)

The specific policy statement related to pesticide use include:

- 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 are harmful to the environment. The policy also acknowledges that requirement for chemical inputs such as herbicides and pesticides, veterinary medical products pose concerns about environmental health as these may impact soils, water bodies and non-target crops as well as non-target pests.

iv. The Factories Act 1990

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. 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.

v. *The Harmful Wastes (Special Criminal Provision) Act 42 of 1988*

This Act which was necessitated by the illegal use and dumping of toxic wastes in the port town of Koko in Southern Nigeria. The Act defines harmful waste to mean any injurious, 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 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.

vi. *Pesticides and Veterinary Drugs Registration Regulations (2006)*

- Prohibits pesticides and veterinary medical products manufacture, import, export, distribution and usage unless it has been registered with the Agency
- Procedures for application for the registration of pesticides and veterinary medical products

vii. *FEPA Decree 58 of 1988 as amended by Decree 59 of 1992 and 1999 but complemented by rules and regulations such as FEPA S.1.5, FEPA S.1.9 dealing with disposal and distribution of pesticides.*

This Act specifies the guideline and rules guiding the dealing with distribution, use and disposal of pesticides in Nigeria. The Act also mandates the Agency to establish instruments for air quality standards, water quality standards, atmospheric protection and ozone layer protection. In discharging the mandate. The 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.

viii. *NAFDAC Decree 15 of 1993, as amended by Decree 19 of 1999*

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, human and veterinary drugs and devices, cosmetics, chemicals and packaged water in Nigeria for the protection of human health. In discharge of its statutory responsibility, NAFDAC has approved the list of chemicals and veterinary drugs allowed in Nigeria for the control of pest and diseases in plant and animals.

ix. Nigeria Institute of Animal Sciences establishment Act 2007.

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. 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.

x. Nigeria Agricultural Quarantine Service Establishment Act 2018

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. 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. 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.

- xi. National Environmental Standards and Regulations Enforcement Agency (NESREA) (Act 2007)*

NESREA is charged with the responsibility for the protection and development of the environment, biodiversity conservation and sustainable development of Nigeria's natural resources. 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, human and animals drugs and provide "Safe use of pesticides", and promote integrated pest management and proper pesticide and veterinary waste disposal.

- xii. Federal Ministry of Agriculture and Rural Development*

Ensures that the citizens 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. With reference to pest management and potential pest threats to agriculture, the (FMARD) annually purchases and distributes pesticides and veterinary drugs (through tender) to the States.

- xiii. State Ministries of Agriculture (Department of Animal Husbandry Services)/ State Ministry of Livestock Production*

At the State level, these Ministries are responsible for information and management of livestock pests, distribution of pesticides and provision of veterinary services.

3.2 International Conventions & Treaties Relevant to Pest Management in Nigeria

Nigeria is a signatory to many conventions on the protection of the environment, which lay credence to the IPM and VMWM Plan presented herein. Some of these conventions pertinent to this study include:

- Stockholm Convention on persistent organic pollutants
 - Rotterdam Convention
 - Basel Convention
 - ECOWAS
- i. Stockholm Convention on persistent organic pollutants

This convention, in accordance with Principle 15 of the Rio Declaration on Environmental and Development, aims at protecting human health and the environment from persistent organic pollutants such as aldrin, dieldrin, chlordane, endrin, heptacholic, hexachlorobenzene, mirex, toxaphene, DDT and PCBs. It calls for outright banning and destruction of 12 Persistent Organic Pollutants, 9 of which are pesticides. These are: Pesticides POPs: Aldrin, Chlordane, DDT, Dieldrin, Endrin, Heptachlor, Hexachlorobenzene, Mirex, Toxaphene. The Industrial POPs: Dioxins, Furans, Polychlorinated biphenyls (PCBs). Pesticide and veterinary waste disposal are contained in the convention.

- ii. 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 19

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.

iii. 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 which include pesticides and veterinary waste.

iv. ECOWAS

There is also the support for the document of harmonization of rules governing the pesticide and animal drugs 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;

- 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.

v. Other relevant international sources/ reference on related best practices include:

- World Bank Group environmental, health & safety guidelines for agribusiness/food.
- World Bank Group environmental, health & safety guidelines for pesticide formulation, manufacturing and packaging.
- WHO global strategy on health, environment and climate change: the transformation needed to improve lives and well-being sustainably through healthy environments.

3.3 World Bank ESSs relevant to IPM and VMWM

The ACRoSAL project is a large project whose activities trigger eight (8) out of the ten (10) Environmental and Social Standards (ESSs) including ESS1 (Assessment and Management of Environmental and Social Risks and Impacts), ESS2 (Labor and Working Conditions), ESS3 (Resource Efficiency and Pollution Prevention and Management), ESS4 (Community Health and Safety), ESS5 (Land Acquisition, Restrictions on Land Use and Involuntary Resettlement), ESS6 (Biodiversity Conservation and Sustainable Management of Living Natural Resources), ESS8 (Cultural Heritage) and ESS10 (Stakeholder Engagement and Information Disclosure). Generally speaking ESS1 and ESS10 are relevant to all project activities. Other ESSs (ESS2-ESS9) would be specifically triggered based on the nature of the project activities and associated risk and impacts. Some of the ACRoSAL sub-projects are large scale agricultural projects involving crop and livestock, which could lead to increased use of chemicals, Veterinary medicines, reagents and pesticides with potential negative impacts and risk on the environment and human health. These activities would specifically trigger ESS3 which requires and provides along with ESS1 guidance to the development of dedicated ESF instrument for integrated pest management and veterinary waste management plan/s to manage related risks and impacts, which is the case for the ACRoSAL project. While all the ESSs triggered by ACRoSAL are relevant to the IPM and VMWM plan to varying extents, ESS1, ESS3 and ESS10 are mostly relevant in terms of the development of this ESF instrument.

PART 4: IDENTIFICATION OF ADVERSE IMPACTS OF PESTICIDES

Baseline information on common crop and livestock pests and diseases as well as veterinary medical wastes in Nigeria, general control methods and their efficacy are discussed in this chapter. Adverse Environment Health Risk Associated with Pesticides application were identified. The baseline information was based on consultations with the various stakeholders as discussed in Annex VII .

4.1 Global Concerns on the Use of Pesticides and Risks Associated with Veterinary Medical Waste

Pesticides when applied to crops and livestock could easily bring adverse effects on environment, as well as human and animal health. They include 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 also pose great environmental and health risks. Veterinary medical waste also poses similar risks if not managed properly managed. The risks and concerns associated with pesticide use and veterinary medical waste are briefly discussed in the following paragraphs.

Pesticide Use Risks

Persistent Organic Pollutants (POPs) associated with pesticide use are of major global concern. Annex A of the Stockholm Convention on Persistent Organic Pollutants, requires parties to take measures to eliminate the production and use of the chemicals and pesticides that 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.

Types and Risks of Veterinary Medical Wastes

Infectious Wastes

These are wastes that have come in contact with body fluids such as blood and other bodily fluids which may cause human disease and may reasonably be suspected of harbouring pathogenic organisms or may pose a substantial or potential hazard to human health or the environment when not properly treated, stored, transported, disposed of or otherwise managed. Examples of infectious wastes include wastes that contain biological materials that have the potential to spread disease such as wastes discarded from diagnostic samples, cultures and stocks of infectious agents from laboratory work e.g. wastes from autopsies and infected animals from laboratories, or wastes from patients in isolation wards and equipment such as swabs, bandages and disposable medical devices.

Pathogenic Wastes

These are wastes which contain faecal matter and other organic wastes contaminated with bacteria, viruses or parasites and thus have the potential of spreading disease when they are not properly handled. Examples of pathogenic wastes include organs or parts of organs, body parts, body fluids/faeces and carcasses of infected animals.

Sharp Wastes

Sharp wastes are wastes that possess sharp points or edges which are designed for the purpose of cutting, piercing or penetrating the skin. Since they are capable of cutting, piercing or penetrating the skin, they have the potential to cause injury through which infection can be spread. Examples of sharp wastes include used scalpels, blades, syringes, needles, broken glass etc.

Chemical Wastes

Chemical wastes that are those chemicals that are no longer in use and are corrosive, ignitable, reactive, toxic, persistent or interact with other chemicals to form explosive or toxic by-products. They could also be acutely poisonous, carcinogenic, and mutagenic. Chemical wastes can move through water, air and soil and hence it is easy to spread their harmful effect or impact on human health when they are exposed. Chemical wastes can access human body through inhalation, ingestion or skin contact. Examples of chemical wastes in veterinary medical wastes include remnant laboratory reagents, solvents, sterilant, heavy metals in equipment eg thermometer batteries etc.

Pharmaceutical/ Cytotoxic Wastes

These are wastes which include unused, contaminated and expired drugs as well as packaging materials that have come in contact with them. These wastes are considered harmful to humans because some drugs contain heavy metals, endocrine disruptors and other chemicals that are harmful to the environment. There is also the risk that improperly disposed drugs could end up in the hands of drug abusers. Other risks of pharmaceutical wastes include development of antibiotic resistance in organisms exposed to the waste or disruption of the balance of flora at sewage treatment plants as a result of exposure to excreted or disposed drugs.

Radioactive wastes

These are the wastes emanating from a nuclear power plant or medical laboratory. They contain radioactive materials that are hazardous to most forms of life and the environment. The wastes decay over the course of time, so they would be confined to a safe place until the time they lose their radioactivity and no longer pose a threat to the environment. Radioactive waste includes any material that is either intrinsically radioactive, or has been contaminated by radioactivity, and that is deemed to have no further use. One of the major sources of radioactive waste is medical wastes through radio-diagnostics and radiotherapy.

4.2 Adverse Environmental and Health Risk Associated with Pesticide Application

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 leukaemia, non-Hodgkins lymphoma, brain, bone, breast, ovarian, prostate, testicular and liver cancers.

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 application that are of concern to the ACREsAL project include soil contamination, air pollution, water pollution, harms to non-target species, and social and health concern of diseases outbreak. These risks are briefly discussed below.

(i) 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.

(ii) Air Pollution

Vapour from sprayed pesticides will be released into the air, and if the chemical compound is very stable, vapour may travel beyond the application location.

(iii) Surface and Ground water pollution

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.

(iv) Harms to Non-target Species

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.

(v) Social and Health Concern of Diseases outbreak

Consumption of crops and plants grown under chemical pest control could cause health hazards to humans and animals within and around the project site. Certain kinds of 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. Possibility of cancers, neurologic, endocrine and reproductive problems form direct and indirect exposure to pesticides. Skin, eye, and nose irritation. Occupational Health and Safety. Long term inhalation of toxic pesticides sprayed, could eventually result in respiratory illnesses or disease conditions.

4.4 Impact Mitigation through IPM and VMWM Plan

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 friendly approach 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 disposal of the pesticides containers and veterinary medical wastes are also key to sustainable agriculture.

The above information, in combination with available pest control methods can be 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 outbreaks in poultry and livestock will be

subdued in an environmentally safe manner that may arise from the project, 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 projects and programs in Nigeria, in agriculture or other sectors, with the support of various Organisations (e.g., Avian Influenza, Polio Control Project, FADAMA, IITA, FAO, TRIMING etc.) will provide a strong platform for identifying and recommending 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), the Integrated Pest Management (IPM) will be the most appropriate pest management approach for the ACREsAL project. The IPM and VMWM Plan for the project provides mitigation measures and presents institutional responsibilities and capacity building needs.

PART 5: INTEGRATED PEST AND VETERINARY MEDICAL WASTE MANAGEMENT PLAN FOR ACRE SAL PROJECT

5.1 Introduction

This part presents a detailed pest management plan for animals and crops as well as the veterinary medical waste management plan for the ACRE SAL project in Nigeria including the methodology for establishing both the integrated pest and veterinary medical waste management plan. It also provides information on classes of pesticides that can be used and banned pesticides.

The plan is developed to reduce dependency on pesticides and encourage integrated pest control methods such as biological, cultural, physical, chemical methods safe disposal of veterinary wastes and design a program for capacity building in integrated pest and veterinary medical waste management plan. Through identifying institutional responsibilities, the plan also provides a reference for stakeholder groups and establishes functional mechanisms which will help ACRE SAL actors and Partners understand and respond to integrated pest and veterinary medical waste management needs.

The integrated pest and veterinary medical waste management plan recommends practical and cost-effective actions to prevent or reduce significant environmental impacts of pesticide use and veterinary medical waste management to tolerable levels and in accordance with international best practices. It also establishes institutional arrangements and capacity building needs. The plans also complement the Environmental and Social Management Framework (ESMF) and other safeguard instruments of the ACRE SAL project.

5.2 IPM and VMWM plan Objectives

The specific objectives of the ACRE SAL IPM/ VMWM plan include:

- Acquisition of baseline information on common crop and animal pests and diseases in the selected study area, and the types of veterinary medical wastes generated with a view to plan and design location specific IPM/ VMWM activities.

- Promotion of participatory approaches in IPM/VMWM to learn, test, select and implement “best-bet” IPM options.
- Promotion of biodiversity monitoring to serve as early warning systems on pest status, alien invasive species, beneficial species and migratory birds.
- Determination/appraisal of existing pest management methods and practices for veterinary wastes management in the selected communities with a view to proffering environmentally friendly options.
- Identification of site -specific potential Environmental and Health Risks associated with pesticides and veterinary medical wastes.
- Development of relevant tools for effective monitoring and evaluation of IPM/ VMWM plan including its impact on the environment and health.
- Establishing linkages to drive the draft policy document for the project and ensure compliance with national and international conventions and guidelines on pesticides use in agriculture.

5.3 Steps for Establishing the IPM and VMWM Plan

Establishing an IPM for plants and Veterinary pests is a function of the following 5 steps:

i. 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 ACREsAL project, any unusual change noticed in an animal shall be recorded and brought to the attention of a veterinarian.

ii. Identification

Identification step is required to determine if the detected pest is actually the organism causing the discomfort or disorder in the animal. This is best performed by a trained farm manager or a veterinarian.

iii. Economical or Medical Significance

Medical judgements of the state of health of an animal are made on the basis of symptoms caused by pests. On the economic side, estimated losses which the pest has caused such as reduction in dairy, 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.

iv. Method Selection

This involves selecting a method or methods for managing the observed pests such as are contained in this IPM.

v. Evaluation

It is necessary under ACREsAL 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 ACREsAL IPM outcome evaluation.

5.4 Methods and Techniques for Animal Pest Management

IPM for animals includes biological, cultural, physical, chemical (use of pesticide), and use of resistant breeds and sanitation in the animal's environment.

Biological

This project will introduce, encourage and artificially increase plants and animals that are parasite or predators of identified pests. This will be effective in managing insects and mites.

Cultural

- It is recommended that under the ACREsAL project, maintaining overall good health of the animals should be a priority in pest management. This necessary to keep the animal healthy which enhance its tolerant level to pests.
- Animal diet 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.

Mechanical tools: Mechanical tools to be employed under ACREsAL may include:

- Grooming combs, brushes, and flea combs with closely spaced teeth to monitor for insect and ticks;
- Use of electronics devices such as lights that attract flying insects around barns or other animal quarters reduce some nuisance pests;
- Use of traps for rodents that may be carries of pests.

Physical control: This may involve the following:

- Use of sticky flypaper to reduce nuisance flying insects to confined areas.
- Use of cages that separate animals from contact with one another which reduces the spread of insects from infested animals to non- infested ones.
- 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 pest.

Sanitation

Implementation of ACREsAL IPM shall accord great importance to sanitation as measure to avoiding pest and diseases in animals. Keeping barnyards, stables, kennels, exercise areas and surrounding areas as clean as possible and ensuring that animals drink from safe water points can prevent reasonably pest invasion, and therefore, highly recommended. Cleaning animal bedding and the surfaces of cages and other animal confinement with disinfectants also kill pathogens and reduce the tendencies of spread of diseases.

Use of pesticides

Use of pesticides may be used in the ACREsAL project in combination with other methods of prevention and control or used when other methods have failed or considered inapplicable. For example, cultural or other management strategies discussed outlined may not be applicable to control or prevention of some pests. In such cases, the use of repellent or chemicals at appropriate application quantities and methods friendly to the environment are conceivable

options. Nonetheless, banned and obsolete pesticides shall not be procured nor be used in any case under ACREsAL.

Classes of Insecticides/Acaricides Used in Plant and Livestock Pest Management in Nigeria

a) Chlorinated Hydrocarbons

This class includes lindane and methoxychlor. Lindane has become a restricted use pesticide for *mange mites and lice*.

b) 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*

Formulations Allowed for Use in Managing Crop and Livestock Pests in ACREsAL project

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.

- a) *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.
- b) *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.
- c) *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.
- d) *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.
- e) *Dust*: A dust is a ready-to-use dry formulation. The following safety caution must apply:
- protect the animal and applicator's eyes from the dust.
 - applicators must wear appropriate personal protective equipment to protect exposed skin, the respiratory tract and eyes
- f) *Baits*: Baits are either commercially prepared as dry granules or made as mixes of insecticides.
- g) *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 formulation on the animal).*

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 labelled for use on animals or in animal 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).

5.5 Integrated Pest Management Methods for Crop Pest Control

Pest are as old as the cultivation of plants. They attack crops at any point in the value chain of crop production. The IPM will involve change in the cultural practices for crop production in such a way that creates unfavourable condition for the development of pest population. Crop rotation, early planting to escape some species of pest, sanitation to reduce spoilage of horticultural crops and burning of infected stalks and crop residues, proper tillage, intercropping, plant spacing and irrigation water management to control pest, use of resistant and early maturing varieties are part of the cultural methods that will be adopted under the ACREsAL project. This project will also use the biological method of pest control by introducing, encouraging and artificially increasing plants and animals that are parasites or predators of identified pests. This will be effective in managing insects and mites.

Pesticides may be used in the ACREsAL project in combination with other methods of prevention and control or used when other methods have failed or considered in applicable. For example, cultural or other management strategies outlined may not be applicable to control or prevent some pest. In such cases, the use of repellents or chemicals at appropriate application quantities and methods for the environment are conceivable options. Nonetheless, banned and obsolete pesticides shall not be procured nor be used in any case under ACREsAL project.

Botanical and organic pesticides using plant extract and dried powders such as neem, dry chill pepper ginger, cocoa pot husks, eucalyptus leaf powder are not a replacement for pesticides but rather an important input of the IPM to reduce dependence on synthetic chemicals. A combination of all the control methods will form the basis for the development of the IPM.

The chemical methods should follow the following principles:

- Use of Cost –effective non-pesticides chemicals such as $\text{Ca}(\text{OH})_2$
- Use of high efficiency, low toxicity and low residue pesticides (Category III of WHO)
- Extension of the application technologies that have low toxicity to humans, animals and plant and with reduced pollution on the environment
- Use of safe spraying devices to enhance the efficiency and effectiveness of the pesticides.
- Strengthen the awareness and education on safe and proper use of pesticides, extend safe application of pesticides through training, follow strictly the regulation on pesticides application and pay attention to safety
- Safe storage of chemicals (e.g keeping pesticides away from food and children)

At planting the IPM practices will focus on appropriate site selection, sanitation, proper tillage, soil improvement practices, selection of resistant and early maturing varieties.

After planting. 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. Tables 1, 2, 3 and 4 below present effective control methods (chemical, cultural and biological) for managing common pests and diseases of the agricultural crops value chains within the project area.

Table 1: Livestock Value Chain Pests and Control Methods for ACRoSAL Project

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 (Taktic)-One can	Good hygiene of the pen by regular cleaning and drying.	--

			(760 ml) mixed with 50 gal water by thorough wetting of animals to the point of runoff.		
		Spinose ear tick	Application of Amitraz spray. Direct low-pressure spray toward the head, ears, shoulders, and neck	<ul style="list-style-type: none"> • 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	Insecticide sprays, dips, or smears are effective in	Early shearing before blow fly season is an effective preventive	

		(Black Blow Fly)	controlling this pest	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 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
		Hog Lice	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	<ul style="list-style-type: none"> • 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 	-

			also provide control.	<p>or the spread of diseases</p> <ul style="list-style-type: none"> • Ensure that animals are not over crowded to avoid pest outbreaks. 	
		Mange Mites	This can be controlled by insecticide spray or deep at the recommended dosage.	<ul style="list-style-type: none"> • 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. 	-
4.	POULTRY	Lice	Insecticides can be applied by dusting or spraying the bird or providing self-treatment devices such as dust boxes.	<ul style="list-style-type: none"> • 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. 	-
		Mites	The chicken (red) mite can be controlled by spraying pesticide into	<ul style="list-style-type: none"> • Animal diets should be well balanced and provided at consistent intervals and in 	-

		the cracks and crevices of the 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.	<p>appropriate portions.</p> <ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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 dustbath 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.	<ul style="list-style-type: none"> • 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 (housefly and stable fly)	Application of Emulsified GardStar spray	<ul style="list-style-type: none"> • 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 Tachinidae (Diptera) parasitize the larvae and pupa. Tabanid adults are used as provisions for nest building wasps

Table 2: Value Chain Diseases and Control Methods in Nigeria

S/ N	LIVESTOCK	DISEASES	CONTROL METHODS		
			CHEMICAL	CULTURAL	BIOLOGICAL
1	CATTLE	Tetanus	<p>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.</p> <p>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</p>	<p>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 minimise contamination.</p> <p>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.</p>	--
		Prussic acid poisoning	--	<ul style="list-style-type: none"> • 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 	--

			<p>thoroughly dry before pasturing</p> <ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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 approach for PPR infections is by administration of antibiotics (long acting oxytetracycline, chlortetracycline) to prevent secondary bacterial infections and	Proper hygiene and isolation of infected animals from healthy ones.	-

			anti-diarrhoeal medicines with supportive therapy (B-complex and Dextrose saline) for 5–7 days, which may be useful to reduce the severity of the disease.		
		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 the same serotype. Currently, there is no universal FMD vaccine.	As a result of the loss of production and the infectious state of the disease, infected animals are usually culled	--
		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	<ul style="list-style-type: none"> • 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 centres.
		Parasitic Gastroenteritis	Use of Anthelmintics are 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.	
2	SHEEP AND	Small Ruminants Pests	Since PPR is a viral disease, there is no specific treatment for this disease. Post-exposure	Proper hygiene and isolation of infected animals from healthy ones.	-

	GOAT		therapeutic approaches for PPR infections are by administration of antibiotics (long acting oxytetracycline, chlortetracycline) to prevent secondary bacterial infections and anti-diarrhoeal medicines with supportive therapy (B-complex and Dextrose saline) for 5–7 days, which may be useful to reduce the severity of the disease.		
		Parasitic Gastroenteritis	Use of Anthelmintics are 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	<p>Footbaths/Foot soaks: There are two different types of solutions commonly used in foot baths: zinc sulphate and copper sulphate. For treatment, they should be used 1-2 times per week for several weeks.</p> <p>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</p>	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.	

			been successful in some cases		
		Trypanosomiasis	<p>A small number of curative and prophylactic drugs have been developed and can be employed.</p> <p>Drugs include Isometamidium chloride, Pyrithidium bromide, Quinapyramine sulfate, Homidium bromide and Diminazene aceturate</p>	<p>Bush clearing is one of the main techniques used to control tsetse populations</p> <p>Under zero-grazing systems, susceptible livestock can be protected from trypanosomiasis risk by keeping them in fly-proof shelters</p>	<p>Control of tsetse populations by eliminating their wildlife hosts has been attempted</p> <p>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.</p>
3	SWINE	Hog Cholera	-	Infected animals are usually culled and pen disinfected	-
		Foot and Mouth Disease	<p>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.</p>	<p>As a result of the loss of production and the infectious state of the disease, infected animals are usually culled</p>	

			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 diarrhoea and dehydration, Tylosin injection into the hip or neck. Repeat injection for 3 4days		
4	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 infections, 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	Strict isolation and quarantine, high standard of hygiene, good management, housing and nutrition.	-

			<p>good immune response.</p> <p>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.</p>	<p>During the outbreak of disease proper disposal of dead birds and zoning of the area can help to control the disease in surrounding flocks.</p>	
		Chronic Respiratory Disease	<p>Antibiotics can help to control the disease but reducing stress is an essential component to managing the disease once it is in the flock.</p>	<p>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</p> <p>During the outbreak of disease proper disposal of dead birds and zoning of the area can help to control the disease in surrounding flocks.</p>	-
		Coccidiosis	<p>Drugs that can be effective are sulphonamides, amprolium and toltrazuril as well as other anticoccidial agents.</p>	-	-

Table 3: Crop Value Chain Pest and Control Methods for ACREsAL Project

Crop	Pest	Control method		
		Cultural	Chemical	Biological
Cowpea	<i>Pod borer (Maruca testulalis)</i>	Monocropping should be avoided	insecticides such as Azodrin, Thiodan DDT, Dursban and Dimecron	Planting transgenic cowpea expressing the Bacillus thuringiensis (Bt-protein Cry1Ab)
	Thrips (<i>Megalurothrips sjostedti</i>)	1. Trap cropping such as sun hemp	dimethoate	Microbial insecticides
	<i>Aphis (Aphis craccivora)</i>	planting of cowpea at wider spacing	dimethoate	Microbial insecticides such as Metarhizum anisopliae and Beauveria bassiana
	<i>Sericothrips occipitalis</i>		dimethoate	
	White flies		dimethoate	Tephnosia vogelii
	<i>Callosobruchus maculatus</i>	Dry chilli pepper fruits, and scale leaves of onion	Fumigation of grains with phostoxin tablets	Cashew Nut Shell Liquid
Groundnut	<i>Caryedon serratus</i>			Tephnosia vogelii
	Groundnut aphid (<i>Aphis craccivora koch</i>)	Early sowing and close spacing	1. Apply pirimicarle 2. lambda -cyhalothrin and monocrotophos.	
Maize	Termites	1. Avoid continuous of the plant and cultivation of maize on the same piece of land 2. Plant early and are harvested early	insecticides such as gamma HCH or Carbofuran can be applied as soil treatment or to the mounds to control colonies	
	Stem borer (<i>Buseola fusca</i>)	1. Partial burning of harvested stalk kills the	Treatment with carbary	

		diapausing larvae. 2. Also complete destruction of dry stalks and stubble is effective in killing the larvae. 2. Deep ploughing after harvest 3. Early planting	(1.5 kg a.i. ha ⁻¹) applied twice at 2-3 weeks interval or carbofuran granule (3% a.i. ha ⁻¹) at planting and Lambda – cyhalothrin and monocrotophos	
	Ear borers	Do not grow maize with other cereals or cotton together on the same field		1. Use of resistant varieties 2. Apply contact insecticides such as endosulfan or synthetic pyrethroids
	Maize weevils	Proper drying of grains before bagging and storage	Fumigation of grains with phostoxin tablets	
	Leafhopper (<i>Cicadulina</i> spp)	Avoid repeating planting of maize on the same plot as this leads to a build-up of the pest	spray of carbaryl or fernitrothion and endosulfan	
	maize weevil (<i>Sitophilu zaemais</i>)	1. Drying grains to moisture less than 9%, 2. Seed treatment with wood ash or refined palm oil. 3. Early harvesting will reduce infestation. 4.Storage space should be free of weevils before new grains are stored	1. Aluminium phosphide. 2. Malathion	Planting resistant varieties
Sorghum	Leafhopper (<i>Cicadulina</i> spp)	Avoid repeating planting of sorghum on the same plot as this leads to a build-up of the pest	spray of carbaryl or fernitrothion and endosulfan	
	shoot fly (<i>Altherigona soccata</i>)	early planting	1. Application of Cypermethrin 2. Seed dressing with carbofuran	resistant varieties
	Stem borer (<i>Buseola fusca</i>)	1.Partial burning of harvested stalk kills the diapausing larvae. 2. Also complete destruction of dry stalks and stubble is	Treatment with carbary (1.5 kg a.i. ha ⁻¹) applied twice at 2-3 weeks	

		effective in killing the larvae. 2. Deep ploughing after harvest 3. Early planting	interval or carbofuran granule (3% a.i. ha ⁻¹) at planting and Lambda – cyhalothrin and monocrotophos	
	Sorghum midge (<i>Contarinia coquillte</i>)	Early and uniform planting of sorghum varieties	1.Sprays with monocrotophos and endosulfan 2. dusts of endosulfan and phospsalone	resistant varieties
Millet	Leafhopper (<i>Cicadulina</i> spp)	Avoid repeating planting of millet on the same plot as this leads to a build-up of the pest	spray of carbaryl or fernitrothion and endosulfan	
	stem borer (<i>Pennisetum americanum</i>)	1.Destroy all old millet stems to kill diapausing populations and clear stubbles 2. Early planting	1.Apply granular carbofuran to the soil at the time of planting and a side dressing 6 weeks later. 2. Spray Lambda-cyhalothrin 5-7 days after eggs are found	
	head miner (<i>Helioceilus albipunctella</i> de Joannis)	Late planting of early of maturing millet	Deltamethrin, cypermethrin, paramethrin and carbaryl	Planting resistant varieties
Rice	White stem borer (<i>maliarpha separatella</i>).	1. Weeding 2. Destroy stubble after harvest	Application of monocrotophos, chropyrifo and carbofuran	early maturing varieties
	African rice gall midge (<i>Orseolia oryzae</i>)	1. Early planting 2. Remove alternative host plants from around the crop to prevent the initial increase in pest population.	monocrotophos and carbofuran insecticide	
	Rice weevil (<i>Sitophilus oryzae</i>)	1. Drying grains to moisture less than 9%, 2. Seed treatment with wood ash or	1. Aluminium phosphide	Planting resistant varieties

		refined palm oil. 3. Early harvesting will reduce infestation. 4.Storage space should be free of weevils before new grains are stored		
Sugar cane	Sugarcane borer (<i>Eldona saccharina</i>)	Stubble should be burnt and crop residues buried	Endosufan or carbary	
	Termites	Killing the queen by manual removal	termiticides (imidacloprid or chlopyriphos)	
	Nematodes	1. Crop rotation. 2. Maintaining weed free fallows. 3. trash mulching or green manuring to promote beneficial organisms. 4. Minimum tillage to promote beneficial organisms		
	Internode borer	1. Dethrashing cane during fifth, seventh and ninth months. 2. avoid excessive nitrogen fertilizers		plant self dethrashing varieties
	Early shoot borers	1.early planting. 2.earthing up during early planting. 3. trash mulching. 4. pulling out dead hearts and killing the larvae 5. inter cropping with legumes		
	White grubs	1.crop rotation. 2. deep ploughing during dry season. 3. collection and destruction of adult beetles		
	Scale insects	1. Plant clean seed setts. 2. Rogue and burn infected sugarcane plant. 3. crop rotation with legumes	Pre-soak setts in malathion solution	De-trash or plant self-dethrashing varieties
Horticultural crops				
Pepper	Aphids (<i>Aphids craccivora</i>)		dimethoate	Planting resistant varieties
	Cutworms	1. Avoid mono cropping. 2. Planting trap crop such as millet, garlic. 3. spray cornmeal to kill the worms when they eat it	spray with endosulfan	

	Fruit flies	1. Crop rotation.2. Adjusting planting date. 3. Field sanitation. 4.		1. Planting resistant varieties. 2. Natural enemies such as wasps
	Leaf miner	1. Rotation with non solanaceous crops 2. Removal of infested plants. 3. Complete removal of post-harvest debris. 4 Ploughing 5. Soil solarization	cabaryl, pyrethrin and delatathrin	the use of sex pheromone to lure adults into traps
	Whiteflies	1. Crop rotation.2. Adjusting planting date. 3. Field sanitation.	1. Use of biopesticides such as neem. 2. Synthetic pesticide (Imidacloprid and lambda-cyhalothrin)	1. Planting resistant varieties. 2. Natural enemies such as wasps
	Thrips (<i>Thrips tabaci</i>)	1.Reflective mulches	1. dimethoate. 2. Microbial insecticides	Natural enemies include some species of predatory mite, pirate bugs and lacewings
Tomatoes	Leafminer (<i>Tuta absoluta</i>)	1. Rotation with non solanaceous crops 2. Removal of infested plants. 3. Complete removal of post-harvest debris. 4 Ploughing 5. Soilsolarization	1. Insecticides (cabaryl, pyrethrin and delatathrin). 2. the use of sex pheromone to lure adults into traps	1. The use of entomopathogenic fungal species. 2. The use of natural enemy such as nematode and parasite
	whitefly (<i>Bemisia tabaci</i>)	1. Crop rotation.2. Adjusting planting date. 3. Field sanitation.	1. Use of biopesticides such as neem. 2. Synthetic pesticide (Imidacloprid and lambda-cyhalothrin)	1. Planting resistant varieties. 2. Natural enemies such as wasps
	green aphid (tomato russet mite)	1. Crop rotation. 2. Maintaining weed free fallows. 3. trash mulching or green manuring to promote beneficial organisms. 4. Minimum tillage to promote beneficial organisms	dimethoate	1. Planting resistant varieties.
	root-knot nematodes	1. Green manure. 2. cow dung 3. composted agro waste. 4. poultry droppings	Spray with Furadan (3G)	

	spider mites	1. Reflective mulches. 2. remove infected plant	Synthetic pesticide (Dichlorvus and lambda-cyhalothrin)	
	fruit worms (<i>Helicoverpa armigera hubner</i>)	1. Avoid mono cropping. 2. planting trap crop such as millet, garlic. 3. spray cornmeal to kill the worms when they eat it	1.Synthetic pesticide (Carbaryl, karate, Cypermethrin, Diamethoate and Monocrophos). 2. Use of biopesticides such as neem.	Planting resistant varieties.
	cabbage looper			Natural enemies such as wasps and tachinid parasitoid
	Birds			
Onions	Bulb mites (<i>Rhizoglyphus</i> spp. and <i>Tyrophagus</i> spp)	1.Do not plant successive crops of onion in same location. 2. allow field to fallow to ensure that any residual organic matter decomposes completely. 3. treating onions seed with hot water prior to planting.		
	Leaf miners (<i>Lyriomyza</i> spp.)	1. Check transplants for signs of leafminer damage prior to planting. 2. remove plants from soil immediately after harvest	cabaryl, pyrethrin and deltathrin	the use of sex pheromone to lure adults into traps
	Onion maggot (<i>Delia antiqua</i>)	1. good sanitation 2. all onion bulbs should be removed at the end of the season as maggots will die without a food source	application of granular insecticides.	
	Thrips (<i>Thrips tabaci</i> , <i>Frankliniella occidentalis</i>)	1. Avoid planting onion in close proximity to grain fields. 2.overhead irrigation of plants may help reduce thrips numbers	dimethoate	Natural enemies include some species of predatory mite, pirate bugs and lacewings
Mango	Fruit fly (<i>Ceratitis cosyra</i> , <i>Bactrocera obliqua</i> , <i>Bactrocera frauenfeldi</i> ,	1. Collect the fallen fruits and destroy them. 2. Also harvest fruits early to reduce flies' damage. 3. Use traps to monitor fruit flies. 4.	If infestation is severe spray suitable insecticide	

	<i>Anastrepha spp.</i>)	Spraying protein bait under leaf surface attract flies to single spot which make easier to kill them.		
	Mango hoppers (<i>Idioscopus clypealis</i> , <i>Idioscopus nitidulus</i> and <i>Amritodus atkinsoni</i>)			
	Mango ealy bugs (<i>Drosicha mangiferae</i>)	1. Collect and burn fallen leaves and twigs. 2. Flooding orchard with water during October kills egg present in soil. Also, deep ploughing in November exposes egg to sunlight. 3. After hatching the nymphs start climbing tree and suck sap. To avoid this band the tree trunks with polythene sheet at a height of about 30 cm from the ground level and apply grease at the lower edge of band.	If infestation is severe, you can spray suitable insecticides	1.To control insects already on tree you can spray fish oil rosin soap or azadirachtin (neem products). 2. soil application of the spores of the fungus, Beauveria bassiana helps in reducing mealybug population.
	Mango tree borer (<i>Batocera rufomaculata</i>)	probing injury sites with a knife or piece of wire can help to destroy larvae and eggs	Application of appropriate insecticide to the trunk and branches of the tree when adult insects are present	
	White Mango Scale (<i>Aulacaspis tubercularis</i>)	1.Remove the infested plant parts and burn them. 2.Spraying emulsive oil will helps in reducing scale population.	Spray with suitable insecticides at recommended quantity	

5.6 Veterinary Medical Wastes Handling.

The types of wastes generated in veterinary practices, the basic rules of the thumb governing their management, their impact on the environment and appropriate ways for handling these wastes are given below in Table 4.

An appraisal of the existing management methods for VMW was carried out through a SWOT analysis of the current situation as shown in Table 5. This analysis identified the strengths, weaknesses, opportunities and threats in the current system, which would serve as a basis for the development of better VWM practices as well as related monitoring and evaluation.

Table 4: Veterinary Medical Waste Handling

Types of Waste Generated	Rules Governing Waste Management	Waste Impact	Waste Handling
Infectious wastes (wastes that have come in contact with blood or body fluids of animals)	Wastes should be separated from other wastes by collecting them in separate and labelled containers.	Water and Air Pollution	Wastes should be pre-treated by incineration before disposal with general wastes
Pathological wastes (organs, body parts, body fluids and carcasses of infected animals)		Water and Air Pollution and land	
Sharp wastes (used scalpels, blades, syringe, needles etc)		Air, Water and Land Pollution	
Chemical wastes (laboratory reagents, solvents, sterilants, heavy metals in equipment eg thermometer, batteries)		Air, Water and Pollution	Decontamination
Pharmaceutical / Cytotoxic wastes (unused, contaminated and expired drugs and vaccines)		Air, Water and Land Pollution	Decontamination
Radioactive wastes (wastes polluted with radionuclides and radiotherapeutic materials)		Air, Water and Pollution	Containment
Non-hazardous/ general wastes		Wastes should be separated from other hazardous wastes	Air, Water and Pollution

Table 5: SWOT Analysis of the Current VMWM Practices.

STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
<ol style="list-style-type: none"> 1. Existence of environmental regulations and legislations which supports waste management in Nigeria. 2. The current practice of burning of the veterinary medical wastes is appropriate for killing the pathogens in the wastes. 	<ol style="list-style-type: none"> 1. There are no specific laws and policies on veterinary medical wastes in Nigeria. 2. Lack of data records on veterinary medical wastes generation rate. 3. Lack of appropriate disposal facilities for veterinary medical wastes. 4. Lack of awareness and trainings on danger in mishandling veterinary medical wastes. 5. Possibility of mixing up of veterinary medical wastes with municipal wastes without pre-treatment. 	<ol style="list-style-type: none"> 1. Establishing the need for veterinary medical wastes handlers will open up employment opportunities. 	<ol style="list-style-type: none"> 1. Lack of trainings for veterinary medical wastes handler can lead to mishandling of the wastes and exposure to occupational hazard. 2. Current practice of improper sorting of veterinary medical wastes before disposal can lead to pollution of soil, land air.

The ACRoSAL project with other donor agencies/ partners in the country will interface with the FADAMA offices in the project states and the TRIMING projects. A lot of experiences and successes have been gained in Nigeria under FADAMA II and III projects, the TRIMING and NEWMAP projects, including application of IPM operations. Therefore, the ACRoSAL project 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

ACReSAL beneficiaries would not require much experimentation time lag in the implementation of this IPM and VMWM Plan.

5.7 Occupational and Health Measures for the Implementation of the of IPM

Personal Protective Equipment (PPE)

It is vital that the people who will be involved in the application and handling of pesticides under the ACReSAL 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 goggles: 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 become 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 cover shoes are suggested since they prevent absorption and are easy to clean.
- Overall 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.

Guide to 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 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.

5.8 Planning Matrix for Livestock and Crop Pests and Veterinary Medical Waste

The planning matrix for livestock and crop pests and diseases and the veterinary medical waste for the ACRE SAL are shown in Tables 6, 7 and 8. Component activities and expected results of the IPM/VMWM plan are shown in Table 9.

Table 6: Planning Matrix for Livestock Pests

Narrative summary	Expected results	Performance indicators	Assumptions/risks
Goal: Enhance the capacity of Veterinarians health to contribute to human and animal health disaster reduction through environmentally friendly pest management practices.	<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 	<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

		increase in use of non-chemical or safe chemical applications on mosquito control around human settlement.	
<p>Purpose</p> <p>(i) improvement in efficiency of specimen transport and disposal system;</p> <p>ii) increase awareness on use and safety of application of chemicals for pest/vector control;</p> <p>(iii) document and disseminate key lessons to users and stakeholders;</p> <p>iv) reduction in the use of harmful or banned chemicals/pesticides 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 ACRoSAL 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 animal 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 linkages established to develop a national IPM policy to promote compliance 	<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 	<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 compliances parameters of the donor etc • Level of chemical control practices • Type and level of use of alternative to synthetic pesticides.

	with international conventions and guidelines on safe pesticide use.		
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Table 7: Planning Matrix for Crop Pests

Narrative summary	Expected results	Performance indicators	Assumptions/risks
<p>Goal: Enhance the capacity of Agronomist and crop production workers to contribute to sustainable crop production human and crop health through environmentally friendly pest management practices in crop production practices.</p>	<ul style="list-style-type: none"> • Improved crop, animal and public health and well proper disposal of pesticides and agricultural waste • Increased national and community surveillance and preparedness on crop and human health risk disaster management; • Increase capacity of institutions to manage crop pest and diseases outbreaks in environmental and socially safe manner; • Increase crop production capacity and productivity, number of Agricultural workers in the management of crop pest and diseases. • Empowerment opportunity and increased income for farming household in northern Nigeria 	<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 agricultural workers in management of crop pest and diseases. • Evidence of reduction in use of pesticides. • Increase in crop productivity and income for agricultural workers and farmers. • Evidence of increase in use of Bio pesticides or safe chemical applications on crop and even on 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) In the immediate future, halt and reverse losses cause by pest and diseases in order to increase productivity and profitability of farmers in northern Nigeria</p>	<p>Medium-term results/outcomes</p> <ul style="list-style-type: none"> • Agricultural institutions and those that control/use pesticides can prioritize pest problems, specifically with the ACREsAL and identify IPM opportunities to 	<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 	

<p>(ii) In the long term strengthen national and local capacity to reduce environmental and health risks associated with pest management practices in northern Nigeria.</p>	<p>mitigate negative environmental and social impacts associated with pesticides.</p> <ul style="list-style-type: none"> • Agricultural and Health institutions and those that control/use pesticides can adopt ecologically sound options to reduce 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 crop and health management; • Collaborate linkages established to develop a national IPM policy to promote compliance with international conventions and guidelines on safe pesticide use. 	<p>compliance parameters of other donors etc.</p> <ul style="list-style-type: none"> • Level of chemical control practices • Types and level of use of alternatives to synthetic pesticides 	
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Table 8: Planning Matrix for Veterinary Waste Management

Narrative summary	Expected results	Performance indicators	Assumptions/risks
<p>Goal: Enhance the capacity of Veterinary clinic to handle veterinary medical wastes through environmentally friendly management practices.</p>	<ul style="list-style-type: none"> • Improved safety in the surroundings of veterinary clinics; • Increased national and community surveillance and preparedness on veterinary waste management; • Increase capacity of institutions to manage veterinary wastes in environmental and socially safe manner; • Increase number of private firms trained on handling of veterinary medical wastes. 	<ul style="list-style-type: none"> • Absence of veterinary medical wastes mixed up with general wastes. • Evidence of veterinary medical wastes pre-treatment facilities within the premises of veterinary clinics. • Evidence of the number of persons and institutions trained on safe veterinary medical waste management practices • Increase in number of accredited private firms for handling and safe disposal of veterinary medical wastes. 	<ul style="list-style-type: none"> • National security remains stable • Government commitment to implement national regulations and conventions on handling of hazardous wastes.
<p>Purpose (i) improvement in efficiency of veterinary wastes pre-treatment, collection, transportation and disposal system; ii) increase awareness safe handling of veterinary medical wastes; (iii) document and disseminate key</p>	<p>Medium-term results/outcomes</p> <ul style="list-style-type: none"> • Health institutions and those that handle diseased animal’s pesticides prioritize safe handling of veterinary medical wastes, specifically with the ACRoSAL and identify VPM opportunities to mitigate negative environmental and social impacts associated with veterinary medical wastes • Policy makers in Health institutions and agric. 	<ul style="list-style-type: none"> • Commitment of government to implement VWM across the national health and agricultural sector spread. • Level of compliance with World Bank safeguards, and compliance parameters of other donors etc. • Level of veterinary medical wastes pre- 	<ul style="list-style-type: none"> • Commitment of government to implement IPM across the national health and agricultural sector spread. • Compliance with World Bank safeguards and compliances parameters of the donor etc

<p>lessons to users and stakeholders;</p>	<p>Organizations and associations are strengthened and provided with guidelines enabling them to promote VWM approaches and</p> <ul style="list-style-type: none"> • Collaborate linkages established to develop a national VWM policy to promote compliance with international conventions and guidelines on safe handling of veterinary wastes. 	<p>treatment facilities put in place in veterinary clinics</p> <ul style="list-style-type: none"> • Types and level of use PPEs by waste handlers. 	
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Table 9: Activities and Expected Results of the IPM/VMWM Plan for the ACREsAL Project

Activities	Expected results	Milestones	Performance indicators	Assumptions/risks
<p>1. Record stakeholders' overviews on Livestock pests and staple crop pest.</p> <p>2. Conduct field diagnosis to specify pests that undermine Livestock and stable crop production.</p> <p>3. Identify livestock and crop farmers' coping mechanisms and researcher recommended IPM options against the pests.</p> <p>4. Develop and explain historical profile of pesticide use and other pest control practices in the project states.</p> <p>5. Specify partnership opportunities at local, national and international levels to assist in the implementation of the PMP</p>	<p>Result 1: Livestock and staple crop farmers 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 and crop 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 ACREsAL 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 ACREsAL 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 and crop rotation scheme to reduce build-up of named pest species • Type of composting and mulching as alternatives to mineral fertilizers. • List of principal actors and of 	<p>Social, economic and political situation remain stable</p>

			partners	
<p>1. Develop participatory learning modules (PLM) in line with Identified training needs.</p> <p>2. Conduct short to medium term training of beneficiaries, potential ACRoSAL 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 and crop farmers in IPM knowledge and skills.</p> <p>5. Promote farmer-led extension to increase secondary adoption of proven IPM options</p>	<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 for technical support staff • Personnel of the ACRoSAL 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 	<ul style="list-style-type: none"> • Type and number of PLMs developed • Type of IPM skills covered in study visits by ACRoSAL staff • 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 	<p>State PIUs of ACRoSAL adopts and apply new improved technologies.</p> <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>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>disseminated and used by extension agents and farmers.</p> <ul style="list-style-type: none"> • Significant reduction in pest damage 	<p>control</p> <ul style="list-style-type: none"> • Type and number of user-friendly taxonomic keys for pest and natural enemy recognition by farmers and extension workers 	
<p>1. Test and promote botanical alternatives to synthetic pesticides.</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</p>	<p>Result 3: Harmful pesticide regimes replaced by environmentally friendly alternatives</p> <p><i>In partnership with the:</i></p> <ol style="list-style-type: none"> 1. <i>SP-IPM for sustainable access to microbial pesticides.</i> 2. <i>Nigeria node (at IAR/ABU) of the West African Network for</i> 	<ul style="list-style-type: none"> • Local commercial enterprises initiated and/or strengthened to produce and/or market botanical pesticides • 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 	<ul style="list-style-type: none"> • Level of reduction in chemical pesticide use; type and number of pesticides replaced by botanical or microbial pesticides • 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 PCU of the ACREsAL project and pesticide 	<p>Government and development partners remain committed to international conventions and guidelines on safe pesticide use</p> <p>Critical mass of staff trained remain within the ACREsAL communities</p>

<p>advisory and oversight committee to guide national and local compliance with World Bank Environmental Social Standards ESS 3 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><i>Taxonomy (WAFRINET) and IITA biodiversity center for identification services.</i></p>	<p>banned/harmful pesticide regimes is fully operational</p> <ul style="list-style-type: none"> • 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 	<p>dealers/service providers</p> <ul style="list-style-type: none"> • Effectiveness of the IPM advisory and oversight committee • Number of pest surveillance groups and pesticide law enforcement mechanisms • Effectiveness of public awareness of campaign 	
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PART 6: IMPLEMENTATION STRATEGY FOR THE IPM/ VMWM PLAN

6.1 Introduction

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

To ensure that the IPM and VMWM Plan is optimally implemented, a number of steps/ actions will be required. These include:

- i. Measures that will ensure capacity building among stakeholders that will implement the IPM/ VMWM plan as well as beneficiary associations and youths expected to be involved in livestock production under the ACRoSAL project
 - ii. Measures to ensure that POPs pesticides and WHO class 1 and 2 pesticides considered highly hazardous are not procured and/or used
 - iii. Measures that will ensure that both crop and 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.
 - iv. Training on the best disposal methods for pesticides cans and veterinary medical wastes.
 - v. Measures that will ensure that pest resistant varieties of crops and livestock are procured as a better pest control alternative
 - vi. Need to ensure that funding and approval process for IPM implementation are well coordinated and effective
- Monitoring and evaluation resources should be provided in due time to ensure no set back in monitoring activities.

6.2 Implementation, Monitoring and Reporting Roles and Responsibilities

Table 10 summarizes The roles and responsibilities associated with the implementation, monitoring and reporting activities of the IPM and VMWM plan.

Table 10: IPM and VMWM Plan Implementation, Monitoring and Reporting Roles and Responsibilities

NO	Responsibilities/ Activities	Stakeholders
a.	Technical advice, support and capacity building, monitoring and feedback to States and LGAs on ACRoSAL project	National Steering Committee (NSC)
b.	Technical expertise and advice, guidance and directives on pest control applications, monitoring and evaluation (M&E); coordination between the project and project communities.	National Project Coordinating Office of the Federal Ministry of Environment (FME)
c.	Provision of general services and supporting the Implementation of project at community level	ACReSAL Project Host Communities, Zone Level Special Purpose Vehicle (SPV) and Non-Governmental Organizations (NGOs)
d.	Provide technical, supervisory and financial support.	World Bank
e.	Coordination at State level. Project Implementation, Sensitization programs and capacity building on IPM/ VMWM plan practise. Preparing State-based IPM/ VMWM plan guidance manuals to foster IPM/ VMWM plan in the states and country as a whole.	The SPMUs with supports from State Agricultural Development Project (ADPs); FADAMA III, State and Federal Department of Agriculture, Federal Ministry of Works, Federal Ministry of Water Resources, Federal Ministry of Works and Federal Ministry of Water Resources.
f.	Consultations, planning and Preparation of IPM/VMWM plan	SPMU and Consultants
g.	Review of IPM/VMWM plan	SPMU and World Bank
h.	Disclosure of IPM/VMWM plan	SPMU
i.	Internal Monitoring	SPMU
j.	External Monitoring and Approval	Consultants, NGOs, World Bank
k.	Preparation of Monitoring and Evaluation Report of IPM/VMWM plan and Disclosure	SPMU
l.	Establishment of IPM/VMWM plan Committees	SPMU
m.	Organization of necessary training and capacity building measures for the different units and other partner organizations and committees;	SPMU

6.2 Capacity Building

There is need to train and enlighten stakeholders on different aspects of the IPM/ VMWM plan requirements necessary for their project support. Existing capacities in Nigeria for the implementation of IPM/ VMWM plan are very limited considering the geographic spectrum and healthcare facilities needed to effectively implement IPM and VMWM Plan. Furthermore, there is the need for farm owners, animal scientists, extension workers, farm workers, herdsmen, veterinary workers, agronomists, health facility based environmental officers, health care workers and MDAs to have proper capacities for implementing the plan and related World Bank templates and requirements. Table 11 summarizes the training needs that have been proposed for the ACREsAL project.

Table 11: Capacity Building Plan and Cost estimate for IPM and VMWM under the ACREsAL Project

Modules	Targets	Responsibility Arrangement	Budget in USD
Overview of World Bank Environmental and Social Safeguards (emphasis on ESS3)	Agronomist, animal scientist, veterinarian, extension workers, HCF health worker, and ACREsAL staff. (Train 456 persons, 24 person per state @ \$125 per person across the 19 ACREsAL project States in 5 years.)	Safeguards Consultant	57,000
Occupational Health and Safety (OHS): Basics in Chemical Pest Control	Agronomist, animal scientist, veterinarian, extension workers, HCF health worker, crop farmers, Animal farmers and ACREsAL staff. (Train 608 persons, 32 person per state @ \$125 per person across the 19 ACREsAL project States)	Independent Consultant	76,000

Modules	Targets	Responsibility Arrangement	Budget in USD
Safe Chemical Pesticide Management (transportation, storage, handling, storage and disposal of empty pesticide containers)	<p>Agronomist, extension workers, HCF health worker, crop farmers, ACREsAL staff, agro-input dealer.</p> <p>(Train 456 persons, 24 person per state @ \$125 per person across the 19 ACREsAL project States).</p>	Independent Consultant	57,000
Safe Veterinary medical waste Management (transportation, storage, handling, storage and disposal of empty Veterinary medical waste containers)	<p>Animal scientist, veterinarian, extension worker, HCF health worker, livestock farmer, ACREsAL staff.</p> <p>(Train 456 persons, 24 person per state @ \$125 per person across the 19 ACREsAL project States).</p>	Independent Consultant	57,000
Decision making on the selection of IPM approaches or options	<p>Agronomist, animal scientist, veterinarian, extension workers, HCF health worker, and ACREsAL staff.</p> <p>(Train 456 persons 24 person per state @ \$125 per person across the 19 ACREsAL project States)</p>	Independent Consultant	57,000
IPM Implementation and Monitoring	<p>Agronomist, animal scientist, veterinarian, extension workers, HCF health worker, and ACREsAL staff.</p> <p>(Train 570 persons 30 person per state @ \$125 per person across the 19 ACREsAL project States)</p>	Independent Consultant	71,250
Small group consultations	<p>Agronomist, Animal scientists, veterinarians, extension workers, HCF health workers, livestock farmers, crop farmers NGOs and ACREsAL staff.</p> <p>(Train 760 persons 40 person per state @ \$125 per person across the 19 ACREsAL project States)</p>	Independent Consultant	95,000

Modules	Targets	Responsibility Arrangement	Budget in USD
Environmental management in pest control	<p>Agronomist, Animal scientists, veterinarians, extension workers, HCF health workers, ACREsAL staff,</p> <p>(Train 456 persons, 24 person per state @ \$125 per person across the 19 ACREsAL project State.</p>	Independent Consultant	57,000
Breeding of natural enemies of pests	<p>Agronomist Animal scientists, veterinarians, extension workers, HCF health workers, ACREsAL staff, members</p> <p>(Train 456 persons 24 person per state @ \$125 per person across the 19 ACREsAL project State.</p>	Independent Consultant	57,000
Total			584,250

6.3 Monitoring to Ensure that WHO Class I and II Pesticides Are Not Used

This section sets out requirements for the monitoring of the environmental and health impacts of the pesticide's management activities. Monitoring and evaluation of the agricultural support IPM will be mainstreamed into the overall monitoring and evaluation system for the ACREsAL projects. 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/VMWM plan implementation vis-à-vis the results.

Specifically, the following are monitoring indicators required to achieve IPM/VMWM plan 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 and pesticides and veterinary medical waste management;
- decline or increase in livestock pests/diseases within the ACREsAL projects beneficiary states;
- 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 crops and livestock;
- improvement in crop and 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 crop and livestock farmers' associations;
- Level of involvement of youth and women in crop and 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 crop and livestock production among the ACREsAL projects beneficiaries; increase in farm revenue; social benefits: e.g., improvement in the health status of farmers; level of reduction of pesticide purchase and use.

Sustainability of Process and Results: Short-term technical study visits to FADAMA agriculture projects, TRIMING project and other ADP projects with proven success in IPM development and implementation will help to create favourable 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 ACREsAL projects beneficiary groups.

Evaluation of Results: The evaluation of results of IPM in the ACRoSAL projects can be carried out by comparing baseline data collected in the planning phase with targets and post project situations.

6.4 Institutional Arrangements and Framework for Implementation

Project implementation would follow the NEWMAP model and will be implemented through existing Nigeria Erosion and Watershed Management Project (NEWMAP, P124905) Project Management Units (PMUs), which is already in place at the Federal Ministry of Environment and State Departments of Environments. NEWMAP is under implementation since 2013 under WB Operation Policies. The existing PMU is familiar with the Bank E&S requirements and Operation Policies, however, might benefit from capacity strengthening on Bank ESF policy and requirements. Synergy with FADAMA and TRIMING operations/locations will be an important factor in site selection but not necessary. Therefore, the PMUs in participating States and at the national level would need to be strengthened where necessary to deliver all project activities.

However, given the multi-sectorial nature of this operation, the institutional arrangement of ACRoSAL will be led by the National Steering Committee that will be chaired by the Honorable Minister of Finance while the Honorable Minister of Environment shall serve as co-chair. Other members shall include Honorable Minister of Water Resources and the Honorable Minister of Agriculture and Rural Development (FMARD) and Heads of relevant Agencies and Departments. The National Steering Committee shall ensure inter-ministerial coordination and policy direction and engagement of the broader agro-climatic resilience engagements and related climate change actions.

Inspection and Reporting Arrangement

National Steering Committee (NSC)

The NSC shall exist at the Federal level. With respect to the IPM/ VMWM plan, it shall:

- provide technical advice and support as well as build capacity of States and LGAs on ACREsAL project;
- monitor ACREsAL project implementation at all levels;
- provide prompt and efficient response mechanism
- review periodically animal and crop pest and diseases -related data to determine their frequency of occurrence;
- provide feedback through quarterly bulletin, monthly newsletter and meetings.

National Project Coordinating Office (NPCO)

The Federal Ministry of Environment (FME) is the lead implementing agency for ACREsAL. A Federal Project Management Unit (FPMU) headed by a Federal Coordinator hosted by FME is responsible for overall coordination. At the National level, a program coordinating office will oversee the Project coordination and management under the responsibility of FME in Abuja. It will be in charge of the management of the designated account, overall project coordination, monitoring and evaluation, and communication.

ACReSAL Project Implementation Unit (PIU)

Since activity implementation will be State led, there would be a small and fit for purpose unit Federal Project Coordinating Unit to provide supervision and technical support to States as needed. States project steering committee similar to that at the Federal level will have a Project Management Unit. The SPMUs will be staffed with a broad range of expertise, supplemented by secondments from the relevant MDAs. Details of the institutional arrangements of ACREsAL will be fleshed out in coordination with the client during project preparation. State Project

Management in each participating State will be headed by a State Coordinator and hosted by each State's Ministry of Environment.

State Ministries of Agriculture (SMAs)

The State Ministries of Agriculture will perform a supervisory role together with the State SPMU. State Ministry of Agriculture will be responsible for ensuring agricultural personnel availability, to enable sensitization programs and capacity building on IPM/ VMWM plan practices. SMAs will also be responsible for preparing State-based IPM/ VMWM plan guidance manuals to foster IPM/ VMWM plan in the zone country as a whole.

State Agricultural Development Project (ADPs); FADAMA III, State and Federal Department of Agriculture

These three are very specialized implementation actors with local and international knowledge on IPM/ VMWM plan, and in agricultural practices in Nigeria. They will establish linkage between each other to support the ACREsAL Project in technical expertise and advisory.

Technical responsibilities will include:

- development of subsequent IPM training programs for the ACREsAL Project states;
- advice on selection of best value chain varieties to ensure project outputs are achieved and also foster IPM.
- ensuring that proffered IMP controls as contained in this report are applied. They will be vital for providing guidance and directives on pest control applications and monitoring and evaluation (M&E);
- breeding of natural enemies (Biological Control): Through the provision of funding by the World Bank, each actor will be responsible for setting up facilities for breeding natural enemies and provide advice on subsequent capacity building needs in breeding of natural hosts.

Agricultural Development Project (ADP) Zonal Management Offices

The zonal management office will be responsible for direct on-site IPM/ VMWM plan activities. The office will liaise with local crop and livestock farmers, Community Based Organizations (CBOs) etc. It will be responsible for continuous trainings of ACREsAL Project site personnel, and the management of planting materials. Together with the ACREsAL Project Coordinating Unit it will perform M&E tasks and ensure coordination between the project and project communities.

Zone Level Special Purpose Vehicle (SPV)

The ACREsAL Project states are to be developed, managed and operated under investment driven strategic partnership with the private sector. A zone-specific project company shall be established at the level of each ACREsAL Project. This project company will be registered as a Special Purpose Vehicles (SPV), under Public-Private-Partnerships between either of the Federal, State and Local Governments (or a combination) and private sector entities to provide the requisite.

SPVs will provide services, including:

- infrastructure development including the rehabilitation, modernization, expansion, development and distribution of on-site infrastructure and utilities, including gas, water, electricity, communication, roads etc;
- provision of specialized agriculture infrastructure and services, including primary processing centres, quarantine facilities, storage facilities etc;
- provision of general services, including warehousing, transportation etc.
- provision of support infrastructure, social infrastructure and the provision of real estate services;
- facilities management, including general project site management, managing infrastructure on the site and the collection of fees and rates to cover for the services provided;

- market the site and attract further investment.
- On the aspect of IPM/ VMWM plan implementation, SVCs will work closely with other implementation groups as where required.

Roles and Responsibilities of ACREsAL Project Host Communities

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

- integrate community developmental goals with those of the ACREsAL Project for economic and social transformation;
- promote group formation and establishment of relevant security personnel for safeguarding the activities within the zone and its environs;
- provision of appropriate security measures to protect lives and properties of investors
- Cooperate with the EMC and other partners to ensure that activities carried on in the ABIR are consistent with the goals of the states;
- organization of farmers into cooperatives for easy access to loan facility for production and processing facilities.

Roles and Responsibilities of Non-Governmental Organizations (NGOs)

The roles of NGOs in the ACREsAL locations and to the benefiting communities would include the following:

- encouragement of marketing of processed goods of the ACREsAL;
- participation in identification of beneficiary communities' project needs;
- assistance in funding community development projects.

Roles and Responsibilities of Donor Agencies (World Bank)

The role of donors shall include:

- assisting in providing financing and technical assistance toward the establishment and sustainability of the ACREsAL Project states and ensuring implementation of the IPM/WMWMP to meet the donor's safeguard requirements;
- the donor will also ensure that other safeguard instruments prepared for the ACREsAL Project are implemented and used to complement each other where appropriate.

Responsibilities of Federal Ministries

Federal Ministry of Agriculture and Rural Development (FMARD)

The FMARD, through its Department of Agric.-Services, Animal Husbandry Services, Agro-Processing and Marketing Department will provide overall leadership and direction to the other Ministries in the facilitation of the desired operational environment for the ACREsAL Project states.

Specific roles will include:

- provision of the policy and legal framework for ACREsAL Project states in Nigeria with a view to ensuring stability and sustainability.;
- facilitating the provision of funding to support the development and sustenance of ACREsAL Project states;
- engaging all the critical stakeholders and securing their support, cooperation and participation in the implementation of this policy;
- 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.

Federal Ministry of Works

- facilitate the rehabilitation of existing/construction of new access roads/road infrastructure to link the ACREsAL Project states to major road networks;
- rehabilitation/expansion of feeder roads connecting major clusters of agricultural production

Federal Ministry of Water Resources

- assist in the determination of hydrology potentials of IPM/WMWMP sites;
- exploration and utilization of appropriate technologies to provide potable water to ACREsAL Project beneficiary communities

Federal Ministry of Environment

- establishment of ACREsAL Project specific environmental and social policy guidelines to reduce delays in obtaining approvals for ACREsAL Project development;
- ensuring compliance of ACREsAL Project states to specific environmental and social policy guidelines.

Federal Ministry of Health

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

- provide technical guidelines, set regulations and ensure quality control for laboratory services in the country;
- provide prompt and efficient response mechanisms for emergencies including epidemics and notify appropriate authorities.;
- conduct health risk assessments for workers involved in pest control in the livestock and crop production subsector;
- Provide feedback to States and the stakeholders involved in ACREsAL Project on public health matters.

Role of World Bank

The role of World Bank in ACREsAL Project implementation are;

- Provide technical, supervisory and financial support
- Support the establishment of the ACREsAL Project resources center
- Support research on new trends in ACREsAL Project
- Provide technical guidance and support to the ACREsAL Project Technical Committee
- Collaborate with all tiers of government for improving ACREsAL Project objective

Objectives of IPM Monitoring and Evaluation

The objectives of monitoring and evaluation for the IPM/WMWMP are to measure and assess the implementation of the IPM/WMWMP against the set objectives with a feedback loop that would subsequently inform the implementation of the IPM for result. The overall impact of the

M&E is to detect early, gaps in the implementation as well as areas where planned measures were not sufficient to address pest management for categories of animal and /or crop pest. Information feedback from M&E will be helpful to ACREsAL project implementation agencies and redesigning their methods of IPM/VMWM plan mix to ensure effectiveness of intervention.

Therefore, the specific target of the M&E of the ACREsAL projects are;

- Providing timely information about the success or otherwise of the IPM/VMWM plan operation process outlined in this report. This will ensure continuous improvement in the ACREsAL projects states;
- Make a final evaluation in order to determine whether the mitigation measures incorporated in the IPM/VMWM plan have been successful.

PART 7: BUDGET FOR IPM/VMWM PLAN IMPLEMENTATION

Table 12 provide indicative budget for implementation of the ACREsAL projects IPM and VMWM Plan over a 5-year period. Approximately US\$ 1,599,950 will be required to effectively implement the IPM/ VMWM plan for the ACREsAL project for a 5-year period as outlined below:

Table 12: Summary Budget for ACREsAL Projects IPM/VMWM Plan Implementation

LINE ITEM	Year 1	Year 2	Year 3	Year 4	Year 5	Total
1. Capacity building & Awareness						
All training programs	116,850	175,276	204,488	87,636	0	584,250
Radio jingles and handbill on IPM	30,000	20,000	10,000	0	0	60,000
<i>Sub-total</i>	146,850	195,276	214,488	87,636	0	644,250
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/disease surveillance	10,000	10,000	5,000	4,000	4,000	33,000
Mitigation Costs (provision of safe alternative, enforcement)	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						
IPM/VMWM plan 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	520,850	479,276	385,338	158,561	55,925	1,599,950

PART 8: SUMMARY OF PUBLIC CONSULTATIONS

An integral part of preparing the IPM is stakeholder's consultations which is necessary to obtain relevant information at all levels of the project, ensure stakeholder buy-in, promote implementation success and project sustainability. The focus stakeholders consulted include the State Ministry of Agriculture and Livestock services, Ministry of Environment, Ministry of Health, Pesticide product retailers, Agricultural Development Projects (ADPs), NEWMAP farmers group, Ministry of Land and Housing and Ministry of information. The consultations were carried out in the form of interactions between consultants and stakeholders. A summary of consultations held is presented in this section.

8.1 Initial Consultations

Following the award of contract and contract agreement signed, meetings were held with the client to obtain relevant information needed for the prompt execution of the project, information about the crop and livestock sectors and the value chains of importance to the ACRoSAL projects.

8.2 Field Survey/ Consultations

Groups consulted for the purpose of developing the IPM include:

- a) Crop and Livestock farmers, retailers, product processors, consumers;
- b) Value chain farmers association (crop and 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, works etc.);
- g) Federal Ministry of Agriculture and Rural Development (FMARD);
- h) Pest Product Retailers;
- i) Veterinarians/ Veterinary Health Centres;
- j) FADAMA;
- k) ADPs.

The consultations held with the different stakeholders were to inform and listen to them regarding the ACREsAL project development, objectives of the projects as well as document their perceptions and concerns. Specifically, the consultations were aimed at obtaining information on crop and livestock pests, management practices and Veterinary medical waste management. In addition, it provided a platform to inform stakeholders on the concept of and the need to embrace and promote environmentally friendly pest management, which is the core value of the IPM/VMWM plan. The gain of the consultations is the gathering of local data and information on the use of pesticides, common animal and crop pests and diseases, prevailing culture of pest control and concerns of the livestock and crop farmers.

The information gathered revealed that with respect to pest management, there is indiscriminate sales, handling and application of pesticides in the project areas. These result to environmental pollution during which the atmosphere, water bodies and land get contaminated. Fake or substandard pesticides were observed to have flooded the markets across the study areas, this apart from the environmental contamination also results to low productivity that seriously reduce crop yield. It was further observed that the predominant people involved in the pesticides business are neither certified nor trained on the use of such chemicals, hence pesticides are sold to farmers out of guide. It was suggested that the IPM should include development of rules and regulations that would govern the sales, handling and application of pesticides and mechanism to ensure that they are strictly observed and adhered to. The monitoring mechanism should also ensure that only the recommended pesticides are used by the farmers. Ministry of Agriculture, ADPs and farmers group are expected to play significant roles to assist in the implementation of the laws.

It was also discovered that veterinary medical wastes are disposed indiscriminately across the project targeted areas, accordingly this result to environmental pollutions such as land and water bodies. There is currently no existing policy with regard to the proper handling and disposal of veterinary medical wastes. It was then recommended that the veterinary medical waste management plan should capture developing viable policies on the disposal of the wastes. There should however be monitoring and evaluation exercise on the waste handling and disposal by an active agency. The recommended stakeholders to assist in solving the above-mentioned problems are ACRESAL project as the main driving force, farmers group, Ministry of Agriculture and ADPs.

The IPM//VMWM plan benefitted immensely from the contributions of stakeholders. (*Full details of consultations are provided in Annex*). In accordance with the Nigerian EIA Law and the World Bank Disclosure Procedures, this plan 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 further review and input from stakeholders.

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ANNEX 1: List of Banned Pesticides

1. Aldrin
2. Chlordane
3. DDT (Dichlochlorophenyl 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 2: List of Livestock and Crop Protection Products Approved for Use by NAFDAC

a) Insecticides

Organochlorines insecticides	Organophosphorus insecticides	Carbamates	Pyrethroids
1. Endosulfan 2. Helptachlor 3. Lindane (Restricted to use on Cocoa only)	<u>Organophosphorus i</u> 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

Organophosphorus	Carbamates	Other herbicides	Fungicides
<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) 6. Chlorophenoxy herbicides (Prometryn; Simazine; 2.4-D (2.4 Dichlorphenoxy acetic acid)) 7. Urea and guanidines; (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. Triasulfuran (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)

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 labelled 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

Labelling

Pesticides should be packaged and labelled 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 hole 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 3B: International Code of Conduct on Pesticide Management

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 4: 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 5 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
Clorpyrifos 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, diarrhoea, 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
Malathion (1)	III (Slightly hazardous)	The substance may have effects on the nervous system, causing convulsions, muscle cramps, vomiting, diarrhoea, excessive salivation, sweating, difficulty breathing, 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
Dizinon	II (moderately hazardous)	The main symptom of soft acute diazinon poisoning is 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 diarrhoea Effects on the central nervous system may include confusion, anxiety, drowsiness, depression, difficulty in concentrating, slurred speech, poor recall, insomnia,	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 behavioural disturbances.

		nightmares and a form of toxic psychosis resulting in bizarre behaviour.	
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, diarrhoea, blurred vision, pin-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

ANNEX 6 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

Highly Hazardous (Class 1b) Pesticide

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
Acephate [ISO]	30560-19-1	
Acifluorfen [ISO]	50594-66-6	
Alachlor [ISO]	15972-60-8	2588
Alanycarb [ISO]	83130-01-2	
Allethrin [ISO]	584-79-2	
Ametryn [ISO]	834-12-8	
Amitraz [ISO]	33089-61-1	
Anilofos [ISO]	64249-01-0	
Azaconazole	60207-31-0	
Azamectin [ISO]	35575-96-3	
Azocyclotin [ISO]	41083-11-8	2786
Bendiocarb [ISO]	22781-23-3	2757
Benfuracarb [ISO]	82560-54-1	2992
Bensulide [ISO]	741-58-2	2902
Bensultap [ISO]	17606-31-4	
Bentazone [ISO]	25057-89-0	
Bifenthrin	82657-04-3	3349
Bilanafos [ISO]	71048-99-2	
Bioallethrin [C]	584-79-2	
Bromoxynil [ISO]	1689-84-5	2588
Bromuconazole	116255-48-2	
Bronopol	52-51-7	
Butamifos [ISO]	36335-67-8	
Butralin [ISO]	33629-47-9	

Common name	CAS no	UN no
Butoxydim [ISO]	138164-12-2	
Butylamine [ISO]	13952-84-6	1992
Carbaryl [ISO]	63-25-2	2757
Carbosulfan [ISO]	55285-14-8	2992
Cartap [ISO]	15263-53-3	
Chloralose [C]	15879-93-3	
Chlordane [ISO]	57-74-9	2996
Chlorfenapyr [ISO]	122453-73-0	
Chlormequat (chloride) [ISO]	999-81-5	
Chloroacetic acid [C]	79-11-8	1751
Chlorophonium chloride [ISO]	115-78-6	2588
Chlorpyrifos [ISO]	2921-88-2	2783
Clomazone [ISO]	81777-89-1	
Copper hydroxide [C]	20427-59-2	
Copper oxychloride [C]	1332-40-7	
Copper sulfate [C]	7758-98-7	
4-CPA [ISO]	122-88-3	
Cuprous oxide [C]	1317-39-1	
Cyanazine [ISO]	21725-46-2	
Cyanophos [ISO]	2636-26-2	
Cyhalothrin [ISO]	68085-85-8	3352
Cyhexatin [ISO]	13121-70-5	
Cymoxanil [ISO]	57966-95-7	

Common name	CAS no	UN no
Cypermethrin [ISO]	52315-07-8	3352
Alpha-cypermethrin [ISO]	67375-30-8	3349
Cyphenothrin [(1R)-isomers] [ISO]	39515-40-7	3352
Cyproconazole	94361-06-5	
2,4-D [ISO]	94-75-7	3345
Dazomet [ISO]	533-74-4	
2,4-DB	94-82-6	
DDT [ISO]	50-29-3	2761
Deltamethrin [ISO]	52918-63-5	3349
Diazinon [ISO]	333-41-5	3018
Dicamba [ISO]	1918-00-9	
Dichlorobenzene [C]	106-46-7	
Dichlorophen [ISO]	97-23-4	
Dichlorprop [ISO]	7547-66-2	
Diclofop [ISO]	40483-25-2	
Dicofol [ISO]	115-32-2	
Difenoconazole [ISO]	119446-68-3	
Difenzoquat [ISO]	43222-48-6	2588
Dimepiperate [ISO]	61432-55-1	
Dimethachlor [ISO]	50563-36-5	
Dimethipin [ISO]	55290-10-7	

	CAS no	UN no
<i>Dimethenamid [ISO]</i>	87674-68-8	
Dimethylarsinic acid [C]	75-60-5	1572
Dimethoate [ISO]	60-51-5	2783
Diniconazole [ISO]	83657-24-3	
Dinobuton [ISO]	973-21-7	2779
Dinocap [ISO]	39300-45-3	
Diphenamid [ISO]	957-51-7	
Diquat [ISO]	2764-72-9	2781
Dithianon [ISO]	3347-22-6	
Dodine [ISO]	2439-10-3	
Endosulfan [ISO]	115-29-7	2761
Endothal-sodium [(ISO)]	125-67-9	2588
EPTC [ISO]	759-94-4	
Esfenvalerate [ISO]	66230-04-4	3349
Ethion [ISO]	563-12-2	3018
Fenazaquin [ISO]	120928-09-8	2588
Fenitrothion [ISO]	122-14-5	
Fenobucarb	3766-81-2	
Fenothiocarb [ISO]	62850-32-2	
Fenpropidin [ISO]	67306-00-7	
Fenpropathrin [ISO]	64257-84-7	3349
<i>Fenpyroximate [ISO]</i>	134098-61-6	
Fenthion [ISO]	55-38-9	3018
Fentin acetate[(ISO)]	900-95-8	2786

	CAS no	UN no
Fentin hydroxide[(ISO)]	76-87-9	2786
Fenvalerate [ISO]	51630-58-1	3352
Ferimzone [ISO]	89269-64-7	
Fipronil	120068-37-3	2588
Fluchloralin [ISO]	33245-39-5	
Flufenacet [ISO]	142459-58-3	
Fluoroglycofen	77501-60-1	
Flurprimidol [ISO]	56425-91-3	
Flusilazole	85509-19-9	
Flutriafol [ISO]	76674-21-0	
Fluxofenim [ISO]	88485-37-4	
Fomesafen [ISO]	72178-02-0	
Fuberidazole [ISO]	3878-19-1	
Furalaxyl [ISO]	57646-30-7	
Gamma-HCH [ISO], Lindane	58-89-9	2761
Glufosinate [ISO]	53369-07-6	
Guazatine	108173-90-6	
Haloxyfop	69806-34-4	
HCH [ISO]	608-73-1	2761
Hexazinone [ISO]	51235-04-2	
Hydramethylnon	67485-29-4	
Imazalil [ISO]	35554-44-0	2588
Imidacloprid [ISO]	138261-41-3	

	CAS no	UN no
Iminoctadine [ISO]	13516-27-3	
<i>Indoxacarb [ISO]</i>	173584-44-6	
Ioxynil [ISO]	1689-83-4	2588
Ioxynil octanoate [(ISO)]	3861-47-0	
Iprobenfos	26087-47-8	
Isoprocarb [ISO]	2631-40-5	2757
Isoprothiolane [ISO]	50512-35-1	
Isoproturon [ISO]	34123-59-6	
Isouron [ISO]	55861-78-4	
Lambda-cyhalothrin	2164-08-1	3349
MCPA [ISO]	94-74-6	
MCPA-thioethyl [ISO]	25319-90-8	
MCPB [ISO]	94-81-5	
Mecoprop [ISO]	7085-19-0	
Mecoprop-P [ISO]	16484-77-8	
Mefluidide [ISO]	53780-34-0	
Mepiquat [ISO]	15302-91-7	
Mercurous chloride [C]	10112-91-1	2025
Metalaxyl [ISO]	57837-19-1	
Metaldehyde [ISO]	108-62-3	
Metamitron [ISO]	41394-05-2	
Metam-sodium [(ISO)]	137-42-8	2771
Metconazole [ISO]	125116-23-6	
Methacrifos [ISO]	62610-77-9	

	CAS no	UN no
Spiroxamine [ISO]	118134-30-8	
Sulfluramid [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	

MINUTES OF THE MEETING WITH SOKOTO STATE NEWMAP SPMU ON ACRESAL HELD AT NEWMAP OFFICE CONFERENCE ROOM, SOKOTO ON 25TH JANUARY 2021 AT 8:00 AM

1. ATTENDANCE:

In attendance was Alh Ibrahim Umar the PC Sokoto NEWMAP, Project Officers of the SPMU and visiting consultants as indicated in the attendance sheet.

2. AGENDA:

- i. Current status with necessary NEWMAP officers
- ii. Concerns relating to effectiveness and adaptability from NEWMAP to ACReSAL
- iii. Questions and Answers session

3. OPENING PRAYERS

The Christian and Muslim Prayers were recited by volunteers.

4. WELCOME ADDRESS BY PC KANO NEWMAP SPMU

Ibrahim Umar NEWMAP Sokoto SPMU welcomed all the participants at the meeting; he also introduced all the consultants and their mission in Sokoto state.

5. INTRODUCTION: ACReSAL –WHAT IS IT ABOUT

Dr. Odili Ojukwu gave a general overview of the ACReSAL Project that involves how to increase the adoption of climate resilient landscape management practices and livelihoods in targeted arid/semi-arid watersheds in Northern Nigeria. He mentioned how the project will give emphasis on desertification, drought, flood control and watershed management practice in Northern Nigeria. He gave a general description how some MDAs will be relevant to the project implementation and what are expected of them.

Each of the visiting Consultants gave a brief on their specific assignments with respect to the project.

Prof Abdullahi Namakka spoke on his area of consultancy, which is Animal and Livestock waste Policy Framework; Dr Usman Ibrahim spoke on integrated pest management Policy, Dr Damilola and Mrs. Mary Bishop on Labour policy issues and GBV, while Prof Agwu Ekwe spoke on the Resettlement Policy Framework, Barr, Ihuoma Igbaniabor spoke on the Stakeholders engagement Policy Framework and Dr Abdulrahman Umar spoke on the Environmental and Social Management Framework on behalf of Dr Odili Ojukwu the Lead consultant ESMF.

6. QUESTIONS/ANSWERS/ COMMENTS/CONTRIBUTIONS

- i. Ibrahim Umar PC NEWMAP Sokoto SPMU gave the general status of the SPMU with respect to the NEWMAP Project implementation, capacity of their staff and available resources on ground for the project. He lamented on the delays in approvals from World Bank that hinders the speedy project implementation in NEWMAP and therefore strategies should be in place to resolves such scenarios in ACREsAL for the project to be implemented successfully without unnecessary delays. He ensures the consultants the readiness to support the incoming project in the state.
- ii. Each Consultant asked specific questions to their areas of assignment and were adequately and sufficiently responded by the PC and his staff.

7. CLOSING/ADJOURNMENT

The meeting was adjourned by 10:12am

19 participants attended the meeting (number of participants on the attendance sheet)

MINUTES OF THE SOKOTO STATE ACRESAL STAKEHOLDERS MEETING HELD AT THE DEPUTY GOVERNOR'S CONFERENCE ROOM, CABINET OFFICE, SOKOTO ON 25TH JANUARY 2021 AT 11:00 AM

8. ATTENDANCE:

In attendance were Sagir Attahiru Bafarawa Hon. Commissioner for Environment Sokoto State, Permanent Secretaries, heads of departments, agencies, of all relevant ministries such as Water resources, Agriculture, Land and Housing, Animal Health, Works, Local government and rural development, Finance, CSOs/CBOs/NGOs etc.

9. AGENDA:

- iv. Current Projects implementation structures (in contributing MDAs –Environment, Agriculture, Lands and housing, Works, Women Affairs, Water Resources, Animal Health and Livestock, Information, Local government and Rural Development)
- v. Applicable Relevant and Appropriate Requirements (ARARs) (particularly for Environment, Agriculture, Land, Water resources and social Issues)
- vi. Concerns relating to ACREsAL at two levels among contributing MDAs:
 - a) Level I: MDAs Concerns on the project
 - b) Level II: Concerns of Communities relating to State/FGN project implementation methods.

10. OPENING PRAYERS

The Christian and Muslim Prayers were recited by volunteers.

11. WELCOME ADDRESS BY HON COMMISSIONER, MIN. OF ENVIRONMENT

Alh. Sagir Attahiru Bafarawa the Hon. Commissioner for Environment Sokoto State welcomed all the participants at the meeting, he also introduced all the consultants and their mission in Sokoto state. He then asked all the participants to introduce themselves starting with visiting consultants followed by other stakeholders at the meeting.

12. INTRODUCTION: ACRoSAL –WHAT IS IT ABOUT

Dr. Odili Ojukwu gave a general overview of the ACRoSAL Project that involves how to increase the adoption of climate resilient landscape management practices and livelihoods in targeted arid/semi-arid watersheds in Northern Nigeria. He mentioned how the project will give emphasis on desertification, drought, Flood control and watershed management practice in Northern Nigeria. He gave a general description how some MDAs will be relevant to the project implementation and what are expected of them.

Each of the visiting Consultants gave a brief on their specific assignments with respect to the project:

Prof. Abdullahi Namakka spoke on his area of consultancy, which is Animal and Livestock Policy Framework; Dr. Usman Ibrahim spoke on integrated pest management Policy, Dr. Damilola spoke on the Labour Policy Framework with Mrs. Mary Bishop on Gender issues, while Prof Agwu Ekwe spoke on the Resettlement Policy Framework, Barr, Ihuoma Igbaniabor spoke on the Stakeholders engagement Policy Framework and Dr. Abdulrahman Umar spoke on the Environmental and Social Management Framework on behalf of Dr, Odili Ojukwu the Lead consultant ESMF.

13. QUESTIONS/ANSWERS/ COMMENTS/CONTRIBUTIONS

Mallam Mu'azu Madawaki Permanent Secretary ministry for Environment requested for a guiding template from the Consultants that will guide the respective MDAs on the specific issues and areas of interest by the consultants to be given to the staff of those MDAs for detailed inputs. He also lamented on the delays with approval from World Bank that hinders speedy implementation during the NEWMAP project in the State. He therefore urged the consultants to pass this concern to the appropriate quarters and ensure that, this is not repeated during the ACRoSAL project in order to have a successful and speedy project implementation.

Aliyu Tureta Director Animal services Ministry for Agric, Sokoto State expressed happiness with the incoming ACRoSAL Project as it came at the right time in the right direction considering drought and desertification issues facing the States in Northern Nigeria especially Sokoto State. He called on the consultants to help draw a policy that

will curtail and minimize indiscriminate cutting down of trees for firewood purposes as it is the root cause for drought and desertification.

He mentioned some of the activities being currently undertaken under his Ministry like Fadama III Project, USAID projects, IFAD, OCP Africa in the areas of Agro-climatic resilience in the state such as using drought resistant seed varieties, agro support inputs, etc.

PC NEWMAP Sokoto suggested that the discussion should be segmented based on the areas to be covered by each consultant in order to make area-specific inputs. He also reiterated the need to speed up process of approval by the World Bank in order to fast-track project implementation in the State.

The Commissioner for Environment suggested that a template be sent to each of the respective MDAs to guide them to make informed and specific inputs.

Dr. Nasiru from Department of Animal health suggested that waste from abattoirs should be captured under animal waste management policy discussion.

Malam Mu'azu from Ministry for Water Resources asked on the specific areas on how ACREsAL project is relevant to his ministry. In response to this question, Dr. Odili Ojukwu responded that all water resources such as Rivers, Dams, Lakes etc that are meant for agricultural purposes such as irrigation, fisheries, etc will be relevant in the project.

Musa Dikko Director Planning and Statistics Ministry for Environment expressed readiness to support the project and how a community sensitization is already ongoing to sensitize people on the use of alternative energy sources in place of firewood.

14. CLOSING:

The meeting was concluded at 1:47pm with closing prayers by volunteers

49 participants attended the meeting.

STAKEHOLDERS CONSULTATIONS ON ACRESAL PROJECT, NIGER STATE MINUTES OF THE MEETING WITH NEWMAP SPMU

VENUE: NEWMAP Office Minna Niger State

DATE: 27TH January 2021

TIME: The meeting started around 8:20 am

ATTENDANCE

Safeguards Consultants and NEWMAP SPMU staff – see attendance for details

AGENDA:

- i. Provide General Overview of ACRESAL Project
- ii. Seek Challenges from SPMU with NEWMAP Implementation in Niger State
- iii. Questions and Answers

OPENING PRAYER

Opening Prayer was said by Mallam Raji S. Adam

WELCOME ADDRESS BY PROJECT COORDINATOR NEWMAP NIGER STATE

The project coordinator (PC) Niger State NEWMAP, Alhaji Usman Garba Ibeto, welcomed the consultants to the meeting. This was followed by the introduction of the NEWMAP SPMU staff in attendance.

OPENING REMARKS/OVERVIEW OF ACRESAL PROJECT

Dr Odili Ojukwu gave a general overview of the ACRESAL project. According to him, NEWMAP is winding up in June and would be replaced by ACRESAL project. ACRESAL project is a way of increasing Agricultural and Climatic resilience in Northern Nigeria with the view of improving food production, reducing global warming, improve livelihood and reduce poverty. He mentioned that 19 States of the Northern Nigeria may benefit from the Project, 5 of these states were selected for initial stakeholders' consultations. The selection criteria were based on accessibility, security, agro cluster and climatic influence. The States selected were Sokoto, Niger, Nasarawa, Gombe and Kano.

He also introduced the Safeguards Consultants that are part of the visit and consultation efforts as follows:

Dr Odili Ojukwu- Environmental and Social Management Framework -

Prof Abdulahi Namakka - Animal Waste Management Plan

Dr Usman Ibrahim - Integrated Pest Management Plan

Prof Agwu Ekwe Agwu - Resettlement Policy Framework

Barr Ihuoma Igbaniabor -Stakeholders Management Plan

Mary Bishop - Gender and Sexual Based Violence

Dr Damilola Adeshina - Labour Management Plan

Dr Odili Ojukwu further encouraged NEWMAP SPMU to state the challenges they may have encountered with NEWMAP implementation in the state. These challenges will be taken into consideration and addressed in the development of the safeguard's instruments associated with the ACRESAL project.

In his response Alhaji Usman Garba Ibeto, Niger State NEWMAP Project Coordinator stated challenges the State faced regarding their operations in the State as follows:

1. Delays in clearance and no objection from World Bank in the areas of designs
2. Need for support staff
3. Non provision and attendance of training of NEWMAP staff [capacity building/institutional training]. Training should be both general and based on area of specialization.
4. Review/performance allowance for NEWMAP staff
5. Interference from Government officials especially in the areas of staff recruitment

INPUTS FROM OTHER CONSULTANTS

Each of the other consultants mentioned what they would require to know from NEWMAP staff and other Stakeholders in the State as follows:

Prof Abdulahi Namakka - *Integrated Pest Management Plan*, requires information regarding trainings on IPM Legislations and IPM from Ministries of Agric and Health

Dr Usman Ibrahim - *Animal Waste Management Plan*. Needs information on General pests of livestock, vet diseases prevalent in Niger state, management of pests and vet diseases, prevention/control, conventional control and local control methods, effects of control methods on the environment – air, land, water, capacity building.

Prof Agwu Ekwe Agwu- *Resettlement Policy Framework*: He wants information on laws, compensation, economic trees, land use, right to land, land acquisition, handling resettlement issues, land conflicts, rights of women, farmer-herder issues, vulnerable group, policies/legal frame work, security challenges and effects in the State

Barr Ihuoma Igbaniabor – *Stakeholders Management Plan*. She emphasized on consultation and engagement with stakeholders, and requires information on grievance redress mechanisms, challenges faced, resolved

Mary Bishop - *Gender and Sexual Based Violence*. She wants data on Law/ penalties for gender-based violence

Dr Damilola Adeshina - *Labour Management Plan*. He wants information on Recruitment procedure and labour laws in the State.

RESPONSES

Dr Odili Ojukwu further solicited for the support of NEWMAP SPMU staff so as to get all the information required by the consultants for robust safeguards reports. He further stated that all the issues raised by the PC and other NEWMAP SMPU staff will be considered accordingly and appropriately to avoid a repeat on the ACRESAL Project.

Alhaji Usman Garba Ibeto also promised to support the consultants by ensuring the documents and information required for their complete reports from appropriate quarters are obtained within 24 hours

CLOSING:

The meeting ended at 9:45 am, with a closing prayer offered by Miss Chinelo Umeckafor

STAKEHOLDERS CONSULTATIONS ON ACRESAL PROJECT, NIGER STATE MINUTES OF THE MEETING WITH STATE-WIDE STAKEHOLDERS

DATE: 27TH January 2021

VENUE: LEGBO KUTIGI CONFERENCE ROOM

DATE: 27th January 2021

TIME: The meeting started at 10:15 am

ATTENDANCE

Please see attendance list for details

AGENDA:

- i. Presentation of General Overview of ACRESAL Project
- ii. Seek Information from Stakeholders on Possible Project Impacts, Challenges and Constraints with ACRESAL Project Implementation in Niger State
- iii. Questions and Answers

OPENING PRAYER

Opening Prayer was said by Miss Chinelo Umeckafor

MODERATOR: Mallam Raji S. Adam

WELCOME ADDRESS

The Permanent Secretary of the Ministry of Environment and Forestry (Engineer Lucky Shekonago) representing the Commissioner of Environment welcomed the Safeguards Consultants and all the Stakeholders present.

CONSULTANT REMARKS

Dr Odili Ojukwu gave an overview of the ACRESAL project. He stated that ACRESAL is a new project being considered for Northern States and designed as an extension of NEWMAP. It is a community-based project that will change socioeconomic position of project States, standard of living and overall wellbeing of the project communities. He added that the Project will address desertification and remedying of the degraded landscapes in participating States, as well as improve the quality of lives and reduce poverty. It is a multi-sectorial project and will ensure sustainability by engaging the community/grass root for ownership. He stated that safeguards clearance is essential by World Bank before a new project is approved. Thus, before engaging in any project, the issues affecting the environment and the people must be effectively.

Dr Odili Ojukwu therefore stated that the essence of the meeting was to explain the ACRESAL project to the stakeholders and solicit their feedback on how the project can affect them, ask questions concerning impacts, and any feedback is welcomed

INPUTS FROM ATTENDEES

Permanent Secretary Ministry of Finance (Alhaji Akilu) asked if the Proposed project is a Grant or Credit for the State and what is the expected counterpart contribution.

He also advised that the Project should involve Traditional Council and people living with disabilities

Andrew Jagaba: Promised to provide support in term of enactment of laws pertaining to the Environment

Alhassan Umar Ministry of Agriculture and Rural Development said Ministry of Livestock should be involved. He stated that there are laws addressing agrochemicals, policies, on water, land and air management and would be made available to the consultants.

Yahaya Suleiman: Head of Service said Erosion issues is widespread in the State especially in Zungeru as a result of Hydro Dam construction Project. He promised to provide support regarding data relating to Labour Procedure management plan and the supply of labour needed.

Aminu Liman of Civil Service Commission made a commitment to give information regarding Labour engagement in the State

Mrs Hasana Harba from ADP is concerned with deforestation. She stated that provision of alternative energy source in the State will address deforestation

Mr Oliver: Involvement of Department of Climate change as a distinct sector in ACRESAL Project and climate change person in SPMU

Mr Philemon Danladi from Ministry of Water Resources

Address unemployment to stop illegal mining, establishment of institution to educate farmers on waste disposal regulations, regulate the use of water and drilling of borehole

Perm Sec Ministry of Environment and Forestry (Engineer Lucky Shekonago):

The use of Domestic Renewable Energy Technology.

Adisa Musa Women leader

She said women and children need to be carried along in the project

Suleiman Yahaya from Head of Service:

Advised the Project Consultant to work with structure already in place for effectiveness. He added that the community should participate in the program actively both also in terms of man power and provision of technical assistance.

Alhaji Suleiman Garba Ibeto PC, NEWMAP

Avoid duplication of projects during implementation

Clearly spell out schedules of duty for climate change officer and national resources officer

Adamu Garba Ministry of Agriculture

He said there are existing structures in the Ministry regarding farmers groups and include REVAMP, SUFON, Women in Agriculture. He also stated that Project desk officers are already in place for high value commodity crops e.g. rice, cashew

Eng Adamu Athama State Ministry of Water Resources

Corporate management, sewage management, provision of PPE, synergy between ministry and community, water sanitation and hygiene development new policies to check policies and leakages

Isa Mohammed HOD Environmental and Climate Change

He advised on the provision of rural electrification project to improve the livelihood of the community, development of renewable energy, afforestation programs, alternative source of energy to discourage deforestation, management of animal waste and emission of methane to reduce GHG.

Mohammed Abdulkabir Shaaba Niger State Planning Commission

Planning Commission can mainstream the project by developing policy documents and make available to the consultants

Jubril – Land and Housing: Resettlement Policy Framework

Promised to offer support for information relating to land acquisition, and rates of compensation, and site selection

RESPONSES TO THE INPUTS:

In his response, Dr Odili Ojukwu said 700 million dollar funding is proposed for the project by the World Bank. Negotiations regarding costs are still expected between the World Bank, the Federal Government and the States. Additionally, States qualification for the project will include the following:

1. The State must set aside one million dollars for the project
2. The State must prepare a commitment plan in the things they need to do as the project proceeds
3. State must commit to a resettlement action plan – compensation and grievance redress mechanism

He also appreciated the suggestions from the stakeholders and also promised to include their suggestions in the report by the consultants.

CLOSING

The meeting closed at 1:15 pm with a closing prayer by a volunteer.

STAKEHOLDERS CONSULTATIONS ON ACRESAL PROJECT, NASARAWA STATE MINUTES OF THE MEETING WITH NEWMAP SPMU

VENUE: TA'AL Conference Hotel, Lafia, Nasarawa State

DATE: 29 January, 2021

TIME: The meeting started 7:40 am

ATTENDANCE

Safeguards Consultants and NEWMAP SPMU staff – see attendance for details

AGENDA:

- iv. Provide General Overview of ACRESAL Project
- v. Seek Challenges from SPMU with NEWMAP Implementation in Nasarawa State
- vi. Questions and Answers

WELCOME ADDRESS BY PROJECT COORDINATOR NEWMAP NASARAWA STATE

The project coordinator (PC) Nasarawa State NEWMAP, Mr Kwakaha Johnathan, welcomed the consultants to the meeting. The NEWMAP SPMU staff and the consultants were given the opportunity to introduce themselves.

The following ACRESAL consultants were in attendance:

Dr Odili Ojukwu - Environmental and Social Management Framework

Prof Abdulahi Namakka- Animal Waste Management Plan

Dr Usman Ibrahim - Integrated Pest Management Plan

Prof Agwu - Resettlement Policy Framework

Barr Ihuoma Igbinigor – Stakeholders Management Plan

Mary Bishop - Gender and Sexual Based Violence

Dr Damilola Adeshina - Labour Management Plan

OPENING REMARKS/OVERVIEW OF ACRESAL PROJECT

Dr Odili Ojukwu gave an overview of the ACRESAL project. In his remark, Dr Ojukwu stated that NEWMAP winds down in June and will be replaced by ACRESAL. The NEWMAP structure at both the federal and state levels (FPMU and SPMU) will be retained for ACRESAL project. Hopefully, Nasarawa and other 18 States will be a recipient of ACRESAL projects. The meetings with the SPMU and stakeholder's engagement are being held so as to have a solid

framework for safeguards compilation. The target audience for the consultation engagement are the decision makers in the State. Dr Ojukwu also emphasized the need for SPMU staff to indicate areas of challenges with NEWMAP implementation so as to prevent a carry over to the ACRESAL Project.

Each of the consultant was given the opportunity to state what they require from NEWMAP SPMU staff in order to get an all-encompassing and robust report.

REMARKS BY PC NEWMAP NASARAWA STATE

In his response, the PC (Mr Kwakaha Johnathan) noted that Climatic change has affected the North generally. Therefore, the North will benefit immensely from ACRESAL project. Furthermore, he mentioned some hiccups they experienced with NEWMAP, which include:

1. Delay in Bank (No objections) approval of engineering designs.
2. Accommodation problem
3. Latent issues regarding political interference
4. No prompt response from Bank to mails, and recruitment advise,
5. Poor allowances
6. Understaffing
7. No time frame for work to be executed. Activities should be time based

Dr Damilola Adeshina asked the PC what projects they might consider if ACRESAL is approved for the state.

The PC stated that if ACRESAL is approved, they might consider the following projects:

1. Watershed management Project
2. Development of supplements for ruminant animal and other livestock
3. Development of organic fertilizers and crop resistant seeds
4. Provision of Transportation – tricycles for the community
5. Sensitization on trees planting

Dr Degree Umar noted that

1. The use of FONGO has helped in project management and improved management expectations
2. No case of GBV/GRM has been reported

Mrs Sa'adatu Akwe added that

1. M7E baseline survey consultant was engaged, draft report was submitted
2. Community members of the affected sites were well sensitized and cooperating

Jibrin Mairiga emphasized that

1. Leadership in the state should be trained on the workings of the project regarding principles of DUE PROCESS ...While

Bartholomew B. Odeh (SLO) said

1. the social and livelihood activities is in progress and there are mutual undertakings between focal NGO and the affected communities through sensitization and mobilization for awareness on the project implementation.
2. On the case of GBV and GRM no such case for now because of the activities of FONGO in the communities
3. The focal NGO are performing their roles as expected by liaising and reporting to SLO by updating their activities to SPMU.

CLOSING REMARKS

In his response, Dr Odili Ojukwu noted that the issues raised will be properly addressed. He also thanked everyone for their contributions

The PC promised to support the consultant to get all the information and documents needed for their report

CLOSING:

The meeting ended around 8:45 am

STAKEHOLDERS CONSULTATIONS ON ACRESAL PROJECT, NIGER STATE MINUTES OF THE MEETING WITH STATE-WIDE STAKEHOLDERS

VENUE: TA'AL Conference Hotel, Lafia, Nasarawa State

DATE: 29th January 2021

TIME: The meeting started at 11:08 am

ATTENDANCE:

Please see attendance list for details

AGENDA:

- iv. Presentation of General Overview of ACRESAL Project
- v. Seek Information from Stakeholders on Possible Project Impacts, Challenges and Constraints with ACRESAL Project Implementation in Nasarawa State
- vi. Questions and Answers

MODERATOR: Dr. Degree Umar

The moderator welcomed everyone and encouraged them to contribute actively.

OPENING PRAYER

Opening Prayer was said by Peter A. Esla and Abubakar Aliyu Ladan

WELCOME ADDRESS BY THE COMMISSIONER FOR ENVIRONMENT - MR MUSA IBRAHIM ABUBAKAR.

In his address, the Commissioner said

1. ACRESAL is a welcome idea in the State
2. The State has placed a ban on charcoal production and encouraged tree planting
3. Individuals with in-depth knowledge of the North and their peculiarities should be engaged in ACRESAL project.
4. The project will be domiciled in the Ministry of Environment, but Ministries of Agriculture, Land and Housing, and Water Resources will be actively involved.

CONSULTANT REMARKS BY DR ODILI OJUKWU

1. ACRESAL structure is taken from NEWMAP experience
2. The stakeholders' meeting is meant to get the Nasarawa State prepared for ACRESAL project.
3. The main aim of ACRESAL project is to reverse desertification and land degradation in Northern Nigeria and to impact the livelihood of the community positively.
4. The project is expected to be community driven and to empower the grassroots

Each consultant was given opportunity to state what information and documents they require from the stakeholders.

FEEDBACKS FROM STAKEHOLDERS

Commissioner for Environment - Mr Musa Ibrahim Abubakar

1. How would RED Plus and NEWMAP be reconciled with ACRESAL, will it not create a clash of interest?
2. Would the structure of SPMU be maintained or will ACRESAL usher in new staff entirely?

Commissioner for Land Prof Salisu Ali-Zanga said

1. Nasarawa has the third largest land availability for farmers in the country
2. The climate and the terrain in Nasarawa are favourable for farming
3. The land owners have a good relationship with the government
4. The Ministry operates by engaging in advocacy contact with the traditional, political and religious leaders before land acquisition
5. Rates are available for land charges. Available rates are in A, B and C categories. He promised the Ministry will make the rates available for the consultants

Asibi Omeri Agabo, MNI Ed Source of Hope Foundation

1. Ministry of women affair is key. The project should encourage women's participation and children friendliness.
2. The program should encourage income generation *via* large scale livestock production?

Bashir Mohammed Umar

The program should capture fishermen. This is due to effects of water pollution

Tpl Daud Galdima

The resettlement program should ensure moving the affected people into a well-defined structure and provision of adequate funds for people being resettled.

Atinuke Cemmang – Director Climate change MENR

Sensitization on issues pertaining to deforestation and its effects on ozone layer depletion as well as climate change

Peter A. Esla, Chairman Borehole Drillers Association

Ensure boreholes are drilled by expert and let the community ensure maintenance of their boreholes

Hannatu David Luka

Ensure communicating with community in their native language

RESPONSES TO THE INPUTS:

In his response, Dr Ojukwu commended the effort made by the State to rid the environment of impurities and this is what ACRESAL stands for. He noted that with the way ACRESAL will be

ran, there would be no clash of interest with all the stakeholders and the structure of NEWMAP SPMU will be maintained for States already on the NEWMAP projects.

He added that women, vulnerable groups and people with disabilities will be adequately represented in ACRESAL projects. Dr Ojukwu and Prof Abdulahi Namakka also commented that the program will also capture fishermen who depend on the water as a source of their livelihood.

In his response to Hannatu David Luka, Dr Ojukwu said the services of the language experts like Gambo Abdulahi would be used so as to communicate effectively with the local community and that all the inputs are noted and will be considered for incorporation into the reports.

Closing remark by the PC

The PC appreciated everyone in attendance. especially the Commissioners, Consultants and Stakeholders. He also commended on their inputs to see the success of the exercise.

Closing time: 1:25 pm

MINUTES OF THE MEETING WITH KANO STATE NEWMAP SPMU ON ACRESAL HELD AT NEWMAP OFFICE CONFERENCE ROOM, KANO ON 1ST FEBRUARY 2021 AT 8:00 AM

15. ATTENDANCE:

In attendance was Alh Ahmad Shuaibu the PC Kano NEWMAP, officers of the SPMU and visiting Consultants as indicated in the attendance sheet for the meeting.

16. AGENDA:

- vii. Current status with necessary NEWMAP officers
- viii. Concerns relating to effectiveness and adaptability from NEWMAP to ACReSAL
- ix. Questions and Answers session

17. OPENING PRAYERS

The Christian and Muslim Prayers were recited by volunteers.

18. WELCOME ADDRESS BY PC KANO NEWMAP SPMU

Alhaji Ahmad Shu'aibu NEWMAP Kano SPMU welcomed all the participants at the meeting; he also introduced all the consultants and their mission in Kano state. He then asked all the participants to introduce themselves starting with visiting consultants followed by Kano NEWMAP SPMU staff.

19. INTRODUCTION: ACReSAL –WHAT IS IT ABOUT?

Dr. Odili Ojukwu gave a general overview of the ACReSAL Project that involves how to increase the adoption of climate resilient landscape management practices and livelihoods in targeted arid/semi-arid watersheds in Northern Nigeria. He mentioned how the project will give emphasis on control of desertification, drought, flood control and watershed management practice in Northern Nigeria. He gave a general description on how some MDAs will be relevant to the project implementation and what are expected of them.

Each of the visiting Consultants gave a brief on their specific assignments with respect to the project.

Prof. Abdullahi Namakka spoke on his area of consultancy, which is Animal and Livestock waste Policy Framework; Dr. Usman Ibrahim spoke on integrated pest management Policy, Mrs. Mary Bishop on Labour policy issues and GBV, while Prof Agwu Ekwe spoke on the Resettlement Policy Framework, Barr, Ihuoma Igbanigor spoke on the Stakeholders engagement Policy Framework and Dr. Abdulrahman Umar spoke on the Environmental and Social Management Framework on behalf of Dr, Odili Ojukwu the Lead consultant ESMF.

20. QUESTIONS/ANSWERS/ COMMENTS/CONTRIBUTIONS

- iii. Alh. Shuaibu PC NEWMAP Kano SPMU gave the general status of Kano SPMU with respect to the NEWMAP Project implementation, their staff and available

resources on ground for the project. He lamented on the delays in approvals from World Bank that hinders the speedy project implementation in NEWMAP and therefore strategies should be in place to resolves such scenarios in ACREsAL for the project to be implemented successfully without unnecessary delays.

- iv. Malam Mukhtar the Environmental Safeguards officer reiterated the need to design mechanisms that will ensure speedy project implementation in ACREsAL to avoid the hiccups with approvals from World Bank that were experienced in NEWMAP.
- v. Salisu Muhammad Procurement Officer also called on the consultant to ensure policy documents to be developed captured procurement issues that will speed up project implementation and addressed issues of funding in basket for all participating states to grab by WB instead in an envelope allocated exclusively for each participating state.
- vi. Ms Zainab Ja'afar Baba Livelihood Officer of the SPMU called on the consultants to ensure they addressed challenges experienced in the implementation of NEWMAP project to avoid reoccurrence in ACREsAL project.
- vii. Engr. Buhari the Project engineer for the Kano SPMU called on the consultants to address issues of unnecessary delays of approval from the World Bank.

21. CLOSING:

The meeting was concluded at 10:50am with closing prayers by volunteers

19 participants attended the meeting

MINUTES OF KANO STATE ACRESAL STAKEHOLDERS MEETING HELD AT TEN-BY-TEN RESTAURANT CONFERENCE ROOM, KANO ON 1ST FEBRUARY 2021 AT 11:00 AM

1. ATTENDANCE:

In attendance were Dr. Kabiru Ibrahim Getso Hon. Commissioner for Environment Kano State, Malama Zahra'u Umar Hon Commissioner for Women Affairs, Permanent Secretaries, Heads of Departments, agencies, of all relevant ministries such as Environment, Water resources, Agriculture, Land and Housing, Animal Health, Works,

Local government and rural development, Finance, CSOs/CBOs/NGOs, visiting consultants etc.

2. AGENDA:

- x. Current Projects implementation structures (in contributing MDAs –Environment, Agriculture, Lands and housing, Works, Women Affairs, Water Resources, Animal Health and Livestock, Information, Local government and Rural Development)
- xi. Applicable Relevant and Appropriate Requirements (ARARs) (particularly for Environment, Agriculture, Land, Water resources and social Issues)
- xii. Concerns relating to ACRoSAL at two levels among contributing MDAs:
 - c) Level I: MDAs Concerns on the project
 - d) Level II: Concerns of Communities relating to State/FGN project implementation methods.

3. OPENING PRAYERS

The Christian and Muslim Prayers were recited by volunteers.

4. WELCOME ADDRESS BY HON COMMISSIONER, MIN. OF ENVIRONMENT

Dr. Kabiru Ibrahim Getso Hon. Commissioner for Environment Kano State welcomed all the participants at the meeting; he also introduced all the consultants and their mission in Kano state. He then asked all the participants to introduce themselves starting with visiting consultants followed by other stakeholders at the meeting.

5. INTRODUCTION: ACRoSAL –WHAT IS IT ABOUT

Dr. Odili Ojukwu gave a general overview of the ACRoSAL Project that involves how to increase the adoption of climate resilient landscape management practices and livelihoods in targeted arid/semi-arid watersheds in Northern Nigeria. He mentioned how the project will give emphasis on desertification, drought, flood control and watershed management practice in Northern Nigeria. He gave a general description how some MDAs will be relevant to the project implementation and what are expected of them.

Each of the visiting Consultants gave a brief on their specific assignments with respect to the project.

Prof. Abdullahi Namakka spoke on his area of consultancy, which is Animal and control of Livestock waste Policy Framework; Dr. Usman Ibrahim spoke on integrated pest management Policy, Mrs. Mary Bishop on Labour policy issues and GBV, while Prof Agwu Ekwe spoke on the Resettlement Policy Framework, Barr, Ihuoma Igbanigor spoke on the Stakeholders engagement Policy Framework and Dr Abdulrahman Umar spoke on the Environmental and Social Management Framework on behalf of Dr. Odili Ojukwu the Lead consultant ESMF.

6. QUESTIONS/ANSWERS/ COMMENTS/CONTRIBUTIONS

- i. Permanent secretary Ministry of Agric kano state expressed his happiness on the incoming ACREsAL project especially to Kano State considering the desert encroachment faced by some parts of Kano State. He urged the consultants to do a thorough job that will ensure policy issues peculiar to Kano state are not left out in the draft of the ACREsAL project.
- ii. Malam Sani Abdu Director Land matters enquired if the project will involve land acquisition? Prof. Agwu responded that it will that's why he was there to ensure Kano state extant laws and policies with respect to land acquisition are reviewed in order to come up with a holistic and most suitable draft document with respect resettlement issues in the project. He therefore assured the consulting team the readiness to support the exercise by making all relevant land acquisition laws and policies in the state available to the consultants.
- iii. Abba Adamu Takai Director Pollution control, Kano state Ministry for Environment assured the consulting team their readiness to support the project by providing all relevant documents available in his ministry, like the draft Kano State Environmental Pollution and control Law, etc.
- iv. Dr. Saleh Garba Ahmad Director Planning and Monitoring Ministry of Environment assured the consultants his department readiness to provide all necessary support for the success of the exercise.
- v. Commissioner for Environment spoke on the need to address the challenges of delay with approvals with World Bank projects like NEWMAP that hinders speedy project implementation.

7. CLOSING:

The meeting was concluded at 1:50pm with closing prayers by volunteers

43 participants attended the meeting (insert the number on attendance sheet).

AGRO-CLIMATIC RESILIENCE IN SEMI-ARID LANDSCAPES (ACRESAL) PROJECT
STATES STAKEHOLDERS' CONSULTATION

STATE: COMBES ; DATE: FEBRUARY 05, 2021; ASSIGNMENT: _____

ATTENDANCE SHEET

S/No	NAME	GENDER	ORGANIZATION	DESIGNATION	EMAIL	PHONE NUMBER	SIGNATURE
1	Dr. Hussain D. Goge	F	Min of Environ	Hon-Commis	hussain.d.goge@moenv.com	080332220444	
2	Dr Odili Ojukwu	M	O.T.S	Consultant	odiliodjukwu@gmail.com	08033380090	
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5	Barr. OBEL YAJI, mni	M	Min. of Agric	Perm-Sec	Obelyaji@minagri.gov.ng	08067949457	
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7	Margaret Butrus	F	Bollu. LGA	Chairperson	070463570	07069358021	
8	Hon Gamba Umayi	M	Baibanga	Chairman	---	0802878326	
9	IBRAHIM BUSA	M	KWAFAM	Chairman	---	07069204889	
10	Hon MUSTAFA SUBHANE	M	NAFHDA	Chairman	mustafasubhane@gmail.com	0802846262	
11	Abubakar Yusuf Baramba	M	A.K.K.O	Chairman	0802846262	0802846262	
12	Hon Bashir Babu Jusu	M	G.S.H.A	Chairman	07073373334	07073373334	
13	G.S. GARKO	M	CIMBELIA	CHAIR	marcumbarko@gmail.com	08036918970	
14	Ahmeda Mussami chao	F	XRCOMAP	Class	ahmedachao@gmail.com	08163606733	

**AGRO-CLIMATIC RESILIENCE IN SEMI-ARID LANDSCAPES (ACRESAL) PROJECT
STATES STAKEHOLDERS' CONSULTATION**

STATE: SOMBALE ; DATE: FEBRUARY 05, 2021; ASSIGNMENT:

ATTENDANCE SHEET

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1	Engr. Moid Gawan	M	NEWSMAP	PC	moid14gawan@newsmap.com	08023747538	[Signature]
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9	Richard James	M	GM-NEWSMAP	CO	richard@newsmap.com	08039256995	[Signature]
10	Mohammed Miss. Aliyu	M	NEWSMAP	NKOT	muhammash@newsmap.com	08034255701	[Signature]
11	Bar. I.K. Igbinjor	F	Consultant	SEP	igbinjor@outlook.com	09091556609	[Signature]
12	Dr. Odidi Ojukwu	M	Consultant	ASMF	odidi@yachoo.com	080233880290	[Signature]
13	Prof. Abdulhadi Namarcha	M	VMU/M Centre	Consultant	namarcha@vmu.edu.ng	08023618304	[Signature]
14	Skoro Ojigbo	F	Consultant	ASMF	skoro@yachoo.com	08065933152	[Signature]

**AGRO-CLIMATIC RESILIENCE IN SEMI-ARID LANDSCAPES (ACRESAL) PROJECT
STATES STAKEHOLDERS' CONSULTATION**

STATE: GOMBE DATE: FEBRUARY 05, 2021; ASSIGNMENT: _____

ATTENDANCE SHEET

S/No	NAME	GENDER	ORGANIZATION	DESIGNATION	EMAIL	PHONE NUMBER	SIGNATURE
15	Abdulrasheed Mu'Khanji Aued	M	Gombe State House of Assembly	Secretary State	Mu'khanji Aued	08030504464	[Signature]
16	Adamu Yusuf	M	NEWSMAP Gombe	APD	adamu@newsmap.com	08036401606	[Signature]
17	Alyce Umar	M	NEWSMAP Gombe	MIS	alyce@newsmap.com	070536048836	[Signature]
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19	FISI Yusuf Dufie	F	MOWA & SA	OPS	yusuf@newsmap.com	080555907529	[Signature]
20	PSAFA BSO	M	MATASH L.G.D	HOD/AGRIC	psafa@newsmap.com	08030505227	[Signature]
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22	SANI ADAMU JAURO	M	MIN. OF ENV.	DPRS	sani@newsmap.com	08022742765	[Signature]
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24	GARBA D-SHREGAI	M	NLC	APD/UR/UKC	garba@newsmap.com	08055582558	[Signature]
25	PAUL PEICA	M	Bishara, Her. Area	HOD/AGRIC	peica@newsmap.com	0806067268	[Signature]
26	Abdullahi J. Jobo	M	NEWSMAP	PO	abdu@newsmap.com	08056805105	[Signature]
27	Mohammed Musa Akyi	M	NEWSMAP	URO 1	musa@newsmap.com	08034255701	[Signature]
28	MUHAMMAD HASSAN	M	NEWSMAP	PA	muhammad@newsmap.com	08037094581	[Signature]

**AGRO-CLIMATIC RESILIENCE IN SEMI-ARID LANDSCAPES (ACRESAL) PROJECT
STATES STAKEHOLDERS' CONSULTATION**

STATE: _____ DATE: _____ ASSIGNMENT: _____

ATTENDANCE SHEET

S/No	NAME	GENDER	ORGANIZATION	DESIGNATION	EMAIL	PHONE NUMBER	SIGNATURE
29	ELI ISAH POSUBURU	M	MDF & F	A.R. EOVU	elisahposuburu 5a. Egnawi. Com	08039749449	[Signature]
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31	Mrs Ababi Saleh	M	STANBOM LGA	HOB AGRIC	lelehababib@gmail.com	08065581914	A.F.
32	Abubakar Lomuda	F	MUST	D/ADMIN	lamuwan@gmail.com	08038532098	[Signature]
33	Engr. Aliyu Sa Shinga	M	MDK&T	Director Genl	aliyushinga@gmail.com	08039557359	[Signature]
34	Muhammad Kabila	M	SLS ANGRON 20	SECRETARY	MUHAMMAD KABILA 24 P. 210. Com	0802291432	[Signature]
35	Sahisy Unyau Rene	M	SLS Balang	Secretary	Unyau.sahisy@gmail.com	0808474547	[Signature]
36	Musa Janga Hinn	M	MLPS	DIRECTOR (PS)	mhinna@gmail.com	08036300916	[Signature]
37	Omer Zubair Mainab	M	NGWMP	SPMU	Omer.zubair26@gmail.com	09017420646	[Signature]
38	ZAYYAD IBRAHIM	M	MNFUMAT	SPMU	ibrahimzayyad@gmail.com	08066633160	[Signature]
39	Tobomdel Mwanret	F	NEWMAT	SPMU	mwanretgeorge.com	0816720155	[Signature]
40	Ellcaudh Bulna	M	Arana Radio	Head of News	ellcaudh.walid@gmail.com	07067781468	[Signature]
41	Sagir Usman Hamu	M	VISION FM	REPORTER	Sagir.usmanadnan@gmail.com	08160585455	[Signature]
42	ESU TAFFAH JULY M	M	MIND OF LANDS	AIR LATOR	mesudwitaffah@gmail.com	07083931391	[Signature]

**AGRO-CLIMATIC RESILIENCE IN SEMI-ARID LANDSCAPES (ACRESAL) PROJECT
STATES STAKEHOLDERS' CONSULTATION**

STATE: Sierra Leone ; DATE: FEBRUARY 05, 2021 ; ASSIGNMENT: _____

ATTENDANCE SHEET

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**AGRO-CLIMATIC RESILIENCE IN SEMI-ARID LANDSCAPES (ACRESAL) PROJECT
STATES STAKEHOLDERS' CONSULTATION**

STATE: SOMBE ; DATE: FEBRUARY 05, 2021 ; ASSIGNMENT:

ATTENDANCE SHEET

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**AGRO-CLIMATIC RESILIENCE IN SEMI-ARID LANDSCAPES (ACRESAL) PROJECT
STATES STAKEHOLDERS' CONSULTATION**

STATE: GOMBE ; DATE: FEBRUARY 05, 2021; ASSIGNMENT:

ATTENDANCE SHEET

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**AGRO-CLIMATIC RESILIENCE IN SEMI-ARID LANDSCAPES (ACRESAL) PROJECT
STATES STAKEHOLDERS' CONSULTATION**

STATE: KANO ; DATE: FEBRUARY 01, 2021 ; ASSIGNMENT: _____

ATTENDANCE SHEET

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**AGRO-CLIMATIC RESILIENCE IN SEMI-ARID LANDSCAPES (ACRESAL) PROJECT
STATES STAKEHOLDERS' CONSULTATION**

STATE: KADUNA ; DATE: FEBRUARY 01, 2022; ASSIGNMENT: _____

ATTENDANCE SHEET

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**AGRO-CLIMATIC RESILIENCE IN SEMI-ARID LANDSCAPES (ACRESAL) PROJECT
STATES STAKEHOLDERS' CONSULTATION**

STATE: KANO

DATE: FEBRUARY 01, 2024; ASSIGNMENT:

ATTENDANCE SHEET

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**AGRO-CLIMATIC RESILIENCE IN SEMI-ARID LANDSCAPES (ACRESAL) PROJECT
STATES STAKEHOLDERS' CONSULTATION**

STATE: NASARAWA

DATE: JANUARY 29, 2021; ASSIGNMENT: _____

ATTENDANCE SHEET

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**AGRO-CLIMATIC RESILIENCE IN SEMI-ARID LANDSCAPES (ACRESAL) PROJECT
STATES STAKEHOLDERS' CONSULTATION**

STATE: NASSARAWA

DATE: JANUARY 29, 2021; ASSIGNMENT:

ATTENDANCE SHEET

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**AGRO-CLIMATIC RESILIENCE IN SEMI-ARID LANDSCAPES (ACRESAL) PROJECT
STATES STAKEHOLDERS' CONSULTATION**

STATE: NASARAWA ; DATE: JANUARY 29, 2021; ASSIGNMENT:

ATTENDANCE SHEET

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**AGRO-CLIMATIC RESILIENCE IN SEMI-ARID LANDSCAPES (ACRESAL) PROJECT
STATES STAKEHOLDERS' CONSULTATION**

STATE: NASARAWA ; DATE: JANUARY 29, 2021 ; ASSIGNMENT:

ATTENDANCE SHEET

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**AGRO-CLIMATIC RESILIENCE IN SEMI-ARID LANDSCAPES (ACRESAL) PROJECT
STATES STAKEHOLDERS' CONSULTATION**

STATE: NASARAWA ; DATE: JANUARY 29, 2021; ASSIGNMENT:

ATTENDANCE SHEET

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**AGRO-CLIMATIC RESILIENCE IN SEMI-ARID LANDSCAPES (ACRESAL) PROJECT
STATES STAKEHOLDERS' CONSULTATION**

STATE: NIGER ; DATE: JANUARY 27, 2021 ; ASSIGNMENT:

ATTENDANCE SHEET

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**AGRO-CLIMATIC RESILIENCE IN SEMI-ARID LANDSCAPES (ACRESAL) PROJECT
STATES STAKEHOLDERS' CONSULTATION**

STATE: NIGER ; DATE: JANUARY 25, 2021 ; ASSIGNMENT:

ATTENDANCE SHEET

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**AGRO-CLIMATIC RESILIENCE IN SEMI-ARID LANDSCAPES (ACRESAL) PROJECT
STATES STAKEHOLDERS' CONSULTATION**

STATE: NIGER ; DATE: JANUARY 27, 2021; ASSIGNMENT: _____

ATTENDANCE SHEET

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**AGRO-CLIMATIC RESILIENCE IN SEMI-ARID LANDSCAPES (ACRESAL) PROJECT
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**AGRO-CLIMATIC RESILIENCE IN SEMI-ARID LANDSCAPES (ACRESAL) PROJECT
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STATE: SOKOTO ; DATE: JANUARY 25, 2021 ; ASSIGNMENT: _____

ATTENDANCE SHEET

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**AGRO-CLIMATIC RESILIENCE IN SEMI-ARID LANDSCAPES (ACRESAL) PROJECT
STATES STAKEHOLDERS' CONSULTATION**

STATE: Sokoto ; DATE: JANUARY 25 2021; ASSIGNMENT:

ATTENDANCE SHEET

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**AGRO-CLIMATIC RESILIENCE IN SEMI-ARID LANDSCAPES (ACRESAL) PROJECT
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STATE: SOKOTO

DATE: JANUARY 25, 2024; ASSIGNMENT:

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**AGRO-CLIMATIC RESILIENCE IN SEMI-ARID LANDSCAPES (ACRESAL) PROJECT
STATES STAKEHOLDERS' CONSULTATION**

STATE: SOKOTO ; DATE: JANUARY 25, 2020; ASSIGNMENT:

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NIGER STATE



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KANO STATE



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AGRO- CLIMATIC RESILIENCE IN SEMI-ARID LANDSCAPES (ACRESAL) PROJECT
STATES STAKEHOLDERS' CONSULTATION.

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**AGRO- CLIMATIC RESILIENCE IN SEMI-ARID LANDSCAPES (ACRESAL) PROJECT
STATES STAKEHOLDERS' CONSULTATION.
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STATES STAKEHOLDERS' CONSULTATION.
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