FINAL TERMS OF REFERENCE

TECHNICAL ASSISTANCE AND CAPACITY BUILDING ON INTEGRATED PEST MANAGEMENT AND SAFE USE OF CHEMICALS FOR FARMER FIELD BUSINESS SCHOOL FACILITATORS, M&E OFFICERS, ADP DESK OFFICERS AND SUPERVISORY ON THE USE OF THE SCOUTING SHEETS, RECORD KEEPING AND DATA STORAGE

1. Background of the Consultancy

In 2015 the TRIMING Project implemented the "Technical Assistance for Advisory Services and Capacity Building on Integrated Pest Management (IPM)". The major objectives of the Consultancy Service were to build capacity at the irrigation project offices, for farm – level stakeholders and furthermore provide technical assistance in key areas such as advice on the most appropriate IPM methods for the participating irrigation schemes, assessment of the capacity of local institutions for collaborative approaches towards IPM etc.

Following on the success of the 2015 programme and on recommendations made by the 3rd World Bank/FAO Implementation Support Mission (3rd ISM, Oct – Nov 2015), the 2016 program dubbed 'Second phase Technical Assistance for advisory services and capacity building on Integrated Pest Management (IPM)' was developed and approved. The 2016 capacity building on IPM program was designed to build capacity of nominated Extension Agents of the Agricultural Development Projects (ADPs) in the respective States where the TRIMING Project is implementing sub-projects. The training of ADPs was envisaged to enable long-term implementation and sustenance of IPM practices in the irrigation schemes, through utilizing the Farmer Field Business School (FFBS) approach.

Considering the successes of the two previous programs and the popular demand from project beneficiaries in the states for continuous capacity building on IPM, the TRIMING Project Management embarked on a Third Phase of the IPM approach in 2018.

In 2019, the TRIMING Project continued its efforts towards ensuring the implementation of IPM practices, techniques and strategies through intensifying the knowledge and skill capacity of the FFBS facilitators who are extension agents from the ADPs in the respective TRIMING states (Sokoto, Zamfara, Kano and Jigawa) and likewise graduates from the existing FFBSs on all irrigation schemes under its coverage who have emerged as capable **Farmer Facilitators**. This program extensively focused on identification and management of post-harvest pests of rice and tomato; post-harvest storage practices (Traditional, and Good Agricultural Practices - GAPs) and also emphasizing and training participants on the safe use of chemicals.

The 2019 program saw to the complementary use of an MS Excel-Based IPM Toolkit which enables FFBS Facilitators input information from scouting exercises so as to generate i) Farm-level, ii) Cluster-Level and iii) Scheme-level data on pest populations and effectiveness of IPM methods before and after IPM intervention. This solution will require close follow-up to ensure FFBS Facilitators understood the training, are complying and where difficulties are experienced, are provided assistance and re-training. Moreover, the process of record keeping will require

supervisory oversight to assist Desk Officers with quality assurance and ensure there is a constant linkage with the MIS Offices at the schemes, with regards data sharing through liaisons with the MIS officers of the respective irrigation schemes.

Following on the recommendations of the 2019 study and the present reality with regards to the COVID 19 pandemic, there is the need for ensuring routine scouting, record keeping and documentation is adhered to; supervised and effective throughout all participating irrigation schemes using the already existing Monitoring and Evaluation ICT infrastructure established at each scheme. In addition, the TRIMING Project is committed to supporting the IPM approach based on the recorded positive outcome recorded so far such as increase in crop yields and cut-down on field and post-harvest losses resulting from pest infestations and outbreaks as well as manage envisaged health and environmental risk. This IPM technical assistance is required to ensure the foundations of the previous programs are guaranteed and knowledge gained is consistently utilized and transferred.

IPM Capacity Building for FFBS Facilitators from Gombe ADP

The TRIMING Project has recently signed a Memorandum of Agreement with the Gombe state ADP for the purpose of nominating ADP extension agents who will be trained as FFBS Facilitators to work in the Dadin Kowa Irrigation Scheme. This is in a bid to get the Gombe State ADP up to speed with other ADPs from Kano, Jigawa, Sokoto and Zamfara States.

Contemporaneously, with the general scope of this Consultancy, the extension agents from the Gombe State ADP will be trained on introductory IPM subject matter focused on rice and tomato production which to a minimum, must include:

1. Identification of Economically Important Pests of Rice and Tomato
2. Pest Economics – Economic Injury Level, Economic Threshold etc.
3. IPM Tactics, Strategies and Principles
4. IPM Methods
5. Agro-chemical Health and Environmental Effects and Safe Use of Chemicals
6. Personal Protective Equipment and safe use of Chemicals
7. Scouting and Record Keeping
8. Hippopotamus Management and Effects on Rice Farming

The Consultant is expected to liaise with the TRIMING Project's Environmental Safeguard Specialist and Agronomist with regards Capacity building on IPM for the Extension Agents from the Gombe State ADP. The trainings will be conducted at the National Agricultural Extension and Research Liaison Services (NAERLS), Amadu Bello University (ABU), Zaria.

Effects of Hippopotamus on Rice Farming in Dadin Kowa Irrigation Scheme (Gombe State)

Fishermen and farmers in Dadin Kowa community in the Yalmatu Deba Local Government Area of Gombe State now carry out their activities in fear as they contend with hippopotamuses, whose presence now poses great danger to some residents and their possessions. Specifically, farmers in the area have been able to ascertain that the hippos attack and each consume early

maturing rice, up to about 75kg overnight. The communities, blessed with abundant land and habitat, have in recent times witnessed destruction of crops by the animal and attacks on fishermen whenever they are on the river or in the barrage. Hippopotamuses require large areas of savannah grasslands, where they feed on stems of herbaceous species, and in times of food stress they will also feed on cultivated rice fields if available (Kendall, 2011). Rice production is one of the main economic activities of the rural population of Dadin Kowa, hence the need for capacity building on IPM for extension agents assigned to the area, especially on the management of large mammalian pests such as the hippopotamus.

As defined by the World Bank, "Integrated Pest Management refers to a mix of farmer-driven, ecologically based pest control practices that seeks to reduce reliance on synthetic chemical pesticides. It involves the following:
(a) Managing pests (keeping them below economically damaging levels) rather than seeking to eradicate them;
(b) Relying, to the extent possible, on non-chemical measures to keep pest populations low; and
(c) Selecting and applying pesticides, when they have to be used, in a way that minimizes adverse effects on beneficial organisms, humans, and the environment". Thus, minimizing reliance on synthetic chemical pesticides

Approach to Capacity Building

- **Agricultural Extension Agents from Gombe ADP:** Currently, there are 16 newly nominated Extension Agents from the Gombe State ADP and an additional 10 number of women from the other 4 ADPs who will be trained afresh on IPM. All details on this Cadre will be provided through the TRIMING Agronomist with assistance from the TRIMING Environmental Safeguards Specialist (ESS). The Consultant should note that the ADP Extension Agents from the Gombe State ADP will be receiving Technical Assistance and Capacity Building on IPM as conducted by the TRIMING Project for the first time.

- **Farmer Field Business Schools (FFBSs):** Extension Agents (FFBS Facilitators) of the ADPs (Kano, Jigawa, Sokoto and Zamfara) started their Farmers Field Business Schools in 2017, in the participating schemes (see Table 2) and have graduated the first and second set of farmers who have begun as farmer facilitators. This Cadre have previously been trained on IPM. Nonetheless; the TRIMING Project is working to ensure that the key messages, tactics, strategies and approaches of IPM and safe use of chemicals including storage are continuously communicated effectively to these farmers and implemented among the FFBSs. The training design must ensure that FFBS Facilitators are conversant with the previous trainings on IPM and outcomes of the previous Consultancy and to a minimum, address the elements listed below:
    - Use of Scouting Sheets
    - Record Keeping
    - Generation of Farm Level, Cluster Level and Scheme Level IPM data
    - Assessment of Farm level, Cluster Level and Scheme Level impacts of IPM activities
    - Economic Thresholds.

- Proven appropriate/recommended IPM methods for the irrigation schemes.
- Monitoring and Evaluating IPM performance (Required for **M&E Officers of the ADPs**)
- Quality Assurance and Quality Control (Required for the **ADP Desk Officers**)
- Safe application of pesticides as a method of last resort; their management and disposal.
- Use of appropriate Personal Protective Equipment (PPEs)
- Management of field and post-harvest pests
- Other relevant details contained in the TRIMING IPM Training Manual

- **M&E Officers of the ADPs**: Based on the previous program (2019), the M&E Officers (who are also FFBS Facilitators) have been identified as responsible for collating data from farm-level scouting activities from their respective Clusters/Schemes. Capacity Building for this cadre should focus specifically on retraining, Gaps Analysis, and evaluating their performance on data collation.

- **ADP Desk Officers:** The ADP Desk Officers have the responsibility to perform data collection, verification, quality control and assurance. Submit final collated data to the TRIMING Agronomist, Scheme-level Environmental and Social Desk Officers and MIS Officers of the respective irrigation project office (*Note that the Scheme-level Environmental and Social Desk Officers will directly share IPM information with the TRIMING Environmental Safeguard Specialist*). Capacity Building for this Cadre will focus on all subject areas, but specifically on quality assurance and quality control; and supervision.

- **Irrigation Scheme(s) MIS Officers:** Currently, all irrigation offices under the TRIMING project have MIS officers who are responsible for storing and managing data from irrigation schemes i.e. crop yield per sector, water discharge rates etc. The MIS officer will store and manage data delivered by the ADP Desk Officers on IPM performance, and monitor reporting frequencies. Such information may also be cloud based and accessible on-line as a response to the COVID 19 pandemic. This Cadre will require capacity building on IPM record keeping, information storage, updating and sharing with extension agents.

2. TRIMING Project Description

The World Bank is supporting the Government of Nigeria to accelerate the development of irrigation through improving efficiency of existing irrigation schemes, expanding areas under irrigation, and improving the safety of dams in selected basins. Doing so is fundamental to achieving the FGN's objective under the Agricultural Transformation Agenda (ATA) of producing additional 20 million metric tons of food by 2020, and build the long-term resilience of the agriculture sector to climate risks.

The TRIMING Project Development Objective is to improve access to irrigation and drainage services and to strengthen institutional arrangements for integrated water resources management and agricultural service delivery in selected large-scale public schemes in Northern Nigeria.

This objective will be achieved through the implementation of four components, the design of which responds to the reality that water infrastructure (dams and irrigation systems), the farmers who use the water and irrigation lands, and the input and output markets for agricultural services and products are all interrelated in a larger connected system of technical, economic and social relationships.

Table 1: TRIMING Project component

Project Components	Main Activities
Component 1: Water Resources Management and Dam Operation Improvement	
Subcomponent 1.1: Support to Integrated Water Resources Management	The *piloting* of anticipated provisions for separation of government regulatory and operational powers and responsibilities for integrated water resources management (IWRM) of basin-wide allocation, control, and river channel maintenance for sustainable public irrigation scheme functioning.
Subcomponent 1.2: Dam Operations Improvement and Safety	Investments for sustainable operational safety, improved operational practices and increased dam safety of selected dams and reservoirs including: Bakolori, Zobe, Goronyo, Tiga, Challawa Gorge and Dadin Kowa dams (ie. 6 dams), and Ruwan Kanya operational reservoir and Hadejia Barrage.
Component 2: Irrigation Development and Management	
Subcomponent 2.1: Irrigation Infrastructure Investments	Rehabilitation of 27,000 ha to improve the performance of a total of 50,000 ha irrigation area in five schemes downstream of the existing storage reservoirs and major investment in irrigation civil works and related studies.
Subcomponent 2.2: Improving Irrigation Management at Scheme Level	Aims to ensure the long-term viability of the irrigation and drainage services delivered on public irrigation schemes by implementing a progressive management transfer to Water Users Associations (WUAs) and to autonomous professional operators, either public or private.
Component 3: Enhancing Agricultural Productivity and Support to Value Chains Development	
Subcomponent 3.1: Support to agricultural productivity and market linkages	Provide resources to enhance farmers' productivity in the rehabilitated schemes and improve their participation in value chains through a matching grant mechanism; and the establishment of Farmers' Management and Service Delivery Centers on each scheme, supported by extension and marketing agribusiness professionals.
Subcomponent 3.2: Support to Innovation and R&D	Technical assistance for farmer water schools, applied research such as improving irrigated agronomy, and introduction of innovations such as new crops or production techniques as part of emerging commercial partnerships.
Component 4: Institutional Development and Project Management	
Subcomponent 4.1: Institutional Development and Governance	This subcomponent includes five activities: capacity building and training of FMWR staff; support to RBDAs; consensus building and supporting the change process; generation, feedback, and dissemination of data, and strengthening supervision and accountability in the sector.
Subcomponent 4.2: Project Management and M&E	The activities here will support the establishment of the Project Management Unit and other key coordination institutions within Government, and will provide guidance on change management processes. The M&E activities will develop an Information System for project purposes, studies and analytical

	work and a records and document management system.

Project Selection and Location

The result of the selection process for the TRIMING project is a focus on three river basins and five irrigation schemes in northern Nigeria, which have been identified by the FederaL Government of Nigeria (FGN) as priority areas.

Table 2: Irrigation Scheme Areas on the Selected TRIMING Schemes

Status and projection	Scheme					Total	Total (all inclusive)
	BIP	MRVIS [1]	KRIS	HVIS	DKIS		
Present irrigated area (ha)	8,000	2,000	12,000[3]	5,000	*(100)*	27,000	*(27,100)*
Improved irrigated area by end of project (ha)	13,000	*(5,000)*[2]	15,000	6,000	*(5,000)*	34,000	*(44,000)*
Farmers (#)	25,000	15,000	40,000	25,000	16,000	121,000	121,000
Direct beneficiaries (#)	200,000	105,000	320,000	200,000	70,000	900,000	900,000

Noting: The items in (brackets) are all inclusive of the TRIMING project funding and other parallel project funding at the sites.

[1] *Support to Hadejia Valley Valley Irrigation Project (MRVIP) is limited to dam safety, water management, and agricultural service interventions (i.e. there is no TRIMING support for infrastructure development).*

[2] *2,500 ha already developed and 2,500 ha new development (all funded by the government and not TRIMING).*

[3] *12,000 ha normal rehabilitation and 3,000 ha major rehabilitation.*

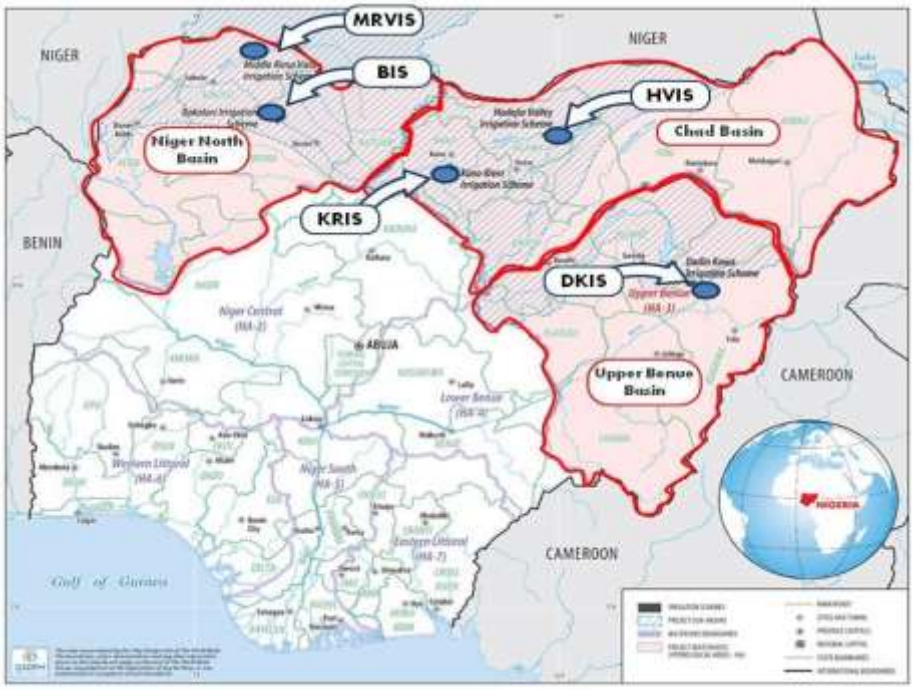

Figure 1: TRIMING Project Basins and Sites

Bakolori Irrigation Scheme (BIP) in Zamfara state. This is the 'first-mover' as the feasibility studies and detailed infrastructure design is complete. Construction is expected to start in October 2016. It is envisaged to rehabilitate a maximum improved irrigated area of 13,000 ha. **The WUA development consultancy service is underway for both BIS and MRVIS and will produce WUA training guidelines for use on all TRIMING sites.**

Middle Rima Irrigation Scheme (MRVIS) in Sokoto state. There is an area of approximately 2,000 ha equipped for irrigation with very low agricultural intensification. Furthermore, there is an existing contract for finalizing the works for a total of 5,000 ha. In this scheme, the TRIMING Project would focus on the hardware for the dam safety requirements and on the software for the irrigation scheme in itself.

Kano River Irrigation Scheme (KRIS). The equipped irrigation area is 15,000 ha though only 12,000 ha are being irrigated. The Project would focus in the first instance to rehabilitate the equipped irrigation area so that it becomes fully operational.

Hadejia Valley Irrigation Scheme (HVIS) in Jigawa state. The equipped irrigation area is 6,000 ha though only 5,000 ha are being irrigated. The project would focus in the first instance to rehabilitate the equipped irrigation area so that it becomes fully operational.

Dadin Kowa (DKIS) and Guyuk (GIS) Irrigation Schemes in Gombe, Borno and Adamawa states. This is a completely new irrigation scheme and pre-feasibility studies prepared by the FGN show an excellent opportunity for a PPP or service-provider approach. The TRIMING Project will provide support for feasibility studies, operational and transaction advice.

The consultancy described in this TOR forms part of Component 3 and includes implementation activities in all TRIMING participating Schemes.

3. Detailed Scope of Work

The service provider shall carry-out the following tasks covering the participating schemes (see Table 2 above for participating schemes):

- ✓ Review existing Integrated Pest Management (IPM) initiatives, achievements, constraints/gaps resulting from COVID 19 and opportunities to promote environmentally safe pest management approaches. Guidance documents to review include: (i) ESMF, (ii) PMP, (iii) Disclosed ESIA reports for all the participating schemes (iv) other IPM reports prepared for agriculture projects in the Nigeria portfolio such as FADAMA III, CADP, and SCPZ (v) TRIMING communication strategy report
- ✓ Review the reports on Technical Assistance for Advisory Services and Capacity Building on Integrated Pest Management.
- ✓ Develop a pest identification card for insect pests and disease pests to help FFBSs Facilitators effectively identify pests and natural enemies on the farm during scouting.

- ✓ Work with the TRIMING Environmental Safeguard Specialist (ESS) and Agronomist in identifying all established FFBSs; their locations, FFBS Facilitators, ADP Desk Officers, M&E Officers, MIS Officers and Environmental and Social Desk Officers.
- ✓ The Consultant will embark on field visits to acquaint itself with the FFBSs. Complementarily, the Consultant will also obtain current information of FFBS status i.e. number of FFBSs per scheme, number of person constitution, distribution and information on seasonally resulting farmer led FFBSs since the previous IPM capacity building program.
- ✓ Conduct training/retraining and capacity building of FFBS Facilitators and other requisite Cadres on Scouting, Record Keeping, use of Scouting sheets, M&E, IPM data entry; IPM data collection and sharing etc. In the course of the planting season, the Consultant is to review irrigation-level M&E reports and guide the process of data entry into the MIS.
- ✓ Provide technical assistance on ensuring quality control and IPM data verification by ADP Desk Officers. This activity must see that ADP Desk officers maintain a harmonized yet flexible procedure for ensuring the quality and integrity of IPM data obtained from scouting exercises during the conduct of every FFBSs' Agro-ecosystem Analysis (AESA).
- ✓ Make enquiries on most recent economically important pest issues experienced in the irrigation schemes over the past one year and provide suitable and appropriate advisory as required.
- ✓ Conduct an assessment or performance evaluation based on past data collection following the previous IPM capacity building and make suitable recommendations.
- ✓ Conduct on-field scouting exercises and record keeping, and demonstrate preliminary IPM scouting data collection and verification.
- ✓ Conduct detailed consultations with the irrigation project offices, specifically with the Agricultural Services Departments; and the FFBSs in their irrigation schemes so as to establish a synergy of operations with regards IPM and sharing of ideas.
- ✓ Ascertain the impacts of capacity building on IPM on the FFBSs based on previous capacity building on IPM.
- ✓ Demonstrate farm-level application of some IPM commodities needed for the purpose of implementing mechanical/physical, cultural, biological and chemical controls.
- ✓ Practical demonstrations on the proper use of PPEs and safe application of pesticides
- ✓ Facilitate the distribution of IPM commodities to beneficiaries and advice on other required IPM commodities needed for the irrigation schemes.
- ✓ Organize logistics for the training to accommodate Environmental and Social Desk Officers (ESDOs) and MIS Officers of each irrigation scheme in the five (5) schemes. *Note: The consultant is to hold each training at the scheme level.* Additionally, ensure that responsibilities of ESDOs as regards IPM activities and functions are well understood and that they are likewise trained on such.
- ✓ Advice and suggest ways for collaborative learning amongst individual FFBSs at intra and inter irrigation scheme levels.
- ✓ Advice on designing and implementing cost effective IPM controls practicable for the FFBSs in response to COVID 19 hence ensuring effective diffusion of information and techniques with current realities.
- ✓ Ascertain or conduct a quantitative analysis of farm-level impacts of IPM over the last/previous planting seasons.
- ✓ Strict adherence to the reporting structure and deliverables for this assignment.

- ✓ Specifically, for the Gombe ADP extension agents and 10 new extension agents from the other States, the Consultant will conduct capacity building on IPM with emphasis on economically important pests of rice and tomatoes, pest economics, IPM tactics, strategies and concepts, IPM methods and practices in rice and tomato production, safe use of chemicals, PPEs etc.
- ✓ Preparation of pamphlets for Hippopotamus management as a pest of rice.
- ✓ COVID-19 Pandemic: With COVID-19 cases on the rise in some of the TRIMING Project States, this Consultancy Contract will complementarily see training of FFBS Facilitators, ADP Desk Officers, M&E Officers and other cadres on the following:
    a) General overview on COVID-19
    b) COVID-19 Key Words and their Meaning
    c) Signs and Symptoms
    d) Prevention and response
    e) Community Health and Safety with Regards the COVID-19 Pandemic in Agricultural Practices

4. Reporting

The Consultant shall report to the National Project Coordinator of the TRIMING PMU, with the Environmental Safeguard Specialist acting as a liaison person for the execution of the contract and the ESDOs of each scheme as well as the ADPs.

5. Methodology

The methodology for the assignment should be elaborated in the Consultant's technical proposal and should be designed with attention to all of the tasks described in the detailed scope of work. The Consultant should elaborate on training approaches it intends to use and demonstrate a good understanding of adult education principles (including FFBS), post-qualification learning activities and continuing professional development. Awareness of training challenges in the field, and of tactics which incentivize and motivate attendance to training sessions should be elaborated. Strategies to ensure uptake and retention of knowledge (for example, hands-on learning in real life situations as practiced in FFBS), including use of digital and hard-copy media, GSM technology and other innovative methods should be motivated in the methodology and expanded on. The methodology should also list sequential activities that the consultant expects to undertake, informed by the detailed scope of works, and reflect these activities in a GANTT chart (activities, timelines and deadlines/deliverables).

The integration of activities to pest management initiatives at the participating schemes is an important strategy of the TRIMING Project implementation and the consultant will work closely with the Project Offices at the schemes; State and local ADPs; IPM Champions and the TRIMING project environmental safeguard specialist and agronomist, and other stakeholders. The Consultant's proposal should demonstrate an understanding of the organizational linkages of these stakeholders and the methodology should expand on how liaison and coordination of these multi-stakeholders will take place.

Basically, the IPM approach should build upon documents already prepared and be fully integrated into the extension system which TRIMING has adopted through ADP nominated extension staff assigned to TRIMING who will use the FFBS methodology in delivery of extension services. From this perspective, the IPM TA should focus on ensuring that the ADP staff (initially trained during the FFBS ToF - Training of Facilitators) should be able to effectively deliver the TRIMING IPM concept and approach to the farmers at the FFBS.

6. Consultant's qualification

The Consultancy assignment will be carried out by a firm with expertise in planning, developing and implementing capacity building programs especially in the agricultural sector. The firm should demonstrate its capacity to present professionals with expertise in the areas of Integrated Pest Management and Safe use of Agricultural Chemicals. The following professionals are a requirement for the Consultancy:

Key Experts

Team Lead. A Master' Degree in Environmental Management; Environmental Economics; Entomology, Agricultural Safety or IPM. At least 8 years' experience in providing technical assistance on pest management issues and the implementation of IPM programs. Specifically, classroom and field-based demonstration of IPM techniques and options. The team lead is expected to coordinate the entire process of content development, training method application, logistics for participants, communication and feedback, field visits and report writing. He/she will ensure direct liaison with the ESS on all matters concerning the Consultancy. It is expected that the Team Lead should have experience in facilitating training or capacity building for programs/projects funded by multilateral agencies (e.g. World Bank, United Nations, DFID etc.)

Training Specialist: Masters' Degree in Agricultural Extension, Training and Development or Agronomy. At least 8 years' experience in delivering trainings and implementing capacity building programs concerned with farmers, crop production and irrigation systems.

Crop Protection Specialist: Masters' Degree in Crop Protection or Integrated Pest Management. At least 7 years' experience in crop protection practices and implementation. Must be grounded in the design and application of physical, biological, mechanical and chemical IPM techniques.

Agronomist: A degree in Agronomy (Masters' Degree will be an added advantage). At least 5 years' experience with good technical and organizational background in performing crop production and protection programs and projects.

Monitoring and Evaluation Specialist: At least 5 years' experience in M&E in agricultural projects. The M&E Specialist will be responsible for ensuring the development of modules focused on scouting and record keeping.

Information Communication Technology (ICT) Expert: A degree in Computer Science, Information and Communication Technology, Data Science, Software Engineering and any other related field with at least 5 years' experience. A recognized ICT certification e.g. Microsoft, CISCO, Oracle, JAVA etc will also be an added advantage. The ICT expert should have

experience dealing in the agricultural sector especially in the design, operation and management of MISs, inter-phasing with stakeholders relevant in the capturing and dissemination of data, useful for planning and decision making. He/She should be knowledgeable in handling cloud-based platforms and coordinate iterative processes for data storage.

Non-Key Experts:

Non-Key experts will be responsible for assistance to the team. The Consultant may choose to have Non-Key experts from any discipline related to the project.

7. Time Frame

The assignment will be conducted over a period of six (6) months

8. Deliverables

The consultant must ensure the delivery of the following comprehensive survey reports:

8.1 Inception Report

A desk review study of all existing literatures on Integrated Pest Management and safe use of chemicals especially the Pest Management Plan (PMP), Environmental and Social Management Framework developed for the TRIMING Project, feasibility and pre-feasibility studies reports and other project documents. This should also include methodology and work plan in order to ensure a good entry point and that this assignment is on track. Consultant must submit (2) hard copies and a soft copy of the inception report.

The purpose of the inception report will be in threefold:

- ✓ To test the understanding of the terms of reference by the consultant,
- ✓ To state clearly how the consultancy will be carried out, in terms of both the methodology and timelines, as well as the anticipated limitations/constraints, and
- ✓ To state the progress made and problems/challenges if any.

(This report, pamphlet and the pest identification cards will be due three (3) weeks after signing of contract).

8.2 FFBS Training and Field Visit Report

This report must describe the actual work done by detailing specific technical information of the process, the operation, and the working principles, hardware and software tools used including challenges encountered if any. It must also present in clear format the feedback from the trainees and facilitators of the FFBS on the IPM approaches and a comprehensive list of attendees.

(This report will be due eleven (11) weeks after submission of inception report).

8.3 Draft Report

The draft report will be submitted after completion of all field exercises including training on IPM, specifically scouting, record keeping, data storage etc and distribution of branded PPEs. This will include comprehensive details of the training with respect to the targeted stakeholders highlighted under section 1, information about the capabilities of the beneficiaries on IPM and progress made with regards the capacity of the Agricultural Development Projects (ADPs) to implement and convey the IPM messages. In addition, report must also include the following:

- Recommendations based on evaluation of the capacity building exercise
- Pest management issues emerging and proposed solutions
- Follow up action plan to contribute further to the TRIMING Project objectives
- Conclusions
- Annexes attached to this report should include but not be limited to the following:
  Annex 1: List of participants with designation, address, phone number, e mail:
  Annex 2: Details of any teaching /training materials used as reference materials including local adaptation or translation
  Annex 3: Training agenda and outputs of the trainings.

Consultant must submit (2) hard copies and a soft copy of the report.
(This report will be due fifteen (15) weeks after submission of inception report).

8.4 Final Report

This report will be submitted after all comments from the draft report have been addressed. This will include;
Finalized Assessment of changes implemented by beneficiaries
Outputs, outcomes from previous training? (if any) and impacts on beneficiaries, as well as challenges and recommendations.
Consultant must submit (2) hard copies and a soft copy of the report.
(This report will be due twenty-one (21) weeks after submission of inception report).

9. Payment Schedule

The consultant shall be paid on a lump sum all-inclusive basis in four portions as follows:

(i)	Upon acceptance of inception report	- 10% of the agreed lump sum
(ii)	Upon submission of a field visit report	- 40% of the agreed lump sum.
(ii)	Upon submission of draft final report	- 40% of the agreed lump sum
(iv)	Upon acceptance of final report	- 10% of the agreed lump sum

Annex 1: Overview of the TRIMING Project's Integrated Pest Management and Safe use of Chemicals approach

S/N	1st Phase - 2015	2nd Phase – 2016/2017	3rd Phase - 2018	4th Phase - 2019
1.	**Target Participants:** Farmers/WUAs, irrigation scheme project staff	**Target Participants:** Extension Agents from Agricultural Development Projects (ADPs) in the TRIMING Project States. These include: Kano Agricultural and Rural Development Agency (KNARDA); Jigawa Agricultural and Rural Development Agency (JARDA); Sokoto Agricultural Development Project (SADP); Zamfara Agricultural Development Agency (ZADP). The Gombe State ADP is yet to be integrated into the FFBS System and Capacity Building on IPM Program	**Target Participants:** FFBS Facilitators	**Target Participants:** FFBS Facilitators and Farmer Facilitators
2.	**Key Scope of Services:** • Development of IPM Training Manual • Training of farmers/WUAs, irrigation scheme project staff and identification of IPM Champions on identification and IPM of economically important pests of rice • Evaluation of farm-level impacts of IPM • Selection of most appropriate IPM options • Identification of research facilities to aid IPM advisory etc • Safe use of chemicals and use of PPEs	**Key Scope of Services:** • Upgrading of IPM Training Manual to include pests of tomato • Training of ADP Extension agents on IPM through the FFBS Platform on economically important pests of rice and tomatoes • Safe use of chemicals • Use of PPEs • Classroom and field demonstrations	**Key Scope of Services:** • Re-training of FFBS Facilitators • Field Visits and Assessment of FFBS set-ups • Monitoring and Evaluation of IPM impacts • Scouting and Record Keeping • Production IPM Pamphlets	**Key Scope of Services:** • Training of FFBS Facilitators and Farmer Facilitators on Post-Harvest Pest Management and IPM in Post-Harvest Management • Field Visits Monitoring and Evaluation of IPM impacts • Scouting and Record Keeping Production IPM Pamphlets • Upgrading of IPM Training Manual to include Post-Harvest Pest Management and IPM in Post-Harvest Management
3.	**No of Trainees:** 300	**No of Trainees:** 135	**No of Trainees**: 135	**No of Trainees:** 553
	Major Outcomes			
	1st Phase	Two irrigation research centres belonging to the Amadu Bello University (ABU) Zaria, Kaduna State, where identified in BIS and KRIS respectively. The irrigation centres have been conducting research in test-farms in the two schemes for years. They have good experience of agriculture in the schemes and are familiar with the pest issues. Efforts were made to meet with the Heads of the irrigation research centres, contact was only established with the irrigation scheme in KRIS as the irrigation research enter in BIS was closed at the time of visit. An exciting discovery at KRIS during discussions with the Officer – in - Charge and Farm Manager of the centre was that IPM approaches were being experimented. The research centre is currently working on application of selective herbicides of rice weed pests to foster IPM. So far,		

		the two remain the only viable research centres located in the schemes and thus, may be eligible for research grant. **Suggested Appropriate IPM Method** A combination of **cultural, chemical and limited mechanical control methods** is most appropriate IPM methods for the irrigation schemes. The justification is provided: **Cultural Control Methods** • For cultural control, Project Staff, and farmers/WUAs are familiar with very effective and inexpensive traditional pest control methods which have been used in the past and are still in use in most irrigation schemes, but with variation. • Cultural controls are inherent in the schemes, and the existing concepts are easily transferable from farmer to farmer, or generation to generation. For example, soil preparation, pruning etc. • In irrigation schemes such as HVIS and KRIP, cultural control through the use of fishing nets is being implemented. Large hectares of land have been feasibly covered with yards of fishing nets to create barriers between crops, specifically rice and Quella birds. This practice is proving effective for the larger schemes which are implementing them, thus hypothetically, this cultural control method can be effective in smaller schemes such as MRVIS and DKIS. • All schemes have attested to having experience in the implementation of cultural control methods; making this a reasonable background for driving cultural control methods through an organized process. • No Record-Keeping or data on pest issues and IPM available **Economic Injury Level (EIL):** The EIL was determined for some pest infestations in some farms in the irrigation schemes using the formula described in. This activity was jointly conducted by the participants and the Consultant. EILs determined include: **Biological Control Possibilities in the irrigation schemes:** • Conservation of Assassin Bugs • Conservation of Monitor Lizards (Reduce Hunting; conserve them in Quella nesting areas) Conservation of Dragon Flies (All schemes) • Conservations of Frogs (All schemes) • In HVIS, cases of Eagles preying on Quella in the Nguru wetlands was reported by farmers. • **Distribution of PPEs** PPEs procured by the TRIMING Project were distributed to all irrigation schemes. The PPEs are to serve as incentives to enable Project Staff and farmers/WUAs practice safe handling of pesticides during pesticide applications or other farm activities requiring personal protection. **FFBS Approach** Following the WB/FAO Mission, it was advised that the concept of IPM Champions be cancelled, but rather build on the existing ADP structures in the States and adopt the FFBS Approach
	2nd Phase	**Assessment of the Capacity of ADPs to transfer IPM Knowledge through Farmer Field Schools** • In reality, the capacity of ADPs to implement IPM at scheme and farm levels does exist. The recent capacity building programs on IPM and FFS gave them the advantage to commence their FFSs and begin as FFS facilitators, equipped to educate and teach farmers in the irrigation schemes on IPM concepts, tactics and strategies. The ADPs being in existence since the mid-1970s are experienced in extension services and have received various kinds of trainings even though not consistent as extension agents would expect. In the past they have worked with the 'Tell and Visit' (T&V) system which was successful at some point, therefore they

		possess the mental and hands-on skill to succeed. However, the induction into the FFS approach will give them a more organized relationship-based approach to providing agricultural extension services to farmers within the irrigation schemes with a sense of accountability especially since they will be supervised by the TRIMING Project. • Furthermore, considering the farmers/WUAs in the irrigation schemes have been trained on IPM during the first phase of the TRIMING IPM approach, it is envisaged that this will make facilitation much easier for the ADP Extension Agents, as they will find farmers in their new FFSs who understand the basics of IPM and are ready to run with them once guided. • Distribution of IPM Commodities and PPEs **Lessons Learnt** • It was observed that there was a reasonable representation of extension agents amongst the ADPs with variations in numbers of participants as per ADP. The TRIMING Project did not recruiting every ADP Extension Agent, but has requested some to be assigned to the project for the purpose of facilitating FFSs and communicating and implementing IPM programs in the five (5) respective irrigation schemes. • Amongst the extension agents, some are Directors, Supervisors, M&E Officers and Village Extension Agents (VEAs). Generally, all cadres except for few VEAs demonstrated an appreciable, above-average ability to comprehend, communicate and demonstrate IPM concepts. The other cadres which include Directors, Supervisors and M&E Officers could ask intelligent questions, react to questions from the Consultant, make suggestions and motivate the VEAs. Some VEAs on the other hand appeared in-experienced in effective communication and liaison with farmers and timid. The Consultant improvised by communicating much simpler and by appointing either a Director or Supervisor to translate in Hausa language so that the VEAs felt comfortable and carried along. • Furthermore, the other Cadres who demonstrated a better understanding on the training content were generally fewer than the VEAs. The concern is that according to the TRIMIMNG design, it is expected that the VEAs will do all the ground work, but at the trainings it was observed that the other cadres will drive FFS and IPM much better than the VEAs, but were fewer in participation and obviously more experienced. • It was advised that the senior cadre should organized Training of Trainers (TOT) sessions at the ADP-level to bring their colleagues up to speed before they commence with their FFSs. Also, in future trainings, participants with generally the same level of understanding should be selected. **Women Participation in IPM Capacity Building** • The program witnessed participation of female extension agents from all the ADPs, some of which demonstrated will in affirming understanding of the training content. It was obvious that the female participants appreciate the training and will do well organizing female farmers at the scheme and farm levels. Nonetheless, TRIMING may need to ensure that stakeholders' avail more female participants in subsequent trainings, not only for the purpose of gender balancing, but to encourage them participating more and gaining communication confidence. **Classroom Assignments and Recaps** • Giving participant's classroom assignments and conducting recap sessions on previous trainings proved very useful and beneficial. For instance, Modules such as Economics of Pest Control began easier to understand following Group assignments where participants had to brainstorm and allow themselves take turns in explaining the Module to themselves. For Module content that could easily be remembered, recaps provided a suitable solution.
	3rd Phase	**Summary Details on Field Visits to FFBSs in KRIS** • **Crop Selection:** All FFBSs are planting the same varieties of tomato (UC82B, Rio Grandy and Farmers' Practice). UC82B and Rio Grandy with a (45-75) cm spacing, while Farmers' Practice is a closer or tighter spacing. • **Structure and Organization:** FFBSs maintain a similar structure (organization) throughout the irrigation scheme. Each FFBSs is part of a Cluster; the clusters have been derived from the three (3) Local Government Areas comprising KRIS. Every FFBS has two

(2) Facilitators, who provide leadership, training and technical assistance to farmers. At the level of the farmers constituting each FFBS, positions have been ascribed to farmers to demonstrate responsibility and accountability. These offices or positions are: Chairman; Secretary, Treasurer and Public Relations Officers.

- **Pest Management:** In the FFBSs in KRIS and among the FFS Facilitators from KNARDA, there is a satisfactory demonstration and transfer of knowledge on IPM. FFS Facilitators are quite conversant with the information garnered during the 2016/2017 Technical Assistance and Capacity Building on IPM, and are in turn ensuring that farmers can make pest management decisions and communicate IPM concepts.

  All over the FFBSs located in KRIS, farmers have developed the rapid behaviour of applying Neem (Azadiractha indica) extract from Neem tree leaves on their test plots, at least twice weekly. This has shown remarkable results as almost all test plots are pest free or have pest populations that are below the subjective Economic Injury Levels (EILs). Before the onset of the FFBSs and establishment of the test plots, insect pests experienced in the previous planting season included aphids, white flies, fruitworms and thrips. These have not been seen due to the aggressive and regular application of neem extract, good soil management practices and housekeeping (weed control, proper adequate spacing etc). Rather than filling their knapsacks with synthetic chemicals, farmers in the FFBSs rather fill-up with Neem extract diluted appropriately in water.

Summary Details on Field Visits to FFBSs in HVIS

- **Crop Selection:** All FFBSs are planting the same varieties of rice (Farrow 44, Farrow 61 and Farmers' Local Variety with a recommended spacing of (20 by 20) cm, while Farmers' Practice is a closer or tighter spacing.
- **Structure and Organization**: As in the case of KRIS, FFBSs maintain a similar structure (organization) throughout the irrigation scheme. Every FFBS has two (2) Facilitators, who provide leadership, training and technical assistance to farmers. At the level of the farmers constituting each FFBS, positions have been ascribed to farmers to demonstrate responsibility and accountability. These offices or positions are: Chairman; Secretary, Treasurer and Public Relations Officers.
- **Pest Management:** In the FFBSs in HVIS, major concern is given to controlling pest population build up in the nurseries prior to transplanting. Although there isn't a widespread use of Neem extract as in the case of KRIS, farmers are focusing efforts to proper land preparation activities which include weed control, tilling, using recommended fertilizer application rates and the use of fishing nets to prevent Quella attacks when the rice is maturing or has matured.

  From the IPM Consultant's independent scouting of some FFBS plots, little evidence of insect or disease pests' infestation were observed. However, some species of birds about 10cm in length were seen in the nurseries. Farmers stated that the birds eat the tillers but this was not confirmed when the birds were sighted. Generally, it is possible to say that pest populations may be below economic damaging levels or that the pests are sub-economic. It was advised that nurseries could be covered with fishing nets temporarily in order to serve as barriers. Also, water management is important. Adequate flooding of the nurseries will destroy true bug (Mai Coat) eggs and stemborers which may be thriving at the base of the rice stands or under the roots. FFBSs also encourage to apply Neem (Azadiractha indica) extract from Neem tree leaves, barks and seeds. Neem is so abundant in HVIS and more or less inexpensive. Because of its wide range effect on pests (insects, diseases etc). It may be the most beneficial IPM control available in the HVIS.

Summary Details on Field Visits to FFBSs in BIS

- **Crop Selection:** All FFBSs are planting the same varieties (FARO 44 (Sub-plot 1), b) FARO 59 (Sub-plot 2) and Farmers' Practice (Sub-plot 3) as stated earlier.
- **Structure and Organization:** FFBSs maintain a similar structure (organization) throughout the irrigation scheme. Each FFBSs is part of a Cluster and an intake; the clusters have been derived from the three (3) Local Government Areas comprising BIS. Every FFBS has Three (3) Facilitators. The FFBSs have a Chairman; Secretary, Treasurer and Public Relations Officers.

		• **Pest Management:** FFS Facilitators and farmers in BIS are more interested in preventing pest outbreaks. They perceive control as a necessity only when the obvious need arises to manage a pest problem. One very important consideration in IPM, is the selection of a healthy crop or crop variety. Selecting a resistant variety is a primary cultural control which to a large extent is preventive and likely to avert crop damage (monetary loss) in the planting season especially when other IPM controls are applied. In this regard, the FFS Facilitators and their FFBSs request that more resistant crop varieties are made available in subsequent trials or when the Farmers Management Service Delivery Centres (FMSDCs) are established. • Assassin Bugs, Spiders and Dragon Flies have been seen in several visits made to BIS. This presents a possibility for conservation of natural enemies and an advantage in the use of biological controls in the long-term. Specifically, Assassin Bugs kill and eat up other insect pests and Dragon flies are known natural enemies of AfRGM and are reasonably present in the irrigation scheme. Symptoms of AfRGM attacks have been reported previously, during the 1st Phase of the Technical Assistance and Advisory on Integrated Pest Management. **Summary Details on Field Visits to FFBSs in MRVIS** • **Crop Selection:** All FFBSs are planting the same varieties of rice (FARO 44 and Farmers' Local Variety). • **Structure and Organization**: FFBSs maintain a similar structure (organization) throughout the irrigation scheme just as in KRIS, HVIS and BIS. Each FFBSs is part of a Cluster. Every FFBS has two (2) Facilitators, who are also responsible for supervising at least three FFBSs overall. At the level of the farmers constituting each FFBS, positions have been ascribed, these offices or positions are: Chairman; Secretary, Treasurer and Public Relations Officers. • **Pest Management:** In MRVIS, farmers are mainly concerned with Quella attacks which occur when planted rice begins to mature. They have also observed Quella flying around the scheme in recent weeks, as if to say the birds are scouting round the scheme and observing the planting season of the rice and its growth phases. Another fear is that due to the unavailability of water discharge from the Goronyo Dam, many farmers in the schemes have not started planting their rice. The main plots where rice is being planted in the scheme belong to the FFBSs who are afraid that their farms may suffer pest infestations since they are the only set of farmers, currently planting. The FFBSs are using tube wells to aid water needs for their farms. Generally, Quella infestations are controlled through the use of fishing nets which are laid over the maturing rice to form a cover and barrier. The size and amount of fishing nets needed is usually dependent on the size of the plot.
	4th Phase	**Rice Threshing and Tomato Storage** Generally, in the irrigation areas, most farmers thresh their rice on the farm but on the bare ground. This is due to their lack of knowledge of the possible contamination of grains by moulds and other pathogens. Nonetheless, the TRIMING Project could see to the supply of adequately cut and measured trampoline material to assist farmers utilize the trampoline as a barrier and ground cover to lay on the ground before threshing. This will help farmers across the schemes to gradually adopt more hygienic approaches to threshing before bagging of rice. Additionally, the TRIMING Project through some partners such as Africa Rice Centre (AfricaRice) has supplied manual threshers to some of the irrigation scheme project offices. A visit to MRVIS provided the Consultant team with insight to materials and equipment supplied. **Rice and Tomato Bagging** Farmers in the irrigation areas bag their rice and dried tomatoes. Rice and tomatoes are bagged separately in polyethylene (synthetic bags) and stored in separate rooms within the homes of farmers. Some farmers separate their harvested rice into three (3) parts. One part for the next planting season, another part for their domestic use and the final part for the markets. In HVIS specifically, FFBS Facilitators informed that they were provided double-bagging and triple-bagging resources by the Bill and Melinda Gates Foundation for storage of rice and to aid post-harvest pest infestation.

Transportation of Harvested Crops

Farmers assist each other in transporting their harvests either to their homes or the markets. Given that some farmers have formed co-operatives, vehicles could be hired amongst them to assist with transportation. The major issues revolve around hygienic conditions of the vehicles used for transportation and covering of the commodities during transportation. Step will be taken following the step-down training to ensure proper disinfection of vehicles and storage areas during the handling process.

Conventional Storage Facilities

Most storage facilities within the irrigation schemes are owned by the local farmers who are natives of the villages and LGAs where most schemes occupy, geographically. While some of these structures may be enough to service smallholders, Farmers spend about NGN 5,000 to transport five 50kg bags of rice, and NGN 20,000 (lump) sum to hire haulage lorries to transport their tomatoes. In order to assist local farmers, the TRIMING Project may want to consider installing storage facilities such as warehouses to support and enhance proper storage activities that meet GAP and continue on the long-term objectives of continuous IPM capacity building and technical assistance initiated for the irrigation schemes. This input, from a perspective of sustainability may in the long-term, under proper supervision, quality assurance and controlled conditions help prevent economic losses and provide a suitable window for off-takers and markets to purchase crops produced from the TRIMING farm plots and eventually other farms in the respective irrigation schemes. It will also enhance the rice and tomato value chains. This will specifically provide good storage conditions, based on Best Available Technologies (BAT) for perishables such as tomatoes and bring the markets closer. Criteria will need to be prepared for "use and operation" modalities of the storage facilities so as to ensure longevity. Storage facilities could be sited in each irrigation scheme or each cluster per irrigation scheme.

Moreover, if this option is considered, then the need for feasibility studies and engineering designs followed by the preparation of the most appropriate safeguard instruments

Suggestions for Collaborative Learning amongst Individual FFBSs

Effective collaboration between FFBSs remains a very resilient way for encouraging learning, knowledge transfer and farmer-driven approaches and improvements in IPM implementation at the scheme-level. The TRIMING Project through its Component 3 sub-activities is currently using the Greenfield and Brownfield Days Initiative to foster collaboration between FFBSs at the Cluster level. This proves to be a sustainable activity; which allows for the farmers to openly inform themselves, ADPs and other stakeholders on the activities of their FFBS. Successes on IPM implementation can also be shared during this activity. While the Greenfield Days held during the planting season, Brownfield Days are held during and after harvest.

Lessons Learnt

The updating of the scouting sheets to MS Excel format proved very helpful, easier to use and less strenuous. Inasmuch as FFBS Facilitators appreciated the modifications; time is still required for all of them to master its use satisfactorily.

IPM commodities procured by the TRIMING Project will be useful, but provision needs to be made for increase in number of some commodities which have been distributed and for procurement of new commodities. The commodities requiring quantity increase are:

- Fishing Nets (Quella birds protection)
- Rain Coats
- Diatomaceous Earth
- Rodent Traps
- Rodent Guards
- Double and Triple bagging
- Android Tablets

		• Insect Sticky Traps • Neem Oil There is need for regular IPM supervision in the form of technical assistance and on-site capacity building and training. The FFBS supervisory teams believe that regular back to back technical assistance will ensure their mastery of IPM rudimentary knowledge and practices, which will enable successful long term unsupervised IPM implementation and recording of sustainable positive results. FFBS request the provision of audio-visual equipment that can enable farmers watch practical IPM practices on-screen. This will make learning easier and accelerate participation of more farmers in the FFBSs.