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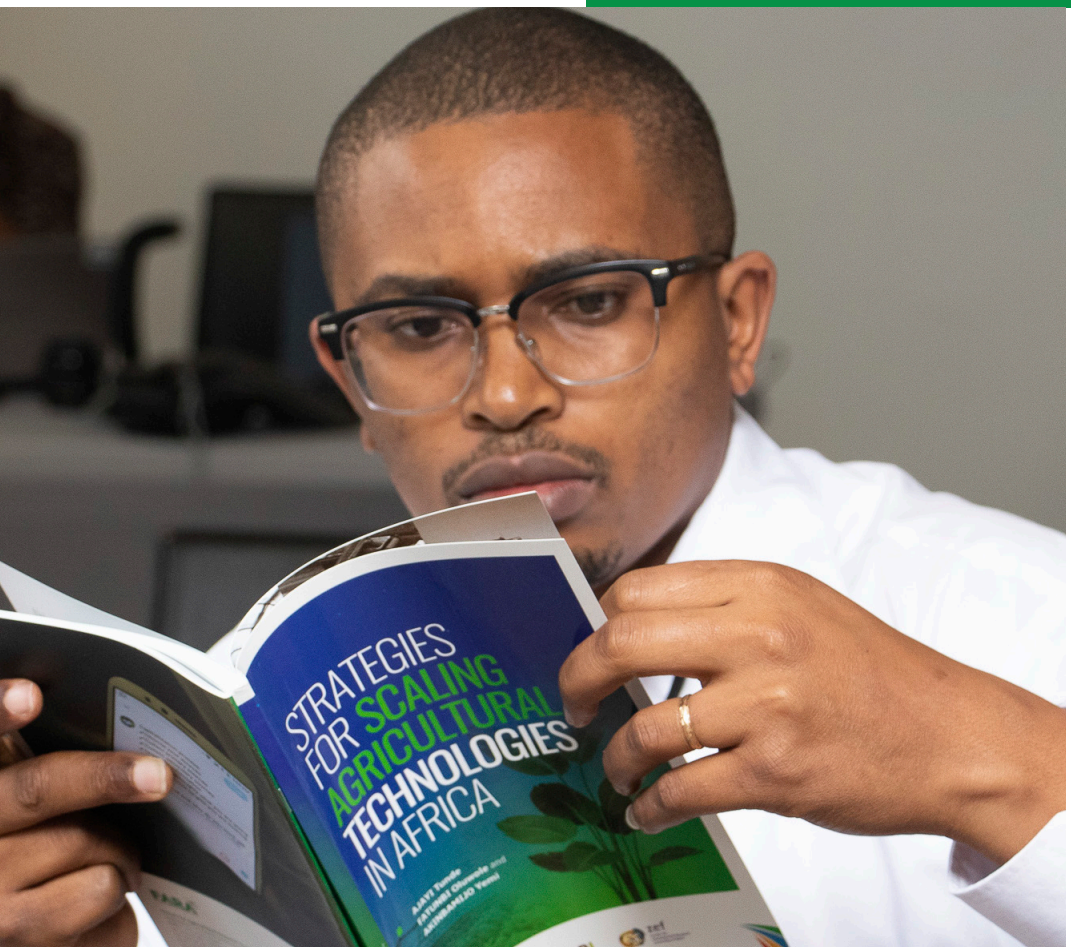

Modular Outreach Materials for Capacity Development Initiatives in TAAT Compacts

TAAT Compacts

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Abstract

The Forum for Agricultural Research in Africa (FARA) has been playing a key role in capacity strengthening at all levels within partner institutions and within key priority intervention areas and their value chains. To this end, FARA in collaboration with AFAAS convened a workshop in Abidjan 2019 bringing together TAAT commodity and enabler compacts and other value chain actors, to develop a template that would act as a platform for training to ensure the commercialization of TAAT proven technologies. Further to this, the compacts have been working with a consultant to develop outreach material in a modular form for at least one technology each. The exercise ran from July to November 2020 and one recommendation is that it should be extended to other training manuals. This is especially because the eventual level of income generation by farmers and other stakeholders will lie in how accurately and effectively, they implement information from proven TAAT technologies.

Keywords: Outreach materials, Commercialization, Compacts, Technologies

Acknowledgements

The development of this set of outreach materials has been coordinated by the TAAT Capacity Development and Technology Outreach Team at FARA, in collaboration with AFAAS.

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Table Of Contents

1. Introduction

As TAAT's enabler compact for Capacity Development and Technology Outreach (CDTO), the Forum for Agricultural Research in Africa (FARA) has been playing a key role in capacity strengthening at all levels within partner institutions and within key priority intervention areas and their value chains. In the process to ensure thematic content of capacity development activities and modules are designed and administered, FARA initiated the process of packaging TAAT materials for outreach in November 2019 during a workshop in Abidjan, in collaboration with AFAAS. The proposed next steps were to package materials based on the developed template and convene a series of webinars whereby TAAT compacts will administer the materials to a wider audience involving the sub regional organizations, national agricultural research and extension services, youth networks, agribusinesses innovation platform facilitators and incubators.

Materials have been developed along an improved version of the November 2019 module template for 9 out of 12 compacts as indicated in Table. 1 below. Attention has been accorded to ensuring that modules are gender responsive (particularly through outcome evaluations) and integrate different approaches towards capacity development. The modules have been numerically labelled using the alphabet letters of the compacts as agreed in the November 2019 Abidjan workshop (see appendix 1). There was a slight degree of variation (such as duration of training sessions and the specifications of materials to be used among others) in the final module content of compacts which is a reflection of the manner of approaches to training and content in training materials. However, great effort has been made to ensure a high level of uniformity within the modules with a removal of any ambiguity in training approaches for facilitators in order to assure a consistent delivery of information on and application of compact technologies irrespective of geographical location.

Module 1.0 TAAT AQUACULTURE COMPACT OUTREACH TRAINING MATERIAL

Module 1.0 TAAT AQUACULTURE COMPACT OUTREACH TRAINING MATERIAL

This set of outreach materials has been developed jointly by the Aquaculture Compact, led by WorldFish and the Capacity Development and Technology Outreach led by FARA.
This manual is one of a series on other related extension manuals:

1 Manual on Quality Catfish Seed
2. Manual on Quality Low-Cost Fish Feed
3. Manual on Fish Value Addition

Guide for users:

The material in this guide has been put together to assist extension workers and other trainers in facilitating and delivering improved technologies to tilapia breeders for profitable ventures. The content uses plain language for easy understanding. The learning materials have been packaged for different hatchery and nursery staff to acquaint themselves with the knowledge and skills necessary to run a successful hatchery operation.

Targeted audience

The manual is aimed at mainly tilapia breeders—both women (30%) and men (45%) as well as youths (25%)—according to their level of involvement along the aquaculture value chain. Any tilapia breeder within 15 to 60 years of age is considered a prospective learner.

Estimated time:

A total of four hours will be required: 3 ½ hours for learning and ½ hour for evaluation and feedback

Assumption:

The material in this guide has been put together to assist extension workers and other trainers in facilitating and delivering improved technologies to tilapia breeders for profitable ventures. The content uses plain language for easy understanding. The learning materials have been packaged for different hatchery and nursery staff to acquaint themselves with the knowledge and skills necessary to run a successful hatchery operation.

Caveat:

Strict regulations for the administration of methyl testosterone, ethyl testosterone or other sex-reversal must be observed. It is required that workers wear protective clothing and masks with an air filter. Make sure the facility has a protocol for managing water used for sex-reversal. Do not release hormone treated water directly into the environment. Always comply with government standards, where these exist.

About TAAT:

Technologies for African Agricultural Transformation (TAAT) is a framework developed by the African Development Bank as part of its efforts for agriculture development on the continent. It is essentially a knowledge and innovation-based response to the recognized need for scaling up proven technologies across Africa aiming to boost productivity, and to make Africa self-sufficient in key commodities. The CDTO FARA leads the Capacity Development arm of TAAT as an enable compact while WorldFish leads the Aquaculture compact of TAAT in 12 countries in Africa: Benin, Burundi, Cameroon, Cote d'Ivoire, Democratic Republic of Congo, Ghana, Kenya, Malawi, Nigeria, Tanzania, Togo and Zambia.

1.0 Introduction

1.1 Background:

Tilapia (Oreochromis niloticus) is a good candidate species for culture to boost fish production in both domestic and global markets. This will contribute to fish nutrition and security in Africa. However, the early sexual maturity and the prolific nature of tilapia often results in stunted growth, which is a major obstacle to realizing the full potential of tilapia farming. This, of course, is unattractive to markets. The purpose of this manual is to distribute methods that will expose extension workers to better practices in Monosex tilapia production and facilitation techniques. This will enable them to spread these skills to other fish breeders in their respective areas, which will increase the production of high-quality fingerlings for fish farmers to buy.

1.2 Rationale of the module

The lack of access to quality fish seed, low skills of fish breeders in better management practices (BMPs), high fry and fingerling mortality and the lack of knowledge on fish health management among hatcheries are among the several challenges hindering fish production. This manual has been put together to assist extension workers and other trainers in facilitating and delivering improved technologies to tilapia breeders to produce fast-growing and healthy fingerlings for profitable ventures.

1.3 Learning Outcomes:

By the end of the training module, learners shall be able to:

1. Have enhanced knowledge on broodstock management and egg incubation.
2. Acquire skills on feed preparation for tilapia sex reversal
3. Acquire entrepreneurial skills in business plan development for sustainable venture
4. Gain skills on how to share knowledge gain with other tilapia farmers in their respective areas for increased tilapia production.

2.0 Content

2.1 Pre-evaluation of learners (with feedback)

2.1.1 Learning Activity Bundle 1: INTRODUCTION

Activity One: Origin of Tilapia - Why Tilapia, the 'Aquatic Chicken' (20 minutes)
Methods of Facilitation

- PPT Presentation
- Brainstorming on issues raise
- Role play on key issues
- Group discussion and feed backs in plenary

Activity Process and Procedure

- Start by pairing up the participants and get them to ask each other a series of questions (through pre-prepared slides with illustrative photos): Have you been to a fish market? Name the types of fish observed. Did you see tilapia? What are the features you observed on the tilapia?

- Introduce the topic of the module (PPT 1- 2) by highlighting importance of tilapia especially in Asia, Africa, Mediterranean and the Middle East, system of cultivation, quality of flesh and introduction of GIFT

- Brain storming and group discussion on consumer preference for tilapia's white flesh, mild flavor, ability to breed easily and massively: called aquatic chicken

Activity Two: : (aiming at those who are not beginners in the group) The Rationale for Mono-Sex Tilapia Production (20 minutes)
Methods of Facilitation

- PPT Presentation
- Brainstorming on issues raise
- Role play on key issues

Activity Process and Procedure

- Rationale for Mono-Sex Tilapia Production (PPT 3) differentiate between female and male tilapia for economic reasons, justification for mono-sex tilapia and use of hapa for mass production.

- Facilitators to use a female and male in role play on differences between female and male as best candidates for aquaculture production.

- Brain storming on key justifications for the choose of all-male or mono-sex for commercial production.

Activity Three: Advantages/Disadvantages of Monosex Tilapia (15 minutes)
Methods of Facilitation

- PPT presentation
- Brainstorming on issues raise
- Role play on key issues
- Group discussion and feed backs in plenary

Activity Process and Procedure

- Advantages and disadvantages of Mono-Sex Tilapia Production (PPT 4)
- Participants should deliberate on these questions.

1. What are the advantages of producing mono-sex tilapia?
2. What are the disadvantages of producing mono-sex tilapia?

2.1.2 Output Evaluation: *What have the learners learnt? Which aspect did they enjoy the most? What would they like to see improved?*
Are there any gender differences in the exposure to the information? Practices? Knowledge?

2.2. REPRODUCTION AND INCUBATION

2.2.1 Learning Activity Bundle 2

Activity Four: Reproduction in Tilapia - Sexual Dimorphism (20 minutes)
Facilitation Method

- PPT Presentation
- Role Playing
- Group discussion
- Illustrated posters

Activity Process and Procedure

- Reproduction in Tilapia - Sexual Dimorphism (PPT 5) on the sexual differences between female and male tilapia.

- Facilitators to use a female and male participant in role play on differentiating between sexual differences of female and male.

Activity Five: Broodstock Selection and Care (20 minutes)
Facilitation Methods

- PPT Presentation
- Role Playing
- Group discussion

Activity Process and Procedure

- PPT 6-7: Factors to consider for broodstock selection and management

- Facilitators to use 2 participants as breeders in role play on select female and male broodstock for tilapia production.
- Brain storming on factors to consider factors to consider for management of broodstock.

Activity Six: Hapa Technology (20 minutes)
Facilitation Methods

- PPT Presentation
- Group discussion
- Illustrated posters
- Brain storming

Activity Process and Procedure

- Hapa technology for Mono-Sex Tilapia Production (PPT 8-9) describes the features, uses, advantages and disadvantages of hapa for mass production.

- Use of illustrated posters on how to construct a hapa and fix in an earthen pond.

- Brian storming in groups on justification to use hapa for commercial production.

Activity Seven: Seed collection and egg incubation (20 minutes)
Facilitation Methods

- PPT Presentation
- Role Playing
- Illustrated posters

Activity Process and Procedure

- Seed selection and egg incubation (PPT 10) enumerates steps for collection of tilapia eggs and incubation process.

- Use of illustrated posters on how the steps for collection of tilapia eggs and incubation process.

- Role playing by 2 participants on how to collect tilapia eggs and incubation process.

2.1.2 Output Evaluation: *What have the learners learnt? Which aspect did they enjoy the most? What would they like to see improved?*
Are there any gender differences in the exposure to the information? Practices? Knowledge?

Activity Process and Procedure

- Before the training session, the facilitator will establish some facts about the audience to enable sharing of experiences and peer learning within the group.

- The facilitator will also carry out a gender analysis using the FARA matrix for identification of gender-based constraints (see Table 1), in order to identify potential actions to address the constraints.

- Start by pairing up the participants and get them to ask each other a series of questions (through pre-prepared slides with illustrative photos) such as whether they remembered the reproduction in tilapia. What is dimorphism? What features will be considered for broodstock selection? Why is hapa technology important for mass production of Monosex tilapia?

2.3. Feed Preparation and Management Practices

2.3.1 Learning Activity Bundle 4

Activity Eight: Techniques for sex reversal hormone feed preparation (15 minutes)
Facilitation Method

- Presentation
- Role Playing
- Group discussion
- Handouts
- Illustrated posters

Activity Process and Procedure

o PPT 11-12 enumerates steps of techniques for sex reversal hormone feed preparation.

Participants should deliberate on these questions.

1. Is the use of sex reversal hormone permitted by your country?

2. Can sex reversal hormone readily bought in your country? – why or why not?

3. Which authority in the country is responsible for controlling discharge of cultured water into the environment?

4. What are the government regulations for controlling discharge of cultured water into the environment?

5. Are these regulations being enforced?

Role play to include the various actors in the country regulation line including the user, supplier, regulator, fish breeder, environmental officer and ma producer or their representative. Learners to describe (a) their imagined roles (b) what their expectations are from the other stakeholders. Facilitator to provide summary and copy of vaccine regulations for the respective countries.

Activity Nine: Better Management Practices and Biosecurity Measures (15 minutes)
FACILITATION METHOD(S)

- PPT Presentation
- Role Playing
- Group discussion
- Hand outs
- Illustrated posters
- Sharing Experience

Activity Process and Procedure

- PPT 13-14 highlights Better Management Practices (BMP) and Biosecurity measures for production of sex reversed tilapia fingerlings.
- Use of illustrated posters and handouts on BMP and biosecurity
- Role playing by 2 participants: one as an extension personnel and the second person as a fish breeder on BMP and biosecurity measures for eggs, yolk sac collection and larval rearing.

Activity Ten: Fry grading (15 minutes)
Facilitation method

- Presentation
- Group discussion

Activity Process and Procedure

- PPT 15 provides reasons and best time to grade fry
- Use of illustrated posters and handouts on BMP and biosecurity
- Role playing by 2 participants: one as an extension personnel and the second person as a fish breeder on BMP and biosecurity measures for eggs, yolk sac collection and larval rearing.

Activity Eleven: Water Quality (15 minutes)
Facilitation Methods

- PPT Presentation
- Group discussion
- Illustrated posters
- Sharing Experience

Activity Process and Procedure

- PPT 16-17 enumerates various aspects of water quality parameters to be monitored
- Use of illustrated posters on water quality management.
- Group discussion on implications of poor water quality in pond.
- Participants to share experience on how water quality has been managed and consequences on fish health or survival due to poor water quality in pond.

Activity Twelve: Fry harvesting and nursery phase (15 minutes)
Facilitation Methods

- PPT Presentation
- Role Playing
- Experiential learning (learning by doing)
- Group discussion

Activity Process and Procedure

- PPT 18-20 highlights fry harvesting and nursery phase
- Use of illustrated posters on water quality management.
- Group discussion on implications of poor water quality in pond.
- Participants to share experience on how they have harvested fry or fingerlings for sale or to stock nursery or production pond.

2.1.2 Output Evaluation: *What have the learners learnt? Which aspect did they enjoy the most? What would they like to see improved?*
Are there any gender differences in the exposure to the information? Practices? Knowledge?

2.4 Outcome evaluation (with feedback):

See Annex

(A set of Likert scale against statements on the improvement e.g. of the knowledge of the participant; positive change in attitude towards some practices; increased motivation to carry out a practice or confidence to implement a practice. The scale will be strongly disagree to strongly agree.)

(If you want to carry out a Quiz, then prepare the quiz as a handout and then prepare answers for learners to check their performance)

3.0 KEY TERMS:

provide definitions and illustrations of key terms for learners to refer
Tilapia, broodstock, breeders, fertilization, fingerlings, fry, Genetically Improved Farmed Tilapia (GIFT), hatchery, hatchlings/larvae, hormone, juveniles, monosex, sex reversal, spawning,

4.0 BIBLIOGRAPHY (SOURCE):

acknowledge sources of materials you used to prepare the outreach material including authors.

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Tacon AGJ. 1992. Nutritional fish pathology: Morphological signs of nutrient deficiency and toxicity in farmed fish. FAO Fish Technical Paper. No. 330. Rome: FAO. 1992. https://www.wikiwand.com/en/Plant_pathology

Abdel Rahman El Gamal. 2019. Removing the premaxilla of tilapia males. Fish Consulting Group.

5.0 ADDITIONAL RESOURCES-FURTHER READING:

Maryland Aquaculture Coordinating Council. 2007. Best management practices: A manual for Maryland aquaculture.

Gianluigi Negroni. 2013. Tilapia Farming Guide.

6.0 Annex with all support materials

Formatted and structured materials on:

1. Slide Deck to be used (by each Activity bundle and each activity)
2. Handout Poultry Diseases during Brooding
3. Photo Props
4. Outcome Evaluation form
5. Other Handouts

Annexes.

1. Training Evaluation Form.

Training evaluation

Please rate your satisfaction in the training workshop on a 1 to 4 rating scale (1 = Dissatisfied, 2 = Somehow satisfied, 3 = Satisfied, 4 = Highly satisfied).

Training elements	Rating scale			
	1 Dissatis-fied	2 Somehow satisfied	3 Satisfied	4 Highly satisfied
Training objectives				
The training objectives were relevant, realistic and clearly defined.				
Training content				
The training content was relevant, ade-quate, well organized and easy to follow.				
The training event was flexible to accom-modate the learning needs/expectations of participants.				
Training process and methods				
The training process and methods helped me better understand the training con-tent.				
Training facilitators provided helpful com-ments, feedback and examples.				
Training materials				

Training materials were relevant, well-organized, adequate and easy to read.				
Training time and duration				
Adequate time was allotted for practical sessions and discussion.				
The balance between presentations and practical sessions was good.				
Learning and intention to apply learning				
I have gained adequate knowledge and skills from the training program.				
I can apply the knowledge and skills gained in my work context.				
Overall Assessment				
Overall, how satisfied are you with the training workshop?				

Acknowledgement

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Professor Bernadette Tosan Fregene
Technology Transfer Officer: Ajibola Abeni Olaniyi
Content Expert: Professor Paul Bolorunduro, National Agricultural Extension and Research Liaison Services (NAERLS) of the Ahmadu Bello University (ABU), Zaria
Extension Material Template was developed by FARA and AFAAS

In case of any need to make changes to the materials or to add further information, please contact: Professor Bernadette Tosan Fregene (WorldFish); (b.fregene@cgiar.org)

The development of this set of outreach materials has been coordinated by the TAAT Capacity Development and Technology Outreach Team at FARA, in collaboration with AFAAS.

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Design & Layout: *FARA Knowledge management learning and Communications Team*

Module 2.0 TAAT CASSAVA COMPACT OUTREACH TRAINING MATERIAL

Module 2.0 TAAT CASSAVA COMPACT OUTREACH TRAINING MATERIAL

Module 2.1. Cassava Production and Weed Management

This set of outreach materials has been developed jointly by the Soil Compact, led by International Fertilizer Development Center (IFDC) and the Capacity Development and Technology Outreach led by FARA.
This module is one of a series on related modules:

The other modules are:
GATP Land preparation Technology for higher Cassava root production.

Guide for users:

This training manual has been developed by ITTA and partners to improve the yield of Cassava in countries of Africa. It provides a step by step approach on how to control weeds and can be used alongside the Six Steps to Cassava Weed Management & Best Planting Practices toolkit. It also details time bound activities that the facilitator can use to get information to the participants with an evaluation after each learning bundle to assess whether learning has taken place.

Targeted audience

All farmers in sub-Sahara Africa especially resource poor youth, women and any disadvantaged groups already engaged in rice farming.

Estimated time:

3 ½ Hours + ½ hour for evaluation and feedback (4 hours in total)

Assumption:

It is assumed that the beneficiaries of this training module have attained basic education (primary and secondary) and are highly motivated to engage in effective rice production. e

Caveat:

This material can be used by any facilitator with appropriate acknowledgments.

About TAAT:

TAAT is a key priority of the African Development Bank's agricultural transformation agenda also known as the Feed Africa Strategy. TAAT is essentially a knowledge and innovation-based response to the recognized need for scaling up proven technologies across Africa aiming to boost productivity, and to make Africa self-sufficient in key commodities. CDTO FARA leads the Capacity Development arm of TAAT as an enabler compact while the International Potato Center (CIP) leads the Orange-Fleshed Sweet Potato compact of TAAT.

1.0 Introduction

1.1 Background:

Yield of cassava in Africa and Nigeria is being stymied by several factors including poor weed control. Weeding takes 50-80 percent of total farm budget. In most communities, women are the main actors that hand weed cassava, an activity that is tortuous and results to back-ache. Yield losses of cassava under weed infestation are estimated at between 50 and 90 percent. Poor weed control and other agronomic constraints impedes cassava production and put yield of cassava in Nigeria at about 8 tons per ha (t/ha) (FAO, 2013). The training manual thus sets out to provide farmers with a series of steps that they can take to make improvements in both cassava planting and weed management. Due to the volume and intensity of the training material, learning outcomes are attached to each of the activities within the two learning activity bundles of basic field preparation and weed management.

1.2 Rationale of the module

The module has been developed to be used alongside the already existing training manual on the Cassava Weed Management & Best Planting Practices which has been designed to enable farmers to overcomes a number of challenges of weeding that consumes their time while at the same time impacting negatively on their income generation from lowered tuber yields.

1.3 Learning Outcomes:

By the end of this module, participants will be able to:

1. Describe the basic steps of setting up a cassava farm
2. Demonstrate methods of weed management
3. Carry out herbicide control using knap sprayers as a method of chemical control

2.0 CONTENT

At the end of each Learning Activity Bundle, there is a need to implement an output evaluation using an electronic or print form from the annex.

2.1 Pre-evaluation of learners (with feedback)

2.1.1 Learning Activity Bundle 1: Awareness raising and sensitization meeting *(20 minutes)*

Activity One: This activity enables the facilitator to meet with local leaders and knowledgeable stakeholders to:

- Carry out self-introduction and allow the local leadership to welcome you
- Identify training participants paying attention to gender and age balance
- Discuss about the rice production activities and any existing fertilizer application practices
- Make logistical arrangements for focal fields, homesteads, dates and times for the training

Facilitation Methods

- Group discussion
- Sharing Experience

Activity Process and Procedure

- For the facilitator, visit the area earlier to introduce yourself to the local leadership and to assist you in setting up the meeting with the local farmers at a suitable date, time and venue.

- The facilitator will also carry out a gender analysis using the FARA matrix for identification of gender-based constraints (see Table 1), in order to identify potential actions to address the constraints.

- Start by pairing up the participants and get them to ask each other a series of questions on the rice growing activities, varieties and fertilizer application practices in the region.

Table 1: Learners' pre-evaluation sheet

Entre-preneur by chain node	Descrip-tion of activities under each node of the value chain	Roles and responsibilities			Roles and responsibilities		
		M	F	Y	Male	Female	Youth
Input supply: e.g how do you access cassava planting materials in the past?							
Production: e.g. how do you improve production output?							
Processing: e.g. What is the best way to apply fertilizer to your cassava?							
Marketing: e.g. What profit are you currently making from your cassava?							

2.2. The Cassava Farm

2.2.1. Learning Activity Bundle Two: Basic Steps in Setting up a Cassava Farm

Activity Two: Site Selection (20 minutes)
Expected Outcomes
At the end of the lesson the learners will be able to:

a. Identify the type of soil required for planting cassava.
b. State the factors to consider in cassava site selection.
c. Describe indicators of a good soil for cassava site selection.
d. Carry out a soil test for cassava plantation
e. Identify appropriate agency/institution to contact for a soil test.

Facilitation Methods

- Lecture Method
- Demonstration method
- Classroom Discussion
- Presentation of images, pictures, video clips or documentaries.

Activity Process and Procedure

- Types of soil required for cassava plantation.
- Factors to consider or avoid in setting up a cassava farm i.e. annual rainfall, soil topography, soil fertility, etc.
- Indicators of good soil(s) for cassava plantation worm cast, etc.
- How to carry out a soil test for cassava plantation
- Agency/institution that could assist with soil test

Facilitator Actions

State the importance of site selection in cassava plantation.
Guide classroom interaction on the contents i.e. type of soil(s) that are required for cassava plantation, factors to consider in cassava site selection, indicators of a good soil, etc.
Present learners with relevant images/visuals to concretise learning.
Provide any other information as may be required.
Demonstrate how to carry out soil test for cassava farm.

Learner Actions

Actively listens to facilitator's explanations and illustrations on site selection for cassava plantation
Share personal unconventional experiences (if any) on site selection for cassava plantation.
Ask relevant questions from the facilitator

Resources

Relevant training manuals, textbooks, pictures, marker pens, white/interactive boards, relevant video clips,
Relevant internet links/ blogs, etc.

Reflections and Assessments

What are the likely consequences of not adhering to the discussed principles by cassava farmers in site selection?
Observation of learners' involvement in classroom interaction
Short quizzes, and assignments.

Activity Three: Measurement of Selected Site (240 minutes) (see annex 1)
Expected Outcomes

a. Discover the purpose(s)/reason/benefits for site measurement in cassava production
b. Identify tools required for site measurement
c. Acquire site measuring technique(s)
d. Gain hands-on experience(s) on site measurement by carrying out a site measuring activity

Content

- Reasons, and benefits of site measurement in cassava production
- Appropriate tools/
- devices required/needed for site effective measurement
- Site measuring techniques
- Field activity on field site measurement

Facilitation Methods

- Field activity(ies)
- Out-of-class instructional delivery
- Out-of-class 2, 3 or more interactions
- Active/field observation
- Presentation of images, tools, etc.
- Practical demonstration with appropriate tools, etc. for site measurement

Activity Process and Procedures

Facilitator

State the importance of site selection in cassava plantation.
Guide classroom interaction on the contents i.e. type of soil(s) that are required for cassava plantation, factors to consider in cassava site selection, indicators of a good soil, etc.
Present learners with relevant images/visuals to concretise learning.
Provide any other information as may be required.
Demonstrate how to carry out soil test for cassava plantation
Ask learners relevant questions for feedback(s) on their learning.

Learner

Actively listens to facilitator's explanations on the purpose(s)/reasons and benefits of site measurement for cassava plantation.
Observe facilitators demonstrations with appropriate site measurement tools/devices
Carry out practical site measurement activity to gain hands-on experience
Ask relevant questions from the facilitator

Resources

Relevant training manuals, textbooks, measuring tapes, rulers, squares, GPS, angle locator, angle gauge, pictures, markers, etc.

Reflections and Assessments

Would you judge any agricultural practice as good if proper site measurement if not considered?
Observation of learners' activities during practical session
Assessment of learners' display of measuring techniques during practical session.

Activity Four: Land Preparation and Tillage (30 minutes)
Expected Outcomes

a. Identify the process of land preparation for a cassava farm
b. Describe methods of land clearing and their benefits.
c. explain the step by step use of herbicides in land preparation for cassava farm
d. Highlight the importance of land tillage and non-tillage.
e. Describe the recommended spacings in a tillage system for cassava farm

Content

- Process of land preparation for a cassava farm.
- Different land clearing methods (manual and mechanical) and their benefits.
- Step by step use of herbicides in land preparation for cassava farm
- The importance of land tillage and non-tillage.
- Recommended spacing in a tillage system for cassava farm

Facilitation Methods

- Lecture Method
- Demonstration method
- Classroom Discussion
- Presentation of images, pictures, video clips or documentaries.

Activity Process and Procedures

Facilitator

State the importance of land preparation and different methods of land preparation, highlight their advantages and disadvantages.
The procedure for use of herbicides in land preparation. This will include types of herbicides, when to use each type of herbicide, mixture rates, spraying equipment and patterns, etc.
Tillage systems for cassava farm, importance of tillage, tillage tools and equipment.
Tillage spacing for different tillage systems for a cassava farm.

Learner

Actively listens to facilitator's explanations and illustrations on land preparation.
Share personal experiences on how they prepare land for cassava in their localities.
Share their experience on the use of herbicides
site selection for cassava farm
describe their practice in terms of tillage systems
Ask relevant questions from the facilitator

Resources

Relevant training manuals, textbooks, pictures, marker pens, white/interactive boards, relevant video clips,
Relevant internet links/ blogs, visit to a cassava field, demonstration on the herbicide application, etc.

Reflections and Assessments

Observation of learners' involvement in classroom and field interaction
Short quizzes, and assignments.

Activity Five: Planting Material selection and handling (30 minutes) (See Annex 2)
Expected Outcomes
At the end of the lesson the learners will be able to:

a. State the importance of a good planting material and their characteristics.
b. Identify varieties of cassava and their features.
c. Describe how to handle and cut cassava stem for planting.
d. Identify cassava stem storage systems.
e. Explain how to treat planting materials before planting.

Content

- Importance and characteristics of a good cassava stem as planting material.
- Varieties of cassava and their features.
- How to handle and cut cassava stem for planting
- Storage systems for cassava stem
- Methods of treating cassava stems for planting.

Facilitation Methods

- Field activity(ies)
- Out-of-class instructional delivery
- Out-of-class 2, 3 or more interactions
- Active/field observation
- Presentation of images, tools, etc.
- Practical demonstration.

Activity Process and Procedures

Facilitator

Explains to the learners planting material and varieties of cassava and their characteristics
State factors to consider while selecting a cassava stem for planting.
Demonstrate how to cut the planting stems and their measurements,
Describe the treatments given to cassava stem cuttings before planting and Storage/preservation systems for stem cuttings.
Present relevant images/videos/documentaries.

Learner

Actively listens to facilitator's explanations
Observe facilitators demonstrations with appropriate materials and measurement tools/devices
Carry out practical site activity to gain hands-on experience
Ask relevant questions from the facilitator.

Resources

Relevant training manuals, textbooks, measuring tapes, rulers, squares, cassava stem, pictures, markers, cutlasses, video clips, etc.

Reflections and Assessments

Observation of learners' activities during practical session
Assessment of learners' display of measuring techniques during practical session

Activity Six: Planting of cassava (20 minutes)
Expected Outcomes
At the end of the lesson the learners will be able to:

a. Identify different methods of planting cassava
b. Demonstrate different cassava planting styles/techniques
c. Demonstrate planting distance calculate plant population
d. Replace non-sprouted cutting after initial planting

Content

- Introduction to planting a cassava field.
- Methods of planting cassava (mechanical and manual),
- advantages and disadvantages of each method.
- Machines and tools used in cassava planting.
- Cassava planting distance and calculating the plant population
- How to replace non-sprouted cutting after initial planting.

Facilitation Methods

- Field activity(ies)
- Out-of-class instructional delivery
- Out-of-class 2, 3 or more interactions
- Active/field observation
- Presentation of images, tools, etc.
- Practical demonstration.

Activity Process and Procedures

Facilitator

Describe/define a planting material, varieties of cassava and their characteristics, factors to consider while selecting a cassava stem for planting,
How to cut the planting stems and their measurements,
Treatments given to cassava stem cuttings before planting,
Storage/preservation systems for stem cuttings.

Learner

Actively listens to facilitator's explanations
Observe facilitators demonstrations with appropriate materials and measurement tools/devices
Carry out practical site activity to gain hands-on experience

Resources

Relevant training manuals, textbooks, measuring tapes, rulers, squares, cassava stem, pictures, markers, cutlasses, etc.

Reflections and Assessments

Observation of learners' activities during practical session
Assessment of learners' display of measuring techniques during practical session

2.2.2 Output Evaluation:

What have the learners learnt? Which aspect did they enjoy the most? What would they like to see improved?

Are there any gender differences in the exposure to the information, practices, knowledge?

2.3. WEEDS IN THE CASSAVA FARM

2.3.1. Learning Activity Bundle 3: Weed Management and Chemical Weed Control

Activity Seven: Weed Control (30 minutes)
Expected Outcomes
At the end of the lesson the learners will be able to:

a. Give a definition of weed and list types of weed.
b. Enumerate different weed classifications
c. Discover weeds as the major constraints to cassava production.
d. Identify methods of controlling weeds in a cassava farm.
e. Hands on instruments used for weeding in cassava farm
f. Acquire weed control techniques
g. Demonstrate weed control techniques by carrying out a weed control exercis

Content

- Weed and weed classification.
- Types of weed.
- Weed control methods (manual, mechanical, chemical, etc.)
- Advantages and disadvantages of different weed control methods.
- Weeds as major constraints to cassava production
- Instruments or equipment used in controlling weeds in cassava farm
- Weed control activity(ies)

Facilitation Methods

- Field activity(ies)
- Out-of-class instructional delivery
- Out-of-class 2, 3 or group interactions
- Active/field observation
- Presentation of images, tools, etc.
- Practical exercise/demonstration with appropriate tools, etc. for weed control.

Activity Process and Procedures

Facilitator

Guide discussion on weed control as the major constraint to cassava production.
Provide information to the learners on the methods of controlling weeds in a cassava farm. i.e. manual, mechanical, chemical, etc.
Demonstrate/show learners the instruments/equipment used in weed control and under which category each of them belongs.
i.e. cutlass and hoe for manual weed control, etc.
These instruments could be real (real objects) or pictures, etc.

Learner

Actively listens to facilitator's explanations on weed control
Participate in interactions on the methods of weed control.
Observe facilitators demonstrations with appropriate weeds control tools/equipment
Participate in individual or group practical on weed control to gain hands-on experience
Ask relevant questions from the facilitator

Resources

Relevant training manuals/kits, textbooks, cutlasses, hand hoes, rakes, weed pullers herbicides, hand- weeders, chemical sprayer, etc.

Reflections and Assessments

Considering the principles of sustainable development which of the weeding control method would you adopt for your cassava farm and why?
Observation of learners' activities during practical session
Assessment of learners handling of weed control tools/techniques.

Activity Eight: Chemical Weed Control (30 minutes)
Expected Outcomes
At the end of the lesson the learners will be able to:

a. Explain what chemical weed control is all about
b. Discuss the benefits of using chemical/herbicides to control weeds
c. Discuss the advantages and disadvantages of chemical weed control
d. Types of herbicides and their mode of action
e. Identify and explain meanings of herbicides labels and symbols
f. Develop/gain experience (skills) on how to use chemical weed control
g. Develop safety considerations/precautionary measures in applying chemical weed control

Content

- Chemical weed control
- Why use chemical to control weeds and benefits of using chemical/herbicides to control weeds
- Advantages and disadvantages of chemical weed control
- Meanings of signs and symbols of herbicides labels
- How to use herbicides to control weeds in a cassava farm
- Safety consideration/precautionary measures in chemical/herbicides weed control
- Limitations to chemical weed control

Facilitation Methods

- Classroom/field activity(ies)
- Out-of-class instructional delivery
- Active/field observation
- Presentation of images, tools, etc. relevant to chemical weed control
- Practical exercise/demonstration with appropriate tools, etc. for chemical weed control.

Activity Process and Procedures

Facilitator

Presents an engaging lesson on what is chemical, or herbicide weed control
Lead discussion on advantages and disadvantages of chemical weed control
Provide information to the learners on the reasons for using chemical/herbicide weed in a cassava farm.
Lead discussions on the meanings of signs and symbols of pesticide labels
Demonstrate/show learners the tools/implements used in chemical/herbicide weed control. i.e. herbicide sprayer, chemicals, etc.
Assign practical work/exercises to individual or group of learners on chemical weed control.
Observe/monitor practical activities of learners and provide any other information as may be required.

Learner

Actively listens to facilitator's presentation on chemical weed/herbicide control
Participate and contributes to discussions on why use chemical weed control in a cassava farm.
Observe facilitators demonstrations with appropriate chemical weed control tools/ implements.
Participate in individual or group practical on chemical weed control to gain hands-on experience

Resources

Relevant training manuals/kits, textbooks, markers, herbicides, chemical sprayer, face masks, rubber gloves, rubber boots, nose cover, face masks, chemical spraying kits,

Reflections and Assessments

Observation of learners' involvement during practical session
Assessment of learners handling of chemical weed control tools.

Activity Nine: Pre-Emergence Weed Control (30 minutes)
Expected Outcomes
At the end of the lesson the learners will be able to:

a. Identify what pre-emergence herbicides are
b. Identify types of pre-emergent herbicides to use for a cassava farm
c. Recognize the proper time to apply pre-emergent herbicides for a cassava far
d. Develop/gain experience on how pre-emergent herbicides works

Content

- What are pre-emergent herbicides
- Types of pre-emergent herbicides, their active ingredients, and relevance to cassava farming
- How pre-emergent herbicides works
- When/how to use pre-emergent herbicides in for a cassava farm.

Facilitation Methods

- Classroom discussion
- Presentation of types of pre-emergent herbicides relevant to cassava farming.
- A short video clip/documentary on application of pre-emergent herbicides application.
- Practical exercise on how to apply pre-emergent herbicide in a cassava farm

Activity Process and Procedures

Facilitator

Presents an engaging lesson on pre-emergence weed control
Provide information to the learners on the types, time and how to apply pre-emergent herbicides in a cassava farm.
Presents short video clips/documentary on pre-emergent herbicide weed control.
OR
Lead practical field activity to expose students to how they could apply pre-emergent weed control in a cassava farm.
Observe/monitor practical activities of learners and provide any other information as may be required.

Learner

Actively listens to facilitator's presentation on pre-emergent weed/herbicide control
Participate and contributes to discussions on types, time and how to apply pre-emergent herbicides in a cassava farm.
Participate in individual or group practical on pre-emergent weed control to gain hands-on experience
Ask relevant questions from the facilitator

Resources

Relevant training manuals/kits, textbooks, short video clips, markers, pre-emergent herbicides, chemical sprayer, face masks, rubber gloves, rubber boots, nose cover, face masks, chemical spraying kits, etc.

Reflections and Assessments

What is better pre-emergent herbicide to use?
Observation of learners' involvement during classroom interaction and during practical session
Short quizzes, group work etc.

Activity Ten: Post-Emergence Weed Control (30 minutes)
Expected Outcomes
At the end of the lesson the learners will be able to:

a. Identify what post-emergence herbicides and their active ingredients (A.I).
b. Identify types of post-emergent herbicides to use for a cassava farm
c. Recognize the proper time to apply post-emergent herbicides for a cassava farm
d. Develop/gain experience on how post-emergent herbicides works

Content

oWhat are post-emergent herbicides
oTypes of post-emergent herbicides, their active ingredients and relevance to cassava farming
oHow post-emergent herbicides works
oWhen/how to use post-emergent herbicides in for a cassava farm.

Facilitation Methods

- Classroom discussion
- Presentation of types of post-emergent herbicides relevant to cassava farming.
- A short video clip/documentary on application of post-emergent herbicides application.
- Practical exercise on how to apply post-emergent herbicide in a cassava farm.

Activity Process and Procedures

Facilitator

Presents an engaging lesson on post-emergence weed control
Provide information to the learners on the types, time and how to apply post-emergent herbicides in a cassava farm.
Presents short video clips/documentary on post-emergent herbicide weed control...
OR
Lead practical field activity to expose students to how they could apply post-emergent weed control in a cassava farm.
Observe/monitor practical activities of learners and provide any other information as may be required.

Learner

Actively listens to facilitator's presentation on post-emergent weed/herbicide control
Participate and contributes to discussions on types, time and how to apply post-emergent herbicides in a cassava farm.
Participate in individual or group practical on post-emergent weed control to gain hands-on experience
Ask relevant questions from the facilitator

Resources

Relevant training manuals/kits, textbooks, short video clips, markers, post-emergent herbicides, chemical sprayer, face masks, rubber gloves, rubber boots, nose cover, face masks, chemical spraying kits, etc.

Reflections and Assessments

Pre-emergent or post-emergent herbicide? Which would you rather have?
Observation of learners' involvement during classroom interaction and during practical session. Short quizzes, group work etc.

Activity Eleven: Caution in Pre and Post Emergence Herbicide Use (30 minutes)
Expected Outcomes
At the end of the lesson the learners will be able to:

a. Identify when and how to apply herbicides in a cassava farm
b. Recognise active ingredients in a pre and post-emergence herbicides
c. Classify herbicides on pre and post emergence basis.
d. Indicate how to calculate the quantity of herbicide/hactare for application in a cassava farm
e. Recognise the appropriate sprayer and method with which herbicides can be applied in a cassava farm.

Content

- When and how to apply herbicide in a cassava farm
- List of active ingredients in a pre and post-emergent herbicides.
- Types of selected herbicides for pre and post emergence in cassava farming. i.e. Fusilade forte (Fluazifop-p-butyl), Primextra Gold (Atrazine and S-metolachlor), Lagon (Dimethoate 480 g/L), etc.
- Quantity of herbicides needed per hectare in a cassava farm
- Appropriate sprayer and method of applying herbicides in a cassava far.

Facilitation Methods

- Classroom discussion
- A short demonstration on methods of determining the required glyphosate per hectare in a cassava farm..
- Presentation of images, pictures, etc.

Activity Process and Procedures

Facilitator

Guide an interactive session on the appropriate time to apply post-emergent herbicides in a cassava farm and how to apply it.
Provides information on types of selected pre-emergent herbicide for pre-planting, pre and post emergence weed control in cassava farming. i.e. Fusilade forte (Fluazifop-p-butyl), Primextra Gold (Atrazine and S-metolachlor), Lagon (Dimethoate 480 g/L), etc.
Demonstration on methods of determining the required quantity per hectare in a cassava farm.
Show the sprayer that works best in a cassava farm and method(s) of applying it.
Observe/monitor practical activities of learners and provide any other information as may be required.

Learner

Actively participate in the interactive session on the appropriate time to apply glyphosate in a cassava farm and how to apply it
Contributes to discussions on types of selected glyphosate for pre-planting, pre and post emergence weed control in cassava farming.
Ask relevant questions from the facilitator

Resources

Relevant training manuals/kits, textbooks, short video clips, markers, Glyphosate, Knapsack sprayer, face masks, rubber gloves, rubber boots, nose cover, face masks, chemical spraying kits, etc.

Reflections and Assessments

Why herbicides pre-cautionary measures are necessary in cassava farming?
Observation of learners' involvement during classroom interaction and during practical session
Short quizzes, group work etc.

Activity Twelve: Herbicides Application. Sprayers, Spraying Methods and Steps for Calibrating a Knapsack Sprayer (240 minutes) (See Annex 3)
Expected Outcomes
At the end of the lesson the learners will be able to:

a. Know methods of herbicides application
b. Prepare knapsack sprayer for use
c. Identify basic principles and steps of calibrating a knapsack sprayer for maximum results
d. Explain/Indicate the formula for calibrating a knapsack sprayer
e. Demonstrate knapsack sprayer calibrating skills
f. Discuss the importance/benefits of calibrating a knapsack sprayer for cassava farm weed control.
g. Clean sprayer after use

Content

- Reading and understanding of herbicide label, signs, and symbols such as NAFDAC registration number, manufacturing date, expiration date, precautionary measures, product active ingredient, percentage concentration, direction for use, note to physician etc.
- How to prepare knapsack sprayer for use
- Basic principles and steps of calibrating a knapsack sprayer
- Practical knapsack spraying demonstration/activities
- The importance/benefits of calibrating a knapsack sprayer for cassava farm weed control.
- How/methods of cleaning Knapsack sprayer after use

Facilitation Methods

- Lecture method
- Classroom discussion/interaction
- Field/site activities
- Short video clips on knapsack calibration
- Outdoor demonstration method
- Presentation of images, pictures, etc.

Activity Process and Procedures

Facilitator

Show to the learners how to prepare knapsack sprayer for use
Provides information on principles and steps of calibrating a knapsack sprayer for maximum results.

Show video clips/documentaries on knapsack sprayer calibration.
Give practical activities to learners on knapsack sprayer calibration.
Observe/monitor practical activities of learners and provide any other information as may be required.

Learner

Observe facilitator's demonstration of how to prepare knapsack sprayer for use.
Actively listen to principles and steps of calibrating a knapsack sprayer.
Watch recommended video(s)
Carry out practical activities on knapsack sprayer calibration.
Ask relevant questions from the facilitator

Resources

Relevant training manuals/kits, textbooks, short video clips, markers, Knapsack sprayer, water, face masks, rubber gloves, rubber boots, nose cover, face masks, chemical spraying kits, measuring tape and pegs, knapsack sprayer, stop watch, measuring cylinder, etc.

Reflections and Assessments

What are the likely consequences of improper knapsack sprayer calibration?
Observation of learners' involvement during classroom interaction and during practical session
Short quizzes, group work etc.

2.1.2 Output Evaluation: *What have the learners learnt? Which aspect did they enjoy the most? What would they like to see improved?*
Are there any gender differences in the exposure to the information? Practices? Knowledge?

2.4. Outcome evaluation (with feedback):

Facilitator to provide evaluation questions based on learning outcomes using open-ended and/or close-ended questions.

(A set of Likert scale against statements on the improvement e.g. of the knowledge of the participant; positive change in attitude towards some practices; increased motivation to carry out a practice or confidence to implement a practice. The scale will be strongly disagree to strongly agree.)

(If you want to carry out a Quiz, then prepare the quiz as a handout and then prepare answers for learners to check their performance)

3. KEY TERMS:

provide definitions and illustrations of key terms for learners to refer

4. BIBLIOGRAPHY (SOURCE):

acknowledge sources of materials you used to prepare the outreach material including authors.

5. ADDITIONAL RESOURCES-FURTHER READING:

None

6. Annex with all support materials

Formatted and structured materials on:

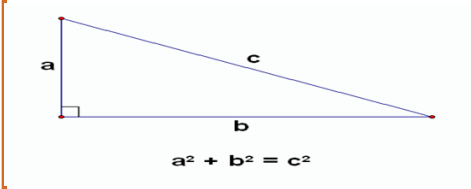
6. Slide Deck to be used (by each Activity bundle and each activity)
7. Manual of Training
8. Training Evaluation form (see below)
9. TRAINING VIDEOS/CHARTS/BROCHURES

Annex 1. ACTIVITY: Measurement of selected site for cassava cultivation (Estimated time: 4hours)

Facilitator/Demonstrator

- The facilitator demonstrates by measuring a straight line of 10m on the cleared land with a tape or rope and pegs.

- Measure an angle of 90° and then measure another 10m. The 10m measurement can be achieved through the use of a tape or straight-lined pegs, the angle can be measured through the use of the protractor, compass or the Pythagoras theory (using pegs and tape)



Resources

A fertile land rich with features of fertile soil (e.g. soil cast, surrounding good vegetation, etc.) of 10m x 10m should be available, GPS (Geographic Positioning System), measuring tape, rope, 20 pegs, protractor, hand squares, compass, etc.

Annex 2. ACTIVITY: Cassava Stem Cutting for Planting and Planting Methods. (Estimated time: 3 hours)

Activities	Resources
• The facilitator demonstrates by showing how to select a good planting material devoid of disease and bruises with complete nodes. • Cut the stem into planting pieces (showing the minimum and maximum number of nodes and internodes) of about 25cm – 30cm and plant to demonstrate different planting methods e.g. slant, flat etc. highlight the maximum and minimum planting depth.	A good, healthy and matured cassava field should be prepared/ identified in advance or healthy harvested cassava stem should be made available in advance. Sharp knife/machete, well prepared ridges/ moulds (participants may be asked to prepare ridges/mould) treatments for cuttings before planting (if any) etc.

Annex 3. ACTIVITY: Weed identification, herbicide selection, knapsack calibration and proper usage of PPE (Estimated time: 4hours)

Facilitator/Demonstrator	Resources required
The facilitator demonstrates by showing different types of weeds (broad leave, narrow leave, perennial, annual, etc., types of weed). Presents different herbicides for different types of weed (both pre-emergence and post emergence), show how to identify the types of herbicides, mixture rates, mode of effect (contact or systemic), stage at which they can be applied, etc. Demonstrate herbicide application using knapsack sprayer. How to calibrate your knapsack sprayer and spraying techniques. Demonstrate the use of complete Personal Protective Equipment (PPE) while handling herbicides. How to maintain your PPE.	The fertile land used in activity 1. A good, healthy cassava field with weeds or any field where different types of weed can be observed especially weeds that are likely to be found in a cassava field. Clean water 100liter, different types of herbicides e.g., Glyphosate (Roundup Turbo, Touchdown Forte, Delsate, Sarosate, Glycel, Force up, Clearweed, etc), Fusilade forte, Primextra Gold (S-Metolachlor + Atrazine), Lagon (Aclonifen + Isoxaflutole), Vigour (terbuthylazine, S-Metalochlor, mesotrione) Lifeline (Glufosinate ammonium) etc. Knapsack sprayer, measuring cup, funnel, bowl, flip chart and stand, markers, complete sets of PPE, etc.

Annex 4. Training Evaluation Form.

Training evaluation

Please rate your satisfaction in the training workshop on a 1 to 4 rating scale (1 = Dissatisfied, 2 = Somehow satisfied, 3 = Satisfied, 4 = Highly satisfied).

Training elements	Rating scale			
	1 Dissatisfied	2 Somehow satisfied	3 Satisfied	4 Highly satisfied
Training objectives				
The training objectives were relevant, realistic and clearly defined.				
Training content				
The training content was relevant, adequate, well organized and easy to follow.				
The training event was flexible to accommodate the learning needs/expectations of participants.				
Training process and methods				
The training process and methods helped me better understand the training content.				
Training facilitators provided helpful comments, feedback and examples.				
Training materials				
Training materials were relevant, well-organized, adequate and easy to read.				

Training time and duration				
Adequate time was allotted for practical sessions and discussion.				
The balance between presentations and practical sessions was good.				
Learning and intention to apply learning				
I have gained adequate knowledge and skills from the training program.				
I can apply the knowledge and skills gained in my work context.				
Overall Assessment				
Overall, how satisfied are you with the training workshop?				

Acknowledgement

Compact coordinator: Abass Adebayo
Technology Expert: Dr. Godwin Aster
Additional Guidance from: Prof Maina Muniafu
Extension Material Template was developed by FARA and AFAAS

In case of any need to make changes to the materials or to add further information, please contact: Godwin Aster at g.atser@cgiar.org

The development of this set of outreach materials has been coordinated by the TAAT Capacity Development and Technology Outreach Team at FARA, in collaboration with AFAAS.

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Module 3.0 TAAT HIGH IRON BEANS COMPACT OUTREACH TRAINING MATERIAL

Module 3.0 TAAT HIGH IRON BEANS COMPACT OUT-REACH TRAINING MATERIAL

Module 3.1. Production and Nutritional Value of High Iron Beans (HIB) in Bomet County of Kenya

This set of outreach materials has been developed jointly by the High Iron Bean (HIB) Compact, led by Alliance of Bioversity International & CIAT (Alliance) and the Capacity Development and Technology Outreach led by FARA.

This module is one of a series on related modules:

The other modules are: -
Processing of high iron beans into composite flour and confectioneries
Harvesting, threshing and post-harvest handling of high iron beans for market

Acronyms

AFAAS - African Forum for Agricultural Advisory Services

AfDB – Africa Development Bank

Alliance – Alliance of Bioversity International & International Centre for Tropical Agriculture

CDTO – Capacity Development and Technology Outreach

FARA - Forum for Agricultural Research in Africa (FARA)

GAPs - Good agricultural practices

HIB – High Iron Beans

PABRA – Pan Africa Bean Research Alliance

PPT – Powerpoint

TAAT – Technologies for Africa Agricultural Transformation

TOTs - Training of trainers

Guide for users:

This guide has elaborate information, which will be covered in the training, materials which will be necessary for effective delivery of this training and a provision of an opportunity for the learner to give feedback. The information covers seed selection, land preparation, sowing, good agronomic practices, and basic value addition, including cleaning, packaging of products and cooking.

Targeted audience

Agricultural extension workers at all levels of government (including regional governments like county governments) and suitable training of trainers (TOTs) such as lead farmers (including women and youth). The materials have been customized for Bomet County, a regional government in Kenya. Similarly, these materials can be customized for any other training of trainers in both government and non-governmental organizations across Africa.

Estimated time:

4.5 Hours plus half hour for evaluation and feedback (5 hours in total)

Assumption:

It is expected that the County Government will allow its technical staff from their various locations to participate in the training.

Caveat:

The certified seeds are available from the licensed seed companies. The seed companies will be requested to participate and provide pro-bono the various HIB seeds necessary for the training. Further, the County Government staff will be requested to identify local bean varieties for inclusion as a comparison in this training.

About TAAT:

TAAT is a key priority of the African Development Bank's agricultural transformation agenda also known as the Feed Africa Strategy. TAAT is essentially a knowledge and innovation-based response to the recognized need for scaling up proven technologies across Africa aiming to boost productivity, and to make Africa self-sufficient in key commodities. CDTO FARA leads the Capacity Development arm of TAAT as an enabler compact while the Alliance leads the High Iron Bean Compact of TAAT.

1.0 Introduction

1.1. Background

Alliance of Bioversity International & International Centre for Tropical Agriculture – Alliance through the Pan Africa Bean Research Alliance (PABRA) implements the HIB Compact in eight countries of Burundi, DR Congo, Kenya, Malawi, Rwanda, Tanzania, Uganda, and Zimbabwe. The compact focuses on scaling the HIB technologies in the bean value chain in collaboration with the public, private and development partners, using the Commodity Bean Corridor Approach . The technologies include bean varieties rich in iron and zinc, good agricultural practices (GAPs) and bean based processed products from the high iron and zinc bean varieties. Each of the eight countries has unique bean varieties, released for commercialization and uptake. The High Iron Bean Compact targets at impacting two million beneficiaries in three years.

1.2. Rationale

Malnutrition levels in Africa are relatively high. For example, in Kenya, where the national average is 26%, some counties have higher levels. For example, malnutrition level in Bomet County is 36%. There is therefore an urgent need to address this nutrient deficiency particularly through the officials of National Agricultural Ministries who have the reach to the grassroots and their mandate is to assist farmers in the production of adequate and nutritious quality food crops. The training guide materials have been developed as part of the bigger plan of developing relevant training modules covering production, processing, consumption and marketing of these new bean varieties across the region. The materials are for trainers working directly with the farmers and end users of the bean-based products. This module will cover information on the nutritional value of the HIBs and benefits consumers of all age brackets will draw from the HIBs. Further, the technical staff will be trained on production of the HIB varieties. The training on production of high iron beans is critical, because there is limited or no emphasis on bean production, while there is increased interest in beans as not only subsistence crop but also as a commercial crop. Further the bean productivity in Kenya is below 5 metric tonnes as compared to approximately 7 metric tonnes per hectare in the region. Hence the need to boost production of beans.

1.3. Learning outcomes

By the end of the training the learners will be able to:

1. Recognize all the bean varieties (including HIB varieties) and make a comparison of their nutritional value
2. Articulate important factors that lead to the optimal production of HIB in the region
3. Prepare HIB based products such as baby porridge, cakes and pre-cooked beans.
4. Identify gender roles and responsibilities within the High Iron Bean value chain

2. CONTENT

At the end of each Learning Activity Bundle, there is a need to implement an output evaluation using an electronic or print form from the annex.

2.1 Pre-evaluation of learners (with feedback)

Bean corridor is a market-driven approach to achieving agricultural transformation and impact at scale. The bean corridor integrates the production, distribution and consumption hubs for bean (economic) intensification.

2.1.1 Learning Activity Bundle 1: Awareness raising and sensitization meeting (20 minutes)

Activity One: This activity enables the facilitator to meet with the agricultural officers, lead farmers at the county level for familiarization, and establishment of the gender representation and participation.
Activity Process and procedure

- Before the training session, the facilitator will establish some facts about the audience to enable sharing of experiences and peer learning within the group.
- The facilitator will also carry out a gender analysis using the FARA matrix for identification of gender-based constraints (see Table 1), in order to identify potential actions to address the constraints.
- The exercise will start by pairing up the participants and getting them to ask each other a series of questions on their agricultural activities and their bean varieties and farming practices in the region.

Entrepreneur by chain node	Description of activities under each node of the value chain	Roles and responsibilities			Roles and responsibilities		
		M	F	Y	Male	Female	Youth
Input supply: E.g. How have you been accessing HIB seeds in the past?							

Production: E.g. How would you prepare the seed bed for planting HIB? How different would that be from other bean varieties, which farmers grow?							
Processing: E.g. Which bean processed products are you familiar with? How would you prepare the products							
Marketing: E.g. How do you market your grain? Is the market sufficient? What challenges do you have in marketing your produce?							

Activity Two: Introduction to HIB (PPT 1- 17) (20 minutes)

Facilitation Methods

- PPT Presentation
- Group Discussion
- Sharing Experience

Activity Process and Procedure

- The facilitator will determine the participants' knowledge with regards to HIB's nutritional, production and basic value addition.

- The facilitator to start by pairing up the participants and get them to ask each other a series of questions on the HIB activities, varieties and agronomic practices in the region (use Table 2. below).

Issue	Score (Poor =0; Fair = 1; good = 2; very good = 3; Excellent =4				
	0	1	2	3	4
There are HIB varieties (name them) in the county					
I am familiar with the agronomic practices for the production of HIBs					
I have information on the micronutrient content of the HIB varieties relative to other bean varieties currently grown in the region					
I have knowledge on the nutritional benefits of the HIB among children, women and men					
I am competent in undertaking basic value addition of the beans and I can train the farmers on the same					
I have knowledge of the cooking time, taste and flatulency aspects of the high iron bean varieties					

2.1.2 Output Evaluation:

i). What have the learners learnt?
ii). Which aspect did they enjoy the most?
iii). What would they like to see improved?
iv). Are there any gender differences in the exposure to the information, practices, knowledge?

2.2 HIB Bean Varieties

Learning activity bundle 2: Identification of the HIB varieties and their respective market classes

A day before the training and also at the start of the lesson learners will be given questions that will enable them share their experiences about HIB varieties and how they are classified from a market perspective.

Activity Three: The identification of HIB varieties (PPT 17 – 19)

Methods of Facilitation

- PPT Presentation
- Group Discussion
- Sharing Experience

Activity Process and Procedure

Small group Activity- the facilitator will divide the learner into groups of 2 – 3 and give them triggering questions including:

- Which bean varieties are grown and are available in the region?
- What are the local names of the various bean samples on display?
- What are the brand names of the beans?
- Look at the charts and name the bean samples shown?

Activity Four: Market classes for HIB varieties (PPT 21)

Methods of Facilitation

- PPT Presentation
- Group Discussion
- Sharing Experience

Activity Process and Procedure

- To what market classes can you place the various bean samples we have?
- To what market classes will you place the HIB varieties (Angaza, Faida & Nyota) in the case of Kenya?
- From where do farmers source their bean seeds?
- From where would you source the HIB varieties to be guaranteed of optimal germination?

Learning materials

The learners will be exposed to different bean varieties. In Kenya, these will include Angaza, Faida, Nyota, KK8, Nyayo, Dolichos, and any other local varieties (Figures 1 and 2).

Figure 1: A sample of different local bean varieties in Kenya for identification by the farmers

Figure 2: High iron and zinc bean varieties in Kenya

More information on the high iron and zinc beans can be accessed from this link.

2.2.1 Output evaluation (with feedback)

To assess the effectiveness of the lesson, the learners will be evaluated using the following questions.

1. Please list the names of the different bean varieties available in your county
2. Please list the names of the high iron beans you know
3. What market classes do the various bean varieties you have identified above belong?
4. Name two companies which distribute high iron beans in your county? Which HIB beans do the companies distribute?
5. Are there any gender differences in the exposure to the information, practices,

2.3 Production of HIB Crop

2.3.1. Learning activity bundle 3: The optimal production of HIB

Activity Five: Land preparation, planting procedures, fertilizer applications and pest control for HIBs. (PPT 22 – 23) (20 minutes)

Methods of Facilitation

- PPT Presentation
- Group Discussion
- Sharing Experience

Activity Process and Procedure

Before the start of the training the learner will be given some triggering questions to guide them on how they will go about producing bean grain.

Small group activity: The facilitator will divide the learners into groups of 2 – 3 and give them triggering questions which include:

- How would you prepare the seed bed for planting HIB? How different would that be from other bean varieties, which farmers grow?
- What spacing will you apply for HIB?
- What is the seed rate and fertilizer use at planting and along the growing period of the beans?
- What are the possible disease and pest challenges you are likely to encounter?
- What possible pest control remedies would you source for to deal with the challenges above and from where?
- What likely challenges do farmers encounter in dealing with pest and diseases in beans and what are the possible solutions to these?
- In applying pest control products, how should you be dressed?

Materials

- HIB seeds from reputable agrodealer outlets
- HIB varieties' catalogues
- Fertilisers for planting and topdressing
- Seed bed preparation equipment (farming implements)
- Personal protective equipment for use during spraying of pesticides

The learners will be exposed to common pests and diseases (Figures 3 and 4).

The learners will be exposed to common pests and diseases (Figures 3 and 4).

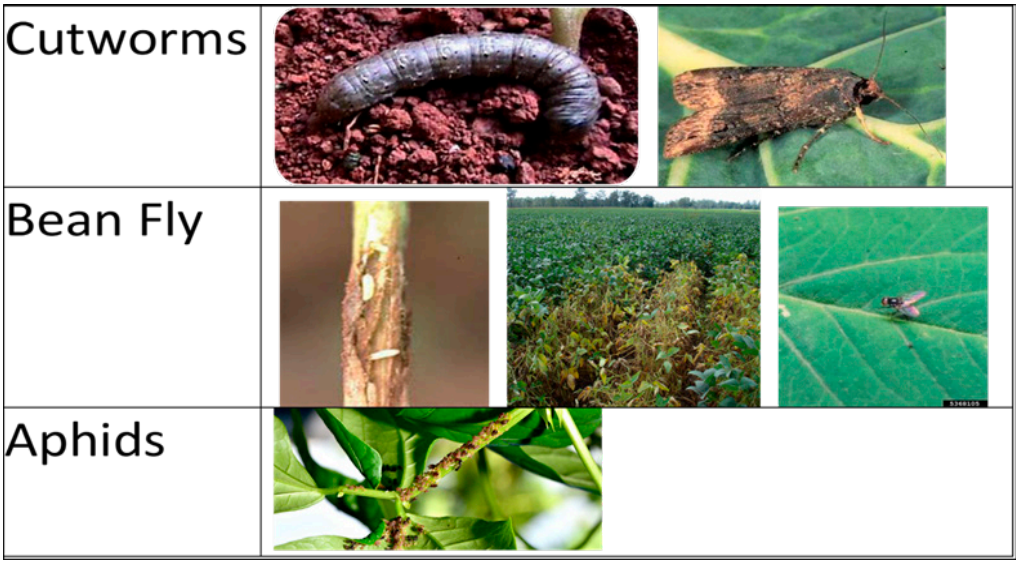

Figure 3: Some common insect pests in beans

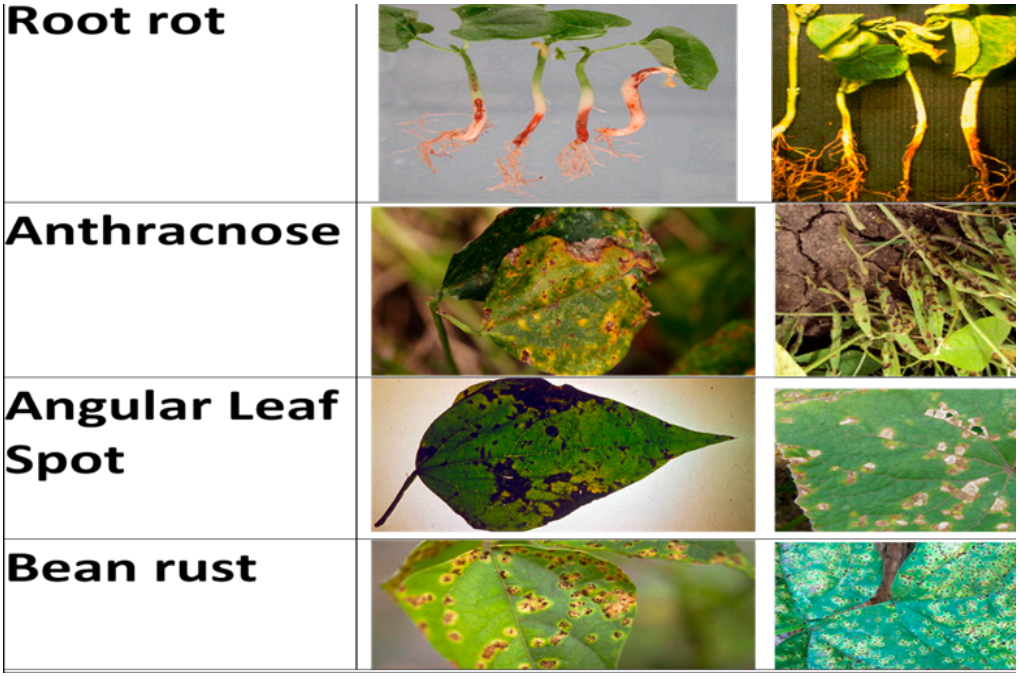

Figure 4: Some common bean diseases

2.1.2 Output Evaluation (with feedback)

i). What have the learners learnt?
ii). Which aspect did they enjoy the most?
iii). What would they like to see improved?
iv). Are there any gender differences in the exposure to the information, practices, knowledge?

2.4. Value addition in HIB

2.4.1. Learning activity bundle 4: Preparation of value addition HIB products

Activity Six: Preparation of HIB based products (PPT 27 – 28)

Facilitation Methods

- Demonstration
- Group Discussion

Activity Process and Procedure

Facilitator will share samples/pictures of the range of HIB products on the market and then proceed to a practical demonstration of HIB value addition activities including cooking, basic processing, cleaning and basic packaging of products (appropriate personnel can be used).
The participants will then be divided into small groups (4-5) and they should then carry out what they have learnt. The facilitator will move from group to group to make sure they are developing the skills in a correct manner.

Group Discussions:

This will be based on questions such as:
i). What was the experience like?
ii). Which were some of the most challenging aspects of the exercise?
iii). What can be done to improve the value addition process?
iv). What value would they put to their products? How does this compare to the market value of the beans alone?

Materials

- Different HIBs grains
- Cooking equipment
- Packaging materials and equipment

The learners will be exposed to different HIB grains, cooking equipment and packaging materials and equipment (Figures 2 and 5).

Packaging

Cooking

Composite bean flour

Precooked beans

Flour for baby porridge

Composite bean flour

Figure 5: sample of equipment for value addition and finished products

More information on preparation of value-added products can be accessed from the links here below.
https://www.youtube.com/watch?v=8E3FB_R9Z3A&t=16s
https://www.youtube.com/watch?v=FvZtmmWp_Kg

2.1.2 Output Evaluation (with feedback)

i). What have the learners learnt?
ii). Which aspect did they enjoy the most?
iii). What would they like to see improved?
iv). Are there any gender differences in the exposure to the information? Practices? Knowledge?

2.5. Outcome evaluation / with feedback: *prepare evaluation questions based on learning outcomes. Could be open-ended or close-ended questions. Then prepare answers for learners to check their performance.*

3. KEY TERMS:

provide definitions and illustrations of key terms for learners to refer

3.1 High iron beans (HIBs):

These are bean varieties which have been bred for iron and zinc micronutrient richness. Examples are Angaza, Faida and Nyota.

3.2 Value addition:

Is the process of improving the quality of farm produce with the view of fetching more in the market. This may include activities like cleaning, packaging, processing into flour and precooked beans etc.

3.3 Good agricultural practices (GAPs):

These are complementary agronomic practices, which are necessary for optimum production of the HIBs and which farmers will need to apply alongside purchase and planting of improved HIBs.

4. BIBLIOGRAPHY (SOURCE):

acknowledge sources of materials you used to prepare the outreach material including authors

i). Pan Africa Bean Research Alliance (PABRA) High Iron Bean Compact: http://www.pabra-africa.org/technologies-for-agricultural-transformation-in-high-iron-bean-in-africa/
ii). Azuri Health: www.azurihealth.co.ke
iii). Cherubet Food Company: https://www.cherubetcompany.co.ke/
iv). Kenya Agricultural and Livestock Research Organization (KALRO): https://www.kalro.org/sites/default/files/AMRI_Katumani_highlight_2016-2017.pdf

5. ADDITIONAL RESOURCES-FURTHER READING:

provide any additional reading materials learners to refer/read; could be text, audio, video, link, etc

6. ANNEXES

1. Slide Deck to be used (by each Activity bundle and each activity)
2. Training Evaluation form for valuation of training.

Training elements	Rating scale			
	1 Dissatis-fied	2 Somehow satisfied	3 Satisfied	4 Highly satisfied
Training objectives				
The training objectives were relevant, realistic and clearly defined.				
Training content				
The training content was relevant, adequate, well organized and easy to follow.				
The training event was flexible to accommodate the learning needs/expectations of participants.				
Training process and methods				
The training process and methods helped me better understand the training content.				
Training facilitators provided helpful comments, feedback and examples.				
Training materials				
Training materials were relevant, well-organized, adequate and easy to read.				
Training time and duration				
Adequate time was allotted for practical sessions and discussion.				

The balance between presentations and practical sessions was good.				
Learning and intention to apply learning				
I have gained adequate knowledge and skills from the training program.				
I can apply the knowledge and skills gained in my work context.				
Overall Assessment				
Overall, how satisfied are you with the training workshop?				

Source: Justin Machini and Josey Kamanda

Acknowledgement

Compact coordinator: Dr. Josey Kamanda
Technology Transfer Officer: Mr. Justin Machini
Content Expert: Mr. Justin Machini
Additional Guidance from: Prof Maina Muniafu
Extension Material Template was developed by FARA and AFAAS

In case of any need to make changes to the materials or to add further information, please contact: Justin Machini (Alliance Bioversity-CIAT) J.Machini@cgiar.org

The development of this set of outreach materials has been coordinated by the TAAT Capacity Development and Technology Outreach Team at FARA, in collaboration with AFAAS.

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Module 4.0 TAAT Livestock Technology OUTREACH MATERIAL

Module 4.0 TAAT Livestock Technology OUTREACH MATERIAL

Module 4.1. Vaccinating Day Old Chicks in Poultry Mother Brooder Units

This set of outreach materials has been developed jointly by the Livestock Compact, led by ILRI and the Capacity Development and Technology Outreach led by FARA. This module is one of a series on related modules:

The other modules are: -
Feed and water management in Brooder House
Temperature and light control in Brooder house.
Management of chickens in Brooder House.
Biosecurity practice in brooder house.

Guide for users:

This guide is meant for agricultural extension and advisory services workers in Animal Health service delivery, trainers, development agents, practitioners, lead farmers, and animal health technologists to facilitate the provision of information on the steps needed to vaccinate Day Old Chicks during the first 30 days of life to produce healthy virile chickens for growers in the smallholder systems.

Targeted audience

All those interested, even beginners, in poultry production, starting from Day Old Chicks.
Specific targets include the Youth (men, women and disadvantaged groups) engaging in poultry mother unit practice.

Estimated time:

2 1/2 Hours + ½ hour for evaluation and feedback (3 hours in total)

Assumption:

It is assumed that the beneficiaries of this training module have attained basic education (primary and secondary) and are highly motivated to engage in poultry mother unit enterprises.

Caveat:

Administration of vaccines and biologicals is governed by the national Director of veterinary Services (DVS). This is because the registration of vaccines and animal health products, , cold chain management and vaccine administration are regulated practices which can affect the efficacy of vaccines.

About TAAT:

TAAT is a key priority of the African Development Bank's agricultural transformation agenda also known as the Feed Africa Strategy. TAAT is essentially a knowledge and innovation-based response to the recognized need for scaling up proven technologies across Africa aiming to boost productivity, and to make Africa self-sufficient in key commodities. CDTO FARA leads the Capacity Development arm of TAAT as an enabler compact while ILRI leads the Livestock compact of TAAT.

Citation:

ILRI & FARA (2020) Vaccinating Day Old Chicks in Poultry Mother Brooder Units: TAAT Livestock Technology outreach material, Version 1, xx pp.

1.0 Introduction

1.1. Background

Chicken production is an important economic activity in many African countries. Poultry is a low capital start-up enterprise that can be undertaken at smallholder traditional and commercial levels to enhance food security and income. The most critical stage with high risks in managing commercial poultry, especially disease prevention and control, is care of Day-Old Chicks (DOC), especially disease prevention and control. This opens an opportunity for entrepreneurs who are willing to start a business in chicken brooder units. while In addition, the adoption of good management practices enhance productivity of the chickens and the well-being for the people who rely on poultry production for their livelihood.

This module is aimed at providing the information needed by new entrants and practitioners to manage effective vaccination program for DOC during commercial chicken brooding
This module covers the vaccination component of mother brooder management while other modules in the series cover other aspects of brooder management.

Chicken production is an important economic activity in many African countries. Poultry is a low capital start-up enterprise that can be undertaken at smallholder traditional and commercial levels to enhance food security and income.

1.2. Rationale of the module

The module addresses the importance of vaccination of DOCs as one of the good management practices to ensure that the chicks remain healthy, prevent the rapid spread of diseases to other clusters chickens and maintain an overall hygiene across the poultry sector. It contributes to poultry health, food security and improved livelihood through livestock production.

1.3. Learning outcomes

By the end of this module, participants will be able to:
1. Understand the role of regulatory institutions on the use of animal vaccines.
2. Differentiate between the various types of poultry vaccines used during chicks brooding
3. Describe the ages at which the vaccines are required and their mode of administration.
4. Apply the various vaccine regimes in accordance with specific country regulations.
5. Understand the various types of poultry diseases and appraise the impact of vaccination in disease prevention in Poultry chicks.

2.0. CONTENT

At the end of each Learning Activity Bundle, there is a need to implement an output evaluation using an electronic or print form from the annex.

2.1 Pre-evaluation of learners (with feedback)

Learning Activity Bundle 1: INTRODUCTION

Activity One: In this activity, the facilitator seeks to establish the participants level of knowledge and experience of the module topic. (20 minutes).
For this pre-evaluation section, please summarise the context of the participants – some are new, others have experience, both positive and negative.

Facilitation Methods

- PPT Presentation
- Group discussion
- Sharing Experience

Activity Process and Procedure

o Before the training session, the facilitator will establish some facts about the audience to enable sharing of experiences and peer learning within the group.

o The facilitator will also carry out a gender analysis using Table 1. for identification of gender-based disparities and possible constraints in order to identify potential actions to address the constraints.

o Start by pairing up the participants and get them to ask each other a series of questions (through pre-prepared slides with illustrative photos) such as whether they remembered the vaccinations against some human diseases as children or in primary schools. What was their experience? Why was it important? What are the parallels with the chicken being raised?

Entre-preneur by chain node	Descrip-tion of activities under each node of the value chain	Roles and responsibilities			Roles and responsibilities		
		M	F	Y	Male	Female	Youth
What vaccines have been taken in the past? *Possible Response: Humans: Measles, whooping cough, tetanus, Meningitis etc. Possible poultry vaccines: Newcastle disease, Fowl pox etc.*							
Who administered it? *Possible response: Staff of Ministry of health, WHO, Local authority Nurse, etc.* *Poultry vaccines: Veterinarian, Animal health Officer, farmer*							
What reactions did you notice *Possible response: Fever, mild sickness, serious reaction (occasionally), etc. Chickens did not eat or drink etc.*							
Why is vaccination important *Possible response: Disease prevention, prevent spread of disease etc.*							

Activity Two: aiming at those who are not beginners in the group) (20 minutes)

Facilitation Methods

- PPT Presentation
- Group discussion
- Sharing Experience

Activity Process and Procedure

o Introduce the topic of the module (PPT 1-3) of the slide deck; the contents draw attention onto the importance of vaccination in general agriculture, the safety regulations that need to be respected and reasons for ensuring such safety measures

o Facilitator leads the learners to construct a poultry value chain (PPT 4) building up on their pre-evaluation sheet (see Table 1) to include other stakeholders involved and the importance of each.

o The concept of Mother Brooder Units (PPT 5) is then introduced as well as the common Poultry Diseases during Brooding (PPT 6-8).

2.4. Regulations for Vaccines (Country Specific)

2.2.1 Learning Activity Bundle 2

Activity Three: PPT Slide 9 – 11. The role of Regulatory institutions in Vaccine use (40 minutes).

Facilitation Methods

- PPT Presentation
- Group discussion
- Sharing Experience

Activity Process and Procedure

Participants should deliberate on these questions.

o Which authority in the country is responsible for controlling vaccine use?

o Can anybody sell poultry vaccines? – why or why not?

o Why are vaccines regulated? - Focus on the impact of wrong use of vaccine in the food chain

Role play to include the various actors in the country regulation line including the user, supplier, regulator, veterinarian or animal health officer and vaccine producer or their representative. Learners to describe (a) their imagined roles (b) what their expectations are from the other stakeholders. Facilitator to provide summary and copy of vaccine regulations for the respective countries.
NB: These documents are available in the Directorate of Veterinary services in each country. In addition, OIE has some guidelines on veterinary practices in developing countries.

Case Story of ineffective vaccine:

There was a case of ineffective reported by a poultry farmer. Nearly 40% of her chickens had died overnight. The farm owner, a woman, claimed that the chickens have been vaccinated against Newcastle disease and has evidence to support her claims. What do you think might have happened? To whom should the woman report? What does this story teach us?

Some of the possibilities include:

1. She bought a vaccine that is expired or lost potency.

2. The woman bought the vaccine from a shop that did not maintain cold chain.

3. The ND vaccine she used was fake and there was no evidence that it was a registered product in the country.

4. The woman bought a genuine vaccine but she handled it carelessly before administration.

5. The nearest veterinarian office should be alerted. The veterinarian will ask questions, examine the Vial of the vaccine, check for expiry date, name of manufacturer, identify the source of the vaccine etc.

6. If repeated cases occur in the are, the matter will be reported to the National drug authority and the Director of Veterinary services.

INFORMATION EMPHASIS

Administration is controlled by the national veterinary authority, e.g. the Director of Veterinary Services. Regulations differ in each country.

2.2.2 Output Evaluation:

What have the learners learnt? Which aspect did they enjoy the most? What would they like to see improved?
Are there any gender differences in the exposure to the information, practices, knowledge?
NB: The facilitator uses the pre-evaluation form (Table 1) so as to compare the responses to all questions before and after the session. If the second evaluation show knowledge has been acquired the next section is taught, otherwise, some aspects may be repeated.

Activity Four: (PPT Slides 5-7). Poultry Diseases (20 minutes)

Facilitation Methods

- PPT Presentation
- Group discussion
- Sharing Experience

Activity Process and Procedure

Facilitator to get the learners to share knowledge about different poultry diseases especially on how to recognize commons signs of diseases.
The following questions can stimulate discussion.

- How many currently keep chickens?
- Who has lost chickens due to diseases?
- What signs did they observe, what happened, what lessons did they learn?
- Do they know the names of any of these diseases?

Figure 1: Images of Common Poultry Diseases

Picture Credits: https://blog.agrihomegh.com/major-chicken-diseases/

Further Reading: A list of 15 Poultry diseases, their symptoms and common treatment methods are available on this website. https://blog.agrihomegh.com/major-chicken-diseases/

2.2.2 Output Evaluation: *What have the learners learnt? Which aspect did they enjoy the most? What would they like to see improved?*
Are there any gender differences in the exposure to the information? Practices? Knowledge?

2.3 Types of Poultry Vaccines (PPT slides 12-18)

2.3.1 Learning Activity Bundle 3

Activity Five: Types of Vaccines (20 minutes)

Facilitation Methods

- PPT Presentation
- Group discussion
- Sharing Experience

Activity Process and Procedure

Facilitator carries out an interactive learning on types of vaccines with learners identifying them from their experiences in pictures, charts and PowerPoint slides.

The learners should discuss their understanding of vaccines by randomly answering the following questions

o What are the main poultry vaccines focusing on the vaccines applicable to chicken in the first one month of life)?

o What is the difference between a vaccine and a medication?

o Why is PREVENTION important? N.B. Participants should not wait for diseases to occur. Vaccination is a preventive NOT diseases control measure.

o How does vaccines work

Figure 2: Images of some Poultry vaccines:

Further resources:

YouTube video of one type of Poultry vaccination. Trainers should be aware that there are many types of vaccines with different routes of administration.
https://www.youtube.com/watch?v=w9OsRynxajY

Facilitators can find additional information in the PPT slides for this training module.
Sharing Experience
Using the slides 18-23 provided in the slide deck, facilitate the discussions around the topics below

(Tip: Some young entrepreneurs have arranged to organize for vaccinations across several producers so they use one batch of vaccine as much as possible)

2.3.2 Output Evaluation: *What have the learners learnt? Which aspect did they enjoy the most? What would they like to see improved?*
Are there any gender differences in the exposure to the information? Practices? Knowledge?

2.4. Modes of Vaccine Administration

2.4.1 Learning Activity Bundle 4: VACCINE ADMINISTRATION

Activity Six: Poultry Vaccine Delivery Routes (PPT Slides 18-22) (30 minutes)

Facilitation Methods

- PPT Presentation
- Group discussion
- Sharing Experience

Activity Process and Procedure

o The facilitator should re-emphasize the importance of vaccination and learning the way of vaccinating and appropriate timings through the demonstration video using the link below.

o Ask a few prompting questions about what aspects may be important for vaccine use prior to viewing the video (so they are looking for these evidences in the video) as follows:

- How are vaccines used?

- Have you used poultry vaccines before?

- How have you applied it?
- What precautions should you take when administering oral vaccine.
- Who can use injectable vaccine?

Videos on Vaccination against Newcastle Disease
https://www.youtube.com/watch?v=DN7evnDkJHM
https://www.youtube.com/watch?v=CmZmJJe3gdc

Activity Seven: Conducting chicks' vaccination (PPT Slides 23 – 26) (30 minutes)

Facilitation Methods

- PPT Presentation
- Group discussion
- Sharing Experience

Activity Process and Procedure

VIDEO WATCHING SESSION (Facilitator to plan in advance for suitable enabling equipment)
For the facilitator, following the video, present queries to emphasize and cement the information in it including:

o Are there any differences in what they practice and what they saw in the video?

o What are some of the valid reasons differences in what is practiced and what they saw in the video?

o What are the similarities in practices that they have watched and those in their local context?

o Do these similarities validate the value of the video (which they can also have on their phones and other electronic equipment) as a learning instrument?

PPT PRESENTATION SESSION

Using slides 23 to 26 in the slide deck, facilitate the following queries:

DISCUSSION QUERIES

1. What is the importance of vaccination in poultry disease control?
2. When should you vaccinate the chickens?

CHOICES: (a)Anytime, (b) During disease outbreak and (c) On specific days according to veterinary recommendation.

NB: Use the opportunity to emphasize that vaccination is not advisable during disease outbreak. If a disease has started, sick chickens should be isolated, dead ones discarded (buried). Contact your local Animal Health technician or veterinarian for advice on disease management. Depending on type of disease different treatment regimes will be recommended.

Additional Hints:

1. Buy DOC from reputable hatcheries.
2. Contact the Veterinarian or nearest Agrovet.

Age of chicken(days)	Vaccine	Common Symptoms	Method of vaccine use
1	Mareks	Swollen head, comb, eyes, eye lids may close. Mucous discharge from eyes and nostrils, reduced egg production. They will stop laying and will have moisture under their wings.	Sub-cutaneous (Given at the hatchery).
1 or 7	Coccidiosis	Yellowish brown bloody droppings	Initially, this type of vaccine was administered mainly via: Drinking water and Spray on to the feed or eye drops.
3	Newcastle disease	Nervous symptoms such as twisted head, greenish diarrhoea	Intra-Ocular (eye drops) & In water
7-14	Fowl Pox	Characteristics lesions on the unfeathered body parts	Wing-web. In older birds, vaccination can be repeated at 12-16 weeks.
14-18	Gumboro	White watery diarrhea and soiled vents. Infected birds may show trembling ruffled feathers etc.	Intra-Ocular (eye drops) & In water
21-30	Gumboro	White watery diarrhea and soiled vents. Infected birds may show trembling ruffled feathers etc.	Intra-Ocular (eye drops) & In water

27-30	Newcastle disease	Nervous symptoms such as twisted head, greenish diarrhoea	Sub-cutaneous (To be done by Animal Health Assistant and veterinarian).

Fig. 1. Torticollis (twisting of head) due to Newcastle disease.

2.5.2 Output Evaluation: *What have the learners learnt? Which aspect did they enjoy the most? What would they like to see improved?*
Are there any gender differences in the exposure to the information? Practices? Knowledge?

2.5. Impact of Vaccines in Disease Prevention and

2.5.1 Learning Activity Bundle 5: IMPACTS OF VACCINES

Activity Eight: Handling Vaccines. (PPT Slide 27- 31) (20 minutes)

Facilitation Methods

- PPT Presentation
- Group discussion
- Sharing Experience

Activity Process and Procedure

- The facilitator should use slides 27 to 31, to provide a case scenario in which a farmer bought 100 chickens and lost 10, 20 and 30 on days 4, 5 and 6 respectively.

- Encourage participants to discuss what might have happened.

DISCUSSION topic examples:

- Financial impact of Newcastle disease.
- How to calculate losses in terms of finance given the rate of death of chicks versus cost of vaccines and final output value.
- Practical example of calculation
- Kills affected birds in
- large numbers.

2.2.2 Output Evaluation: *What have the learners learnt? Which aspect did they enjoy the most? What would they like to see improved?*
Are there any gender differences in the exposure to the information? Practices? Knowledge?

2.6 Outcome evaluation (with feedback):

Facilitator to provide evaluation questions based on learning outcomes using open-ended and/or close-ended questions (see evaluation form in annex).

(A set of Likert scale against statements on the improvement e.g. of the knowledge of the participant; positive change in attitude towards some practices; increased motivation to carry out a practice or confidence to implement a practice. The scale will be strongly disagree to strongly agree.)

(If you want to carry out a Quiz, then prepare the quiz as a handout and then prepare answers for learners to check their performance)

3.0. KEY TERMS:

Vaccine: Vaccines contain the same germs that cause disease. (For example, the live Newcastle disease vaccine contains poultry Newcastle virus, and the Fowlpox vaccine contains fowlpox virus.), in either killed or weakened point, so that they only stimulate immunity (produce antibodies) when introduced into the chicken body but not cause disease. Some vaccines contain only a part of the disease germ. A vaccine stimulates the animal or human immune system to produce antibodies, exactly like it would if naturally exposed to the disease. After getting vaccinated, the animal develops immunity to that disease, without having to get the disease first.

Medication/Treatment: This refers to the management and control of a disease that has occurred through the use of specially formulated medicines or remedies. It may also involve the use of medications to prevent the onset of a disease. T

NB: There is no direct treatment for viral diseases. Infected animals should be isolated from the rest of the herd and treated with anti-inflammatory drugs and antibiotics (Consult your local veterinarian) for secondary infections if necessary.

Cold Chain: The practice of keeping vaccines, medications and biological products under suitable temperature in refrigerators or cooler boxes to prevent the destruction of the active ingredients on the vaccine or product. Vaccines are typically stored in the fridge at 2-80 degrees Celsius.

DVS: Director of Veterinary Services

Intra-muscular: A method of administering vaccine into the deep muscle or flesh of the animal through the use of syringes. This allows the vaccine to be absorbed quickly into the blood stream.

National Drug Authority: The national authority of a country responsible for the registration of medicines and pharmaceutical products and similar products.

Morbidity: Refers to a condition of the animal in which a disease results in sluggishness, slow growth, poor performance and general lack of thriftiness.

Oral: A method of administering vaccine to chickens via drinking water.

Sub-cutaneous: A method of administering vaccine under the skin through the use of needles (syringe).

Veterinarian: Someone trained in the management and control of animal diseases

Wing-web: A method of administering vaccine by piercing the wings of the chicken with a special needle.

4.0 BIBLIOGRAPHY (SOURCES)

- Guide to Chicken Health and Management, Ethiopia, ILRI Manual 25. https://www.ilri.org/publications/guide-chicken-health-and-management-ethiopia-farmers-and-development-agents).

- http://www.poultryhub.org/health/disease/types-of-disease/mareks-disease-virus-or-mdv/#:~:targetText=Marek's%20Disease%20Virus%20(MDV)%20is,that%20affects%20poultry%20flocks%20worldwide.

- https://www.farmhealthonline.com/disease-management/poultry-diseases/gumboro/

5.0. ANNEX WITH ALL SUPPORT MATERIALS FORMATTED AND STRUCTURED MATERIALS ON:

1. Slide Deck to be used (by each Activity bundle and each activity)

2. Manual of vaccination against Poultry Diseases during brooding.

3. Training Evaluation form for valuation of training.

Training elements	Rating scale			
	1 Dissatisfied	2 Somehow satisfied	3 Satisfied	4 Highly satisfied
Training objectives				
The training objectives were relevant, realistic and clearly defined.				
Training content				
The training content was relevant, adequate, well organized and easy to follow.				
The training event was flexible to accommodate the learning needs/expectations of participants.				
Training process and methods				
The training process and methods helped me better understand the training content.				
Training facilitators provided helpful comments, feedback and examples.				
Training materials				
Training materials were relevant, well-organized, adequate and easy to read.				

Training time and duration				
Adequate time was allotted for practical sessions and discussion.				
The balance between presentations and practical sessions was good.				
Learning and intention to apply learning				
I have gained adequate knowledge and skills from the training program.				
I can apply the knowledge and skills gained in my work context.				
Overall Assessment				
Overall, how satisfied are you with the training workshop?				

Source: Mamusha Lemma and Adeniyi Adediran (ILRI I@S).

Acknowledgement

Compact coordinator: Dr. Adeniyi S. Adediran
Technology Transfer Officer: Dr. Getachew Feye
Content Expert: (Dr. Adeniyi Adediran)
Additional Guidance from: Prof Maina Muniafu and Dr Mamusha Lemma (ILRI)
Extension Material Template was developed by FARA and AFAAS

In case of any need to make changes to the materials or to add further information, please contact: Adediran, Adeniyi Samuel (ILRI); (a.adediran@cgiar.org)

The development of this set of outreach materials has been coordinated by the TAAT Capacity Development and Technology Outreach Team at FARA, in collaboration with AFAAS.

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Knowledge Management & Outreach Officer: Benjamin Abugri
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Capacity Development Officer AFAAS: Dr Samson Eshetu
Instructional Design Consultant: Prof Maina Muniafu

Design & Layout: *FARA Knowledge management learning and Communications Team*

MODULE 5.0 TAAT ORANGE-FLESHED SWEET POTATO TECHNOLOGY OUTREACH MATERIAL

MODULE 5.0 TAAT ORANGE-FLESHED SWEET POTATO TECHNOLOGY OUTREACH MATERIAL

Module 5.1. Sweet Potato Plant Material Conservation. Triple S method. Sand. Storage Sprouting

This set of outreach materials has been developed jointly by the OFSP Compact, led by International Potato Center (CIP) and the Capacity Development and Technology Outreach led by FARA.
This module is one of a series on related modules:

The other modules are: -

1. Everything you ever wanted to know about sweetpotato, Topic 1: Facilitating training sessions

2. Everything you ever wanted to know about sweetpotato, Topic 2: The origin and importance of sweetpotato

3. Everything you ever wanted to know about sweetpotato, Topic 3: Sweetpotato varietal selection and characteristics

4. Everything you ever wanted to know about sweetpotato, Topic 4: Nutrition and orange-fleshed sweetpotato

5. Everything you ever wanted to know about sweetpotato, Topic 5: Sweetpotato seed systems

6. Everything you ever wanted to know about sweetpotato, Topic 6: Sweetpotato production and management

7. Everything you ever wanted to know about sweetpotato, Topic 7: Sweetpotato pest and disease management

8.Everything you ever wanted to know about sweetpotato, Topic 8: Harvesting and post-harvest management

9. Everything you ever wanted to know about sweetpotato, Topic 9: Processing and utilisation

10. Everything you ever wanted to know about sweetpotato, Topic 10: Marketing and entrepreneurship

11. Everything you ever wanted to know about sweetpotato, Topic 11: Gender and diversity aspects

12. Everything you ever wanted to know about sweetpotato, Topic 12: Monitoring, learning, and evaluation of sweetpotato projects

Guide for users:

This Triple S training guide has been developed directly from the ToT Triple S Trainers manual which is for all those involved in training smallholder farmers across Sub-Saharan Africa. It sets out the same information in a timed manner with learning outcomes to enable feedback from the participants in the training module on the Triple S technology.

Targeted audience

All farmers in sub-Sahara Africa especially resource poor youth, women and any disadvantaged groups already engaged in orange-flesh sweet potato (OFSP) production.

Estimated time:

5 ½ Hours + ½ hour for evaluation and feedback (6 hours in total)

Assumption:

It is assumed that the beneficiaries of this training module have attained basic education (primary and secondary) and are highly motivated to engage in OFSP production. enterprises.

Caveat:

This material can be used by any facilitator with appropriate acknowledgments.

About TAAT:

TAAT is a key priority of the African Development Bank's agricultural transformation agenda also known as the Feed Africa Strategy. TAAT is essentially a knowledge and innovation-based response to the recognized need for scaling up proven technologies across Africa aiming to boost productivity, and to make Africa self-sufficient in key commodities. CDTO FARA leads the Capacity Development arm of TAAT as an enabler compact while the International Potato Center (CIP) leads the Orange-Fleshed Sweet Potato compact of TAAT.

1.0 Introduction

1.1. Background

Triple S stands for Sand, Storage, Sprouting – the three main steps for using stored sweet potato roots to conserve planting materials during the dry season. The roots are stored in dry sand during the dry season, and then planted out and watered before the rains arrive so that their sprouts can develop into vines and provide planting materials right at the start of the rains. The earliness to planting translates into vigorous crop growth and higher yields which increases access to food for farm household consumption given that some early maturing sweet potato can produce harvestable roots within 90 days after planting ensuring that households have something to eat as they wait for the cereals to mature.

1.2. Rationale of the module

The module has been developed to be used alongside the already existing training manuals on the Triple S technology which has been designed to enable farmers to overcomes a number of challenges that impact negatively on the income generation and nutritional abilities insofar as OFSP production is concerned (see annex 1).

1.3. Learning Outcomes:

By the end of this module, participants will be able to:

1. Describe how Triple S can ensure sufficient sweet potato planting materials are available at the start of the rains and how this can benefit different types of households
2. Examine and identify healthy plants in the field for subsequent Triple S use
3. Demonstrate how to set up a Triple S system
4. Compute within their seasonal calendar when Triple S activities need to occur
5. Create a sharing plan for the Triple S technique

2.0. CONTENT

At the end of each Learning Activity Bundle, there is a need to implement an output evaluation using an electronic or print form from the annex.

2.1 Pre-evaluation of learners (with feedback)

2.1.1 Learning Activity Bundle 1: Awareness raising and sensitization meeting (20 minutes) (Tr. Manual pg. 8)

Activity One: This activity enables the facilitator to meet with local leaders and knowledgeable stakeholders to:

- Ensure that there is a need for Triple S in the area
- Raise awareness about the benefits of Triple S
- Find out about the sweet potato activities, varieties and cultural practices in the target area
- Identify training participants (and it should be remembered that Triple S is very suited to resource poor farmers, both men and women, young and old)
- Make logistical arrangements for focal fields, homesteads, dates and times for the training

Facilitation Methods

- Group discussion
- Sharing Experience
- Video on year-long Triple S process
- Training chart

Activity Process and Procedure

o Before the training session, the facilitator will establish some facts about the audience to enable sharing of experiences and peer learning within the group.

o The facilitator will also carry out a gender analysis using the FARA matrix for identification of gender-based constraints (see Table 1), in order to identify potential actions to address the constraints.

o Start by pairing up the participants and get them to ask each other a series of questions on the sweet potato activities, varieties and cultural practices in the region.

Entre-preneur by chain node	Descrip-tion of activities under each node of the value chain	Roles and responsibilities			Roles and responsibilities		
		M	F	Y	Male	Female	Youth
Input supply: e.g how do you access OFSP planting materials in the past?							

Production: e.g. how do you improve production output?							
Processing: e.g. What is the best way to process OFSP?							
Marketing: e.g. What profit are you currently making from your OFST crop?							

Activity Two: Introduction to Triple S technology (20 minutes) (Manual pg. 4 – 6)

Facilitation Methods

- Group discussion
- Sharing Experience
- Video on year-long Triple S process

Activity Process and Procedure

- Ice breaking introductory activity (see suggestions in Tr. Manual; Appendix 1)
- Quick run through of the day's aims, programme and timings
- Presentation: Use flip charts 1-5, and probing questions
- How can Triple S help improve your food security?
- When should you store your Triple S roots?
- When do we expect the rains to start here, are there any signs to watch out for?

o When would this mean we need to start planting out and watering our Triple S stored roots?

o Enter the months for each activity on your handout calendar

o How much planting material will we get from 40 Triple S roots, and over how many weeks of vine harvesting? There is need to specify the size of roots

o What equipment does each farmer require for Triple S?

Activity Three: Selecting and marking healthy plants to use for Triple S and De-haulming/De-topping to help cure sweet potato roots (Tr. Manual pg. 20 - 21) (40 minutes).

Facilitation Methods

- Field Visit
- Group discussion
- Sharing Experience

Activity Process and Procedure

Field activity: move to nearby sweet potato field, ask participants to walk through the crop and carefully observe the plants.
Discuss the group's observations.

o Ask 3 of them to walk through the field again and to stop where they find a diseased plant, join them and discuss the importance of not using roots from diseased plants for Triple S storage, and the need for rogueing of virus infected plants. Find a healthy plant and discuss its characteristics.

o Then ask group to get into pairs, give each pair 5 sticks, and ask them to use the sticks to mark healthy plants they find and could use the roots of for Triple S.

o Ask each pair to join another pair and check their selection of healthy plants. Discuss, demonstrate and plan for de-haulming.

Activity Four: Setting up and loading a Triple S container (Tr. Manual pg. 25 - 27) (40 minutes).

Facilitation Methods

- Demonstration
- Group discussion
- Group Role play

Activity Process and Procedure

- Learners to follow facilitators directions in setting up a Triple S container
- Group activity: plan how each will train 10 other farmers.
- Trainer to take records on student performances for follow-up in next session.

Materials:

o Nearby field of sweet potato at root bulking stage, so participants can practice identifying and marking healthy plants to provide roots for use in Triple S

o Short sticks to use for marking healthy sweet potato plants

o Equipment for facilitator to demonstrate Triple S (basin, newspaper or sisal sack, coarse dry sand, ~60 sweet potato roots)

o Triple S training flip chart, trainer's guide, farmer handout 1

o Farmers' should bring their own notebooks and pens.

2.2.2 Output Evaluation: *What have the learners learnt? Which aspect did they enjoy the most? What would they like to see improved?*
Are there any gender differences in the exposure to the information? Practices? Knowledge?

2.2. Healthy Root selection

2.2.1 Learning Activity Bundle 2: Healthy root selection and loading of the Triple S container

Activity Five: (Flip Charts 1-6). Introduction/Recap/Overview reminder of the Triple S process (10 minutes)

Facilitation Methods

- PPT presentation
- Group discussion
- Sharing Experience

Activity Process and Procedure

- Ice breaking introductory activity, ask two farmers to recap what they learnt during the last Training Session
- Quick run through of the day's aims, programme, timings
- Probing questions for flip chart presentation with the following probing questions:
- How do we identify healthy and unhealthy sweet potato plants?
- Why did we mark healthy plants last session?
- How does de-haulming plants before harvest help?

Activity Six: Careful harvesting of roots for Triple S and deciding which roots to use (Tr. Manual pg. 22) (20 minutes)

Facilitation Methods

- Field activity
- Group discussions
- Sharing Experience

Activity Process and Procedure

- Move to nearby field, ask participants in 4 groups (each with a portion of the field) to:
- Check marked plants (if they were not de-haulmed) still look healthy, and remove sticks from any diseased ones
- Carefully harvest all roots from the marked healthy plants
- To help curing, place the roots in the shade of a tree, cover with canvas not plastic, do not wash roots
- Carefully carry the roots back to the homestead

Activity Seven: Preparing and loading the Triple S container (Tr. Manual pg. 25 - 27) (20 minutes)

Facilitation Methods

- Field activity
- Group discussions
- Sharing Experience

Activity Process and Procedure

- Presentation: Use flip charts 7-9 and probing questions include:
- What would happen if we used roots from diseased plants?
- How can we tell if roots might be infested by weevils?
- What would happen if we used immature roots?
- Why do we use: newspaper; cool dry coarse sand; a 10 cm layer of sand on top; roots of a certain size; a storage location with a thatched roof preferably?

Demonstration:

- Which roots to use in the Triple S
- How to prepare the cool dry coarse sand and the Triple S container
- How to line the newspaper in the basin
- How to load the roots and sand in layers
- How to load the final layer of sand
- Ideal storage location for Triple S

Activity Eight: Storing the Triple S container and keeping the Triple S safe during storage (Tr. Manual pg. 27) (20 minutes)

Facilitation Methods

- Field activity
- Group discussions
- Sharing Experience

Activity Process and Procedure

- Small group activity: Each group to slowly set up a Triple S as follows:
- Select and load roots
- Record date, number, location (NB Facilitator to move between groups observing and questioning)

Presentation: Use flip chart 10-11 and probing questions should include:
Why, when, how to monitor the roots in your Triple S?

Group activity: Plan how each will train 10 other farmers

Materials:

- Same nearby field of sweet potato with healthy plants marked, the participants will check current health of these plants and harvest them carefully and carry the roots back to the homestead
- Harvesting equipment: normal hoes, fork hoes, sticks, or other harvesting tools, sack to carry Farmers' own equipment for setting up their Triple S system – ideal to have 4 sets if 4 groups (basin plus other containers the farmers want to test, e.g. basket, box; newspaper; clean, cool coarse dry sand; sweet potato roots (that the group harvested); cool, dark site for storing the Triple S e.g. inside a thatched roof hut or under a raised structure); pen and notebook
- Triple S training flip chart; trainer's guide; farmer handout 2

2.2.2 Output Evaluation: *What have the learners learnt? Which aspect did they enjoy the most? What would they like to see improved?*
Are there any gender differences in the exposure to the information? Practices? Knowledge?

2.3. Monitoring, De-Sprouting and Preparing to Plant Out Stored Roots

2.3.1 Learning Activity Bundle3: Planting preparations

Activity Nine: Introductions and farmer recap of Session II learning (10 minutes)

Facilitation Methods

- PPT presentation
- Group discussions
- Sharing Experience

Activity Process and Procedure

- Ice breaking role play, ask farmers to get into 4 groups and each group to spend 5 minutes practicing a 1-minute role play of how they set-up their Triple S. Performance & discussion.

- Quick run through of the session's aims, programme, timings

Activity Ten: Monitoring Triple S roots during storage (Tr. Manual pg. 28) (20 minutes)

Facilitation Methods

- PPT presentation
- Group discussions
- Sharing Experience

Activity Process and Procedure

Presentation: Use flip charts 10-11, and probing questions including:

- What are we looking for when we monitor our Triple S?

- What do we do if we find weevil damaged roots, or rotten or rat eaten, or shriveled roots?

- When might we want to de-sprout roots, how, how often?

- How often should we monitor our Triple S?

Activity Eleven: De-sprouting where dry season is > 4 months (Tr. Manual pg. 29) (15 minutes)

Facilitation Methods

- PPT presentation
- Group discussions
- Sharing Experience

Activity Process and Procedure

Demonstration

Using nearby Triple S container (note: carry it outside into the shade), facilitator then demonstrates how to:

o Carefully unload the Triple S, inspecting each root o decide what action (if any) to take for each root

o Carry out the recommended actions

o De-sprout roots, discussing the need for de-sprouting only in locations where dry season is long (> 4 months) and how many times it should be done?

o Re-load remaining roots into Triple S, and return to storage

Small group activity:

o In 4 groups, each group should work on unloading, checking, taking any action necessary and reloading a Triple S (if only 1 other Triple S nearby, then get each participant to unload and decide on action needed for a few roots).

o Participants should list the number of roots that had sprouted, were damaged and the reason for damage, and differences they noted between roots of different sizes.

o Facilitator to move around, checking and helping

Activity Twelve: Preparing your root bed and understanding why Triple S helps (Tr. Manual pg. 30) (30 minutes)

Facilitation Methods

- PPT presentation
- Group discussions
- Sharing Experience

Activity Process and Procedure

Presentation: use flip charts 12-13, and probing questions including:

- When to use a spacing of 30 x 30cm instead of 60 x 60cm?
- Why make a small depression above or between roots?
- Why do we not remove the sprouts just before planting?
- How often to water the roots when we plant them out?
- How long after root planting till we can harvest vines?
- What tools do we need for preparing the root bed?

Group discussion topics: Why do we practice Triple S? When do you plant out

your Triple S roots?

Small group activity: Update on each person's training of 10 farmers

Materials:

- Triple S previously set-up at farmer's home; plus, ideally 4 other Triple S nearby for group work Clean mat or old sacking on which to place roots, clean bucket for sand, fresh newspaper

- Triple S training flip chart; trainer's guide; farmer handout 3

2.2.2 Output Evaluation: *What have the learners learnt? Which aspect did they enjoy the most? What would they like to see improved?*
Are there any gender differences in the exposure to the information? Practices? Knowledge?

2.4. ROOT BED PREPARATION AND PLANTING OUT TRIPLE S ROOTS

2.4.1 Learning Activity Bundle 4: Root Bed Preparation and Planting

Activity Thirteen: Introductions and farmer recap of Session III learning (10 minutes)

Facilitation Methods

- PPT presentation
- Group discussions
- Sharing Experience

Activity Process and Procedure

- Ice breaking role play: in 3 groups each group will role play one of: i) selecting and marking healthy plants, ii) loading a Triple S, iii) monitoring a Triple S. Performances & discussion.

- Quick run through of the session's aims, programme, timings

Activity Fourteen: Monitoring Triple S roots during storage (Tr. Manual pg. 28) (20 minutes)

Facilitation Methods

- PPT presentation
- Group discussions
- Sharing Experience

Activity Process and Procedure

Presentation: Use flip charts 10-11, and probing questions including:

- What did you find when you monitored your Triple S?
- How often did you monitor your Triple S?
- What problems did you encounter?
- When should you prepare your root bed?
- Which roots to use for planting out?

Activity Fifteen: Root bed preparation (Tr. Manual pg. 30) (30 minutes)

Facilitation Methods

- PPT presentation
- Group discussions
- Sharing Experience

Activity Process and Procedure

Demonstration:
Unload Triple S and carefully carry the roots to the nearby field where they will prepare the root bed.
Facilitator to:
Discuss what size seed root bed to prepare

- Prepare part of the root bed
- Plant out about 10 roots, explaining spacing, positioning of roots, need for depression above or between the roots
- Discuss watering requirements, show watering technique

Small group activity: in 4 groups, each group will prepare an area of the seed bed, and plant out some Triple S roots, and water them.
Facilitator to move around, checking and helping.

Activity Sixteen: Planting out Triple S roots (Tr. Manual pg. 30) (30 minutes)

Facilitation Methods

- PPT presentation
- Group discussions
- Sharing Experience

Activity Process and Procedure

Presentation: Use flip charts 12-16, and probing questions including:

- Watering requirements of planted Triple S roots?
- Rate of vine growth from roots?
- Why do we need to fence in the root bed area?
- How to harvest and plant out the cuttings?
- How to get large subsequent vine harvests?
- Why can staggered planting be advantageous?

Group calculations: How many Triple S will I need to set up to supply me with planting materials for 0.3ha?

Activity Seventeen: Vine production and harvesting from Triple S roots (Tr. Manual pg. 32)

Facilitation Methods

- PPT presentation
- Group discussions
- Sharing Experience

Activity Process and Procedure

Demonstration then practice of:
Vine harvesting technique, including vine length, age, quality, transport, storage method

Small group: update on each person's training of 10 others

Reflection session:

- What aspects were difficult to understand?
- What other information is needed?
- Any aspects of Triple S or the training that need adapting to the local context?

Materials:

Triple S previously set-up at farmer's home; nearby field where root bed can be placed;
Hoes (each farmer to bring one); watering can and ~20 litres of water; fencing materials
Triple S training flip chart; trainer's guide; farmer handout 4

2.2.2 Output Evaluation: *What have the learners learnt? Which aspect did they enjoy the most? What would they like to see improved?*
Are there any gender differences in the exposure to the information? Practices? Knowledge?

2.5. Outcome evaluation (with feedback):

Facilitator to provide evaluation questions based on learning outcomes using open-ended and/or close-ended questions.

(A set of Likert scale against statements on the improvement e.g. of the knowledge of the participant; positive change in attitude towards some practices; increased motivation to carry out a practice or confidence to implement a practice. The scale will be strongly disagree to strongly agree.)

(If you want to carry out a Quiz, then prepare the quiz as a handout and then prepare answers for learners to check their performance)

3.0. KEY TERMS: provide definitions and illustrations of key terms for

Triple S: Stands for Sand, Storage, Sprouting – the three main steps for using stored sweetpotato roots to conserve planting materials during the dry season.

Dehaulming: An act of detaching the above the ground vegetative part of the sweet potato from the tuber

Desprouting: An ant of removing the apical sprout that is formed during the storage period of the sweet potato

BIBLIOGRAPHY (SOURCE):

acknowledge sources of materials you used to prepare the outreach material including authors.

https://cgspace.cgiar.org/bitstream/handle/10568/105600/INFOGRAPHIC%20Triple%20S%20%28Storage%20in%20Sand%20and%20Sprouting%29.pdf?sequence=1&isAllowed=y

5.0. ADDITIONAL RESOURCES-FURTHER READING:

a. https://www.sweetpotatoknowledge.org/files/2019-sphi-brief-40-scaling-triple-s-plus-with-gender-responsive-tools-and-diverse-scaling-partners/

b. https://www.sweetpotatoknowledge.org/files/presentation-16-scaling-sweet-potato-triple-s-plus-gender-responsive-options-for-quality-planting-material-higher-yields-and-extended-shelf-life-for-storage-roots-in-ethiopia-ghana/

6.0. Annex with all support materials

Formatted and structured materials on:

1.Flip Charts/Slide Deck to be used (by each Activity bundle and each activity) http://www.sweetpotatoknowledge.org/wp-content/uploads/2018/03/TRIPLE_S_TRAINING_FLIPCHARTS__v12_09112017-3.pdf

2.Manual of Training for Triple S technology (http://www.sweetpotatoknowledge.org/wp-content/uploads/2017/10/TripleS_TRAINERS_MANUAL-1.pdf)

3.Training Evaluation form (see below)

4.TRAINING VIDEOS https://www.youtube.com/watch?v=szp9BNWNi_Y&list=PL_JQ-cLPwYsY9tpgaxkFCfDaajJnNqRkHE&index=1

https://www.youtube.com/watch?v=fcXUtIPmh94&t=238s

Training Evaluation Form.

Training evaluation

Please rate your satisfaction in the training workshop on a 1 to 4 rating scale (1 = Dissatisfied, 2 = Somehow satisfied, 3 = Satisfied, 4 = Highly satisfied).

Training elements	Rating scale			
	1 Dissatisfied	2 Somehow satisfied	3 Satisfied	4 Highly satisfied
Training objectives				
The training objectives were relevant, realistic and clearly defined.				
Training content				
The training content was relevant, adequate, well organized and easy to follow.				
The training event was flexible to accommodate the learning needs/expectations of participants.				
Training process and methods				
The training process and methods helped me better understand the training content.				
Training facilitators provided helpful comments, feedback and examples.				
Training materials				
Training materials were relevant, well-organized, adequate and easy to read.				
Training time and duration				
Adequate time was allotted for practical sessions and discussion.				

The balance between presentations and practical sessions was good.				
Learning and intention to apply learning				
I have gained adequate knowledge and skills from the training program.				
I can apply the knowledge and skills gained in my work context.				
Overall Assessment				
Overall, how satisfied are you with the training workshop?				

Acknowledgement

Compact coordinator: Joyce Maru (Program Coordinator Sweetpotato/Capacity Development Lead)
Technology Expert: Sammy Agili
Additional Guidance from: Prof Maina Muniafu
Extension Material Template was developed by FARA and AFAAS

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The development of this set of outreach materials has been coordinated by the TAAT Capacity Development and Technology Outreach Team at FARA, in collaboration with AFAAS.

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Agribusiness and Gender Expert: Karen Munoko
Capacity Development Officer AFAAS: Dr Samson Eshetu
Instructional Design Consultant: Prof Maina Muniafu

Design & Layout: *FARA Knowledge management learning and Communications Team*

MODULE 6.0 TAAT RICE COMPACT TECHNOLOGY OUTREACH MATERIAL

MODULE 6.0 TAAT RICE COMPACT TECHNOLOGY OUTREACH MATERIAL

Module 6.1. The GEM Parboiling Technology for Women and Youth in Africa

This set of outreach materials has been developed jointly by the TAAT Rice Compact, led by AfricaRice and the Capacity Development and Technology Outreach led by FARA. This module is one of a series on related modules:

The other modules are: -
Boosting Rice Productivity by adopting Good Agricultural Practices
Scaling up Climate Smart Mega Rice Varieties and Hybrids to Improve Crop Yield

Guide for users:

This guide is meant for agricultural engineers and equipment fabricators, trainers, development agents, practitioners, lead farmers, and technologists. The guide provides information on the steps needed to develop the GEM Parboiling system, including the fabrication of the GEM Parboiler, construction of the processing workshop and practices of processing to produce quality rice that meet market standards and preference and appreciated by consumers.

Targeted audience

Policy Makers at the Ministries in charge of Agriculture, agricultural engineers, private equipment fabricators, youth and women processors, rice millers, industry and development projects among others.

Estimated time:

3 Hours + ½ hour for evaluation and feedback (3 ½ Hours in total)

Assumption:

It is assumed that the beneficiaries of this training module (fabricators and large-scale millers) have attained first degree university education or at least completed college education and are highly motivated to engage in the fabrication of the GEM parboiling equipment. The users of the technology – women and youth should have minimum level of education.

Caveat:

The development of the GEM parboiler is governed by the Head of Food and Drugs Authorities or the National Standards Authorities. The processing of rice, which is a food item is regulated to ensure that the metal used is stainless, which is not harmful to human health.

About TAAT:

TAAT is a key priority of the African Development Bank's agricultural transformation agenda also known as the Feed Africa Strategy. TAAT is essentially a knowledge and innovation-based response to the recognized need for scaling up proven technologies across Africa aiming to boost productivity, and to make Africa self-sufficient in key commodities. CDTO FARA leads the Capacity Development arm of TAAT as an enable compact while ILRI leads the Livestock compact of TAAT.

1.0 Introduction

1.1. Background

In Africa, rice is processed by two stakeholder groups - companies, using the industrial rice mills and women groups using artisanal methods to parboil the paddy before milling. To condition the paddy to the required state for milling, women use tons of firewood and traditional methods to parboil. Whilst the use of firewood is costly, the system is time consuming and causes deforestation from the cutting of firewood for use. Moreover, traditional parboiling system causes excessive drudgery and produces intensive smoke that is detrimental to the health of women. The large amount of waste (threshed rice husks) produced through milling poses a challenge of disposal. Locally produced rice is often non-competitive due to the poor quality of parboiled and milled rice, which may be discoloured, contain burnt rice, inert matter and sometimes have foul odour which deter consumers from purchasing it. The rice coming from local processing practices often does not meet market standards; consequently, it has limited access to market and processors gain little income from it.

In addition to low paddy yields, post-harvest losses in terms of quality and quantity are estimated to be at least 47%. Whilst SubSaharan Africa (SSA) consumes about 32.925 million metric tons annually, it produces 18.628 million tons of milled rice leaving a 42% gap and consequently the region imports 13.985 million tons of rive that is valued at US$ 5.9 billion.

1.2. Rationale of the module

The module addresses critical bottlenecks in rice processing and covers the processes and business of conditioning paddy rice through the GEM parboiling technology to produce quality milled rice for the market whiles providing hygienic environments and ensuring human safety and environmental protection. It provides an opportunity in the rice value chain to turn imports into additional job creation and business development for many women and the youth while ensuring food security for millions of people on the continent.

1.3. Learning Outcomes:

By the end of this module, participants will be able to:

1. Describe the rational, design and the components of the GEM Parboiling System

2. Identify the materials required for the fabrication, establishment and construction of the GEM Parboiling System

3. Apply the principles to operate a GEM Parboiling system, depending on the country regulations

4. Point out the importance of widespread adoption of the GEM Parboiling System including its impact on consumer acceptability, market access and income generation

2.0. CONTENT

At the end of each Learning Activity Bundle, there is a need to implement an output evaluation using an electronic or print form from the annex.

2.1 Pre-evaluation of learners (with feedback)

2.1.1 Learning Activity Bundle 1: INTRODUCTION

Activity One: In this activity, the facilitator seeks to establish the participants level of knowledge and experience of the module topic. (20 minutes).
For this pre-evaluation section, please summarise the context of the participants – some are new, others have experience, both positive and negative.

Facilitation Methods

- PPT presentation
- Group discussions
- Video
- Sharing Experience

Activity Process and Procedure

o Before the training session, the facilitator will establish some facts about the audience to enable sharing of experiences and peer learning within the group.

o The facilitator will also carry out a gender analysis using Table 1. for identification of gender-based disparities and possible constraints in order to identify potential actions to address the constraints.

o Start by pairing up the participants and get them to ask each other a series of questions (through pre-prepared slides with illustrative photos) such as whether they remembered the procedures for processing other cereals such as maize, sorghum and millet. What was their experience? Why was it important? What are the parallels with rice processing?

Entre-preneur by chain node	Descrip-tion of activities under each node of the value chain	Roles and responsibilities			Roles and responsibilities		
		M	F	Y	Male	Female	Youth
What commodity have been processed in the past? *Possible Response: maize, sorghum, millet, cassava etc.*							
Who processed it? *Possible response: Self, service provider, miller or partly self and partly Service provider; partly self and partly miller, etc.*							
What quality manifestation did you notice?							
Why is rice parboiling important? *Possible response: improves market access; improves rice quality, etc.*							

Activity Two: Rational, Design and the Components of the GEM Parboiling System (Aiming at those who are not beginners in the group) (20 minutes)

Facilitation Methods

- PPT presentation
- Group discussions
- Sharing Experience
- Case Study

Activity Process and Procedure

o Introduce the topic of the module (PPT 1-3) of the slide deck; the contents draw attention onto the importance of rice processing in general agriculture, the safety regulations that need to be respected and reasons for ensuring such safety measures

o Facilitator leads the learners to construct a rice value chain (PPT 4) building up on their pre-evaluation sheet (see Table 1) to include other stakeholders involved and the importance of each.

o The concept of the GEM Parboiling system is then introduced together with the best practices of rice milling (PPT 5-6).

Case Story of ineffective rice parboiling (PPT 14-17):

Mrs. Ogbonikan Juliet from Glazoué IP was excited by the new technology and reported, I have never enjoyed parboiling activity as I am doing now. Before the installation of the system in our IP, we were spending a lot of money on firewood but today, we can save that money. It increases our gains and saves the environment. Before then, I used to change my dress after parboiling because of the smell of the smoke but today, I am well dressed and can go to wherever I want with the same cloth. It really changed my life, I'm more confident and can bring any visitor to my workplace. Mr. Joshua Jonathan of the Bukan Sidi Lafia Innovation Platform in Nigeria testifies that most of the IP members process their paddy before selling, using the IP fixed price to market their products, which is 7-10% above the open market price; thus, maximizing profit by adding value to the paddy harvested.

Group Discussion Queries

o What were the limitations of the IP before the installation of the new system?

o Which aspects changes with the introduction of the new technology?

o How can rice farmers be made aware and sensitized about the improved parboiling technology?

Some of the possibilities include:

- The women group used local practices – home use cooking utensils

  The women group used traditional stove that consumes a lot of firewood and produces excessive smoke

- The women group had no knowledge of improved parboiling technology

- There should be a massive sensitization campaign to draw the attention of the general public on the negative effects of the traditional par-boiling system and to adopt the improved system
- The Agricultural Extension Agents, Food and Drugs and Standard Authorities, Health workers and Environmental Protection Agencies should be alerted on the widespread use of traditional parboiling technology and the negative effect on women incomes, health and the environment

- These workers should be asking questions concerning the traditional parboiling system and their effects on the women who practice it.

Information Emphasis

Administration is controlled by the Food and Drugs and Standard Authorities, Health workers and Environmental Protection Agencies

2.2.2 Output Evaluation: *What have the learners learnt? Which aspect did they enjoy the most? What would they like to see improved?*
Are there any gender differences in the exposure to the information? Practices? Knowledge?

NB: The facilitator uses the pre-evaluation form (Table 1) so as to compare the responses to all questions before and after the session. If the second evaluation show knowledge has been acquired the next section is taught, otherwise, some aspects may be repeated.

2.2 The materials required for the fabrication, estab lishment and construction of the GEM Parboiling System

2.2.1 Learning Activity Bundle 2: Fabrication, establishment and construction of Parboiling System

Activity Three: Assembling GEM Parboiling Systems. (30 minutes) (PPT 19-23)

Facilitation Methods

- PPT presentation
- Demonstration/Video
- Group discussions
- Sharing Experience

Activity Process and Procedure

i. Recap of previous session and introduction to GEM Parboiling system
Facilitator to get the learners to share knowledge about their different experiences with rice milling

The following questions can stimulate discussion.

- How many currently process rice for the market?
- Who has lost revenue due to the poor quality of the milled parboiled rice?
- What signs did they observe in the rice, what happened, what lessons did they learn?
- What specific unwanted things did the buyers see in the processed milled rice?

ii.Demonstration on assembling of GEM Parboiling system

- Facilitator takes the participants through a model of the parboiling system asking them to name the various parts and what materials they are made of
- Learners attempt to assemble the equipment in groups with explanations to the other participants
- Facilitator points out any precautions and safety measures that need to be taken as well as providing participants with maintenance tips.

Materials

GEM Parboiling Equipment
Figure 1: Images of poor quality parboiled system

Long White Grain Ir Parboiled Rice ...
lishaimpex.com

Further reading: AllImagesVideosNewsMapsMore; AllImagesVideosNewsBooksMore

2.2.2 Output Evaluation: *What have the learners learnt? Which aspect did they enjoy the most? What would they like to see improved?*
Are there any gender differences in the exposure to the information? Practices? Knowledge?

2.3. The principles of operating a GEM Parboiling system

2.3.1 Learning Activity Bundle 3: Operating a GEM Parboiling system

Activity Four: Types of processing and parboiling (20 minutes) (PPT slides 24-27)
Methods of Facilitation

Facilitation Methods

- PPT presentation
- Role Playing
- Group discussions
- Sharing Experience

Activity Process and Procedure

Facilitator carries out an interactive learning on types of rice processing/ parboiling with learners identifying them from their experiences in pictures, charts and PowerPoint slides.

The learners should discuss their understanding of rice processing/parboiling and milling by randomly answering the following questions

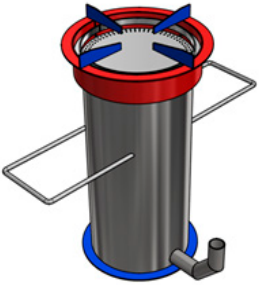
- What are the main rice processing/parboiling and milling on the rice market value
- What is the difference between a parboiling and processing?
- Why are early precautions to obtain the best quality of milled rice important
- How does rice parboiling/processing work

Figure 2: Images of improved rice parboiling system

Improved GEM Parboiler

Stainless Steel Tank

Stainless Steel Mesh Basket



Improved Stove

Improved drying surfaces

Quality milled rice output

Packaged and Branded Rice

Further resources:

YouTube video - Facilitators should be aware that there are many types of parboiling systems. AfricaRice videos are entitled

(i) New video on AfricaRice GEM Rice Parboiling Technology (www. researchgate.net)

(ii) Rice Innovation Platform. – GEM Parboiling Technology

(iii) Cash in with Parboiled rice (africarice.org> germ-rice-parboil....)

Facilitators can find additional information in the PPT slides for this training module.

Sharing Experience

Using the slides 18-23 provided in the slide deck, facilitate the discussions around the topics below

(Tip: Some young and women entrepreneurs have arranged to services to rice producers, processors and millers

Activity Five: Various parboiling technologies and systems (PPT Slides 28-29) (30 minutes)

Facilitation Methods

- PPT presentation
- Role Playing
- Group discussions
- Sharing Experience

Activity Process and procedure

- The facilitator should re-emphasize the importance of rice processing and learning the procedures of processing, appropriate timings through the demonstration video using the link below.

- Ask a few prompting questions about what aspects may be importance of improved rice parboiling and processing prior to viewing the video (so they are looking for these evidences in the video) as follows:
  - How is parboiling technology used?
  - Have you ever used parboiling technology before?
  - How have you use it? Describe
  - What precautions should you take when parboiling?
  - Who can use the improved parboiling technology?

Videos on improved rice parboiling and processing

(i) New video on AfricaRice GEM Rice Parboiling Technology (www. researchgate.net)

(ii) Rice Innovation Platform. – GEM Parboiling Technology

(iii) Cash in with Parboiled rice (africarice.org> germ-rice-parboil....)

Activity Six: Carrying out the parboiling practices (PPT Slides 30 – 36) (40 minutes)

Facilitation Methods

- PPT presentation
- Role Playing
- Group discussions
- Sharing Experience

Activity Process and procedure

VIDEO WATCHING SESSION (Facilitator to plan in advance for suitable enabling equipment)
For the facilitator, following the video, present queries to emphasize and cement the information in it including:

- Are there any differences in what they practice and what they saw in the video?
- What are some of the valid reasons differences in what is practiced and what they saw in the video?
- What are the similarities in practices that they have watched and those in their local context?
- Do these similarities validate the value of the video (which they can also have on their phones and other electronic equipment) as a learning instrument?

DISCUSSION QUERIES

- What is the importance of parboiling in rice processing?
- When should you carry out the parboiling practice?

CHOICES: (a)Anytime, (b) During drying (c) On specific days or time after harvesting?

NB: Use the opportunity to emphasize that parboiling is not advisable wet periods or when the paddy is wet. Contact your local food technology institution or he Ministry responsible for Agriculture for advice on rice parboiling and processing.

Additional Hints:

- Get your paddy from a good source (avoid mixture of varieties)
- Contact the nearest office of the Ministry of Agriculture or a food technology institution

	Parboiling is done in two sessions for a period of 2 days.	
Day 1	Cleaning (winnowing & Washing) - Cleaning is to remove organic and inorganic impurities.	
	Rice parboiling process	
	· After washing, the paddy is soaked in hot water (initial temperature of 85oC for most varieties) and allowed slightly covered to slowly cool down for 16h or overnight.	
Day 2	· Soaking allows the paddy to absorb water (humidity is about 30%).	
· The soaked paddy is 25 min		
Day 3	The steamed paddy is dried to 18% under the sun and from 18% to 14% under shade before milling (	
	When the moisture is at 16%, collect the paddy in bags and store of 3 days.	

	After this period, continue the drying to a moisture of 14% for paddy to be milled immediately (1-2 days) or to 12 % for long term storage (3 months)	
	Why is parboiling advantageous 1. The total milling return for parboiled rice is higher than for non-parboiled rice (economic gain).	
	2. The percentage of whole grains in parboiled rice is higher than non-parboiled rice (economic gain). 3. Parboiled rice is cleaner than non-parboiled rice due to the cleaning process before soaking. 4. Parboiled rice can be stored for longer time than non-parboiled rice (cleaning process eliminates	

2.2.2 Output Evaluation: *What have the learners learnt? Which aspect did they enjoy the most? What would they like to see improved?*
Are there any gender differences in the exposure to the information? Practices? Knowledge?

2.4. Impact of rice processing on consumer acceptability, market access and income generation

2.4.1 Learning Activity Bundle 4

Activity Seven: Impact of GEM Parboiling and Processing Technologies. (20 minutes)

Facilitation Methods

- PPT presentation
- Role Playing
- Group discussions
- Sharing Experience

DISCUSSION topic examples:

Financial impact of poor parboiling system
How to calculate losses in terms of finance given the quality of the parboiled rice
Practical example of calculation

2.2.2 Output Evaluation: *What have the learners learnt? Which aspect did they enjoy the most? What would they like to see improved?*
Are there any gender differences in the exposure to the information? Practices? Knowledge?

2.5 Outcome evaluation (with feedback):

Facilitator to provide evaluation questions based on learning outcomes using open-ended and/or close-ended questions (see evaluation form in annex).

(A set of Likert scale against statements on the improvement e.g. of the knowledge of the participant; positive change in attitude towards some practices; increased motivation to carry out a practice or confidence to implement a practice. The scale will be strongly disagree to strongly agree.)
(If you want to carry out a Quiz, then prepare the quiz as a handout and then prepare answers for learners to check their performance)

3.0. KEY TERMS: provide definitions and illustrations of key terms for

GEM: Grain Quality-Enhancer, Energy Efficient and Durable material (GEM)

Parboil: A method of conditioning paddy rice for milling by controlled steaming in order to obtain better quality and more nutritious grain rice

4.0 BIBLIOGRAPHY (SOURCE):

acknowledge sources of materials you used to prepare the outreach material including authors .tions of key terms for learners to refer

GEM Parboiling brochure (English and French) – TAAT www.AfricaRice.org

GEM Technology for women and youth in Africa: http://www.ricehub.org/RT/post-harvest/gem-parboiling/

Ndindeng, S.A., Manful, J.T., Futakuchi, K., Mapiemfu, D.L., Akoa-Etoa, J.M., Bigoga, J., et al. 2015. Upgrading Africa's rice quality: a novel artisanal parboiling technology for rice processors in sub-Saharan Africa. Food Science and Nutrition, 3(6), 557–568. https://doi.org/10.1002/fsn3.242

Ndindeng, S. A., Wopereis, M., Sanyang, S., Futakuchi, K., 2019. Evaluation of fan-assisted rice husk fuelled gasifier cookstoves for application in sub-Sahara Africa. Renewable energy, 139, 924–935. https://doi.org/10.1016/j.renene.2019.02.132

Ndindeng, S. A., Candia, A., Mapiemfu, D. L., Rakotomalala, V., Danbaba, N., Kulwa, K., Houssou, P., Mohamed, S., Jarju, O. M., Coulibaly, S. S., Baidoo, E. A., Moreira, J., Futakuchi, K. (2020) Valuation of rice post-harvest losses in sub-Saharan Africa and its mitigation strategies. Rice Science. Accepted

Zohoun, E.V., Tang, E.N., Soumanou, M.M., Manful, J., Akissoe, N.H., Bigoga, J., Futakuchi, K., Ndindeng, S.A., 2018a. Physicochemical and nutritional properties of rice as affected by parboiling steaming time at atmospheric pressure and variety. Food Science & Nutrition.6 (3), 638–652. https://doi.org/10.1002/fsn3.600

ADDITIONAL RESOURCES-FURTHER READING:

[1] Improving the quality of parboiled rice', AfricaRice annual report 2016, page 19–20. https://43c018b3-2e2d-4407-af86-1d6495506405.filesusr.com/ugd/0839e4_ecb716a8375a44a99b0165d9be511367.pdf

[2] Fueling the GEM with rice husk: Good for the household economy, the environment and health', AfricaRice annual report 2018, page 14. https://43c018b3-2e2d-4407-af86-1d6495506405.filesusr.com/ugd/0839e4_b5a29a01464148c088319fc9712c846e.pdf

[3] Consumer valuation of an improved rice parboiling technology: Experimental evidence from Cameroon. https://ageconsearch.umn.edu/record/233845

..... [4] GEM Parboiling in Lafia Innovation Platform, Nigeria https://www.youtube.com/watch?v=5uWwZx92tyM

ANNEX WITH ALL SUPPORT MATERIALS FORMATTED AND STRUCTURED MATERIALS ON

1. Slide Deck to be used (by each Activity bundle and each activity)
2. Handout on the GEM Parboiling Technology
3. Training Evaluation form for valuation of training.

Training elements	Rating scale			
	1 Dissatis-fied	2 Somehow satisfied	3 Satisfied	4 Highly satisfied
Training objectives				
The training objectives were relevant, realistic and clearly defined.				
Training content				
The training content was relevant, adequate, well organized and easy to follow.				
The training event was flexible to accommodate the learning needs/expectations of participants.				
Training process and methods				
The training process and methods helped me better understand the training content.				
Training facilitators provided helpful comments, feedback and examples.				
Training materials				
Training materials were relevant, well-organized, adequate and easy to read.				
Training time and duration				
Adequate time was allotted for practical sessions and discussion.				

The balance between presentations and practical sessions was good.				
Learning and intention to apply learning				
I have gained adequate knowledge and skills from the training program.				
I can apply the knowledge and skills gained in my work context.				
Overall Assessment				
Overall, how satisfied are you with the training workshop?				
Source: Sali Atanga Ndindeng and Ernest Assah Asiedu				

Acknowledgement

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Additional Guidance from: Prof Maina Muniafu and Dr Mamusha Lemma (ILRI)
Extension Material Template was developed by FARA and AFAAS

In case of any need to make changes to the materials or to add further information, please contact: Dr. Ernest Assah Asiedu E.Asiedu@cgiar.org

The development of this set of outreach materials has been coordinated by the TAAT Capacity Development and Technology Outreach Team at FARA, in collaboration with AFAAS.

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MODULE 7.0 TAAT SOIL COMPACT OUTREACH TRAINING MATERIAL

MODULE 7.0 TAAT SOIL COMPACT OUTREACH TRAINING MATERIAL

Module 7.1. Urea deep placement (UDP) for improved nitrogen use efficiency in rice cropping systems

This set of outreach materials has been developed jointly by the Soil Compact, led by International Fertilizer Development Center (IFDC) and the Capacity Development and Technology Outreach led by FARA.

Guide for users:

This training manual has been developed by IFDC and partners to improve nitrogen fertilization in rice systems, particularly in irrigated rice systems. The urea granules, often called urea supergranules (USG), are applied seven days after transplanting of rice seedlings. This covers the nitrogen (N) requirements of rice throughout its cycle. This one-time application of urea granules significantly reduces the recommended rates of urea while increasing paddy yields. The reduction in the N application rate depends on the soil fertility status, the cropping system and conventional fertilizer recommendation by national services.

Targeted audience

All farmers in sub-Sahara Africa especially resource poor youth, women and any disadvantaged groups already engaged in rice farming.

Estimated time:

4Hours + ½ Hour for evaluation and feedback (5 ½ Hours in total)

Assumption:

It is assumed that the beneficiaries of this training module have attained basic education (primary and secondary) and are highly motivated to engage in effective rice production.

Caveat:

This material can be used by any facilitator with appropriate acknowledgments.

About TAAT:

TAAT is a key priority of the African Development Bank's agricultural transformation agenda also known as the Feed Africa Strategy. TAAT is essentially a knowledge and innovation-based response to the recognized need for scaling up proven technologies across Africa aiming to boost productivity, and to make Africa self-sufficient in key commodities. CDTO FARA leads the Capacity Development arm of TAAT as an enabler compact while the IFDC) leads the Soil Compact of TAAT.

1.0 Introduction

1.1. Background

Cereals represent an important component of staple foods in developing countries and rice is the second most important cereal food crop in Sub-Saharan Africa. To satisfy the increasing demand of rice, production must increase by 70% to 907 million tons by year 2027, and this is best achieved through intensification of cropping systems rather than expansion of cultivated areas. To achieve this goal, rice farmers would need, in addition to observing other good agricultural practices, improve their use of mineral fertilizers to go beyond the 20 kg/ha. Of the nutrients needed by plants, nitrogen is the major yield determining element for cereals, particularly for rice under irrigated or rainfed conditions. The cost of fertilizers represents 15-30 % of total production costs in a rice farm. The most common method of application of nitrogen fertilizer in a rice field is broadcasting of prilled urea, in most cases as split applications from planting to flowering. However, nitrogen applied in a broadcast design is not efficiently used by the crop. Only about 30% of the applied N fertilizer is taken up by the crop. The remainder is lost through gaseous ways, runoff, leaching or immobilization in the soil, creating a financial burden to farmers and contributing to environmental pollution.

1.2. Rationale of the module

The module has been developed to be used alongside the already existing training manual on the UDP technology which has been designed to enable farmers to overcomes a number of challenges that impact negatively on the income generation and nutritional abilities insofar as rice production is concerned (see annex 1). It is an important technology because it improves nitrogen use efficiency in rice cropping systems.

1.3. Learning Outcomes:

By the end of this module, participants will be able to:

1. Explain the meaning of UDP technology and demonstrate the production of Urea Supergranules
2. Describe the farm operations associated with UDP including the placement of supergranules
3. Point out the agronomic recommendations related to UDP and describe the conditions for optimal performance of UDP
4. Detail the benefits and constraints related to UDP
5. Describe the use of UDP in other crops

2.0. CONTENT

At the end of each Learning Activity Bundle, there is a need to implement an output evaluation using an electronic or print form from the annex.

2.1 Pre-evaluation of learners (with feedback)

2.1.1 Learning Activity Bundle 1: Awareness raising and sensitization meeting (25 minutes)

Activity One: This activity enables the facilitator to meet with local leaders and knowledgeable stakeholders to:

- Carry out self-introduction and allow the local leadership to welcome you
- Identify training participants paying attention to gender and age balance
- Discuss about the rice production activities and any existing fertilizer applicatio practices
- Make logistical arrangements for focal fields, homesteads, dates and times for the training

FACILITATION METHODS

- Group discussion
- Sharing Experience

Activity Process and procedure

- For the facilitator, visit the area earlier to introduce yourself to the local leadership and to assist you in setting up the meeting with the local farmers at a suitable date, time and venue.

- The facilitator will also carry out a gender analysis using the FARA matrix for identification of gender-based constraints (see Table 1), in order to identify potential actions to address the constraints.

- Start by pairing up the participants and get them to ask each other a series of questions on the rice growing activities, varieties and fertilizer application practices in the region.

Entre-preneur by chain node	Descrip-tion of activities under each node of the value chain	Roles and responsibilities			Roles and responsibilities		
		M	F	Y	Male	Female	Youth
Input supply: e.g how do you access rice planting materials in the past?							
Production: e.g. how do you improve production output?							
Processing: e.g. What is the best way to apply fertilizer to your rice crop?							
Marketing: e.g. What profit are you currently making from your rice crop?							

Activity Two: Introduction to UDP technology (20 minutes) (Manual pg. 1)

FACILITATION METHODS

- Group discussion
- Sharing Experience
- PPT Presentation (Slides 1-2)

Activity Process and procedure

- Quick run through of the day's aims, programme and timings

- Presentation: Involve the participants to respond to probing questions in small groups
  - Why are the urea granules called supergranules?
  - When should they be applied to the field?
  - How do the application rates of the supergranules compare to normal urea?
  - Does this rate translate into any savings? How much if yes?
  - What factors influence this reduction in nitrogen application?

Activity Three: The production of Urea Supergranules (Tr. Manual pgs. 1-2)(40 minutes).

FACILITATION METHODS

- Demonstration/Video of production process
- Group discussion
- Sharing Experience

Activity Process and Procedure (Use slides 4-6)

For the facilitator;
Demonstrate the production process using a compacting machine or by playing a video of the process.
Allow the participants to make observations in groups and then discuss the group's observations using the following queries:

- What equipment(s) is/are used in the process?

- Are there any external additions?

- Did the process have any chemical or biological additions?

- How much prilled urea is used to produce a specified quantity of USG?

- What is the shape of the supergranules? How much do they weigh?

- Can the process be used on other types of fertilizers?
  The facilitator can then use a ppt presentation to reinforce the information the participants obtained from the demonstration

2.1.2 Output Evaluation: *What have the learners learnt? Which aspect did they enjoy the most? What would they like to see improved?*
Are there any gender differences in the exposure to the information? Practices? Knowledge?

2.2. The farm operations associated with UDP and the placement of supergranules

2.2.1 Learning Activity Bundle 2: The farm operations associated with UDP

Activity Four: Nursery preparation (Tr. Manual pg. 3) (40 minutes).

METHODS OF FACILITATION

- Field Observations
- Power point presentation
- Group discussions

Activity Process and Procedure (Use slides 7 – 10)

Facilitator to make field observations of different nurseries with participants. In their small groups, participants will do the following:

- Demonstrate tillage in their small groups
- Each group to assess the activity of one another group with a mark out of ten
- Discussion to center on best tillage method and reasons for it

Activity Five: Tillage of the farm (Tr. Manual pg. 3) (40 minutes).

FACILITATION METHODS

- Field Observations
- Demonstration
- Group discussions

Activity Process and Procedure (Use slides 11 – 12)

- Facilitator to ask participants to demonstrate tillage in their small groups
- Each group to assess the activity of one another group with a mark out of ten
- Discussion to center on best tillage method and reasons for it
- PowerPoint presentation to solidify the knowledge gained from the discussions

Activity Six: Transplanting of rice seedlings (10 minutes)

FACILITATION METHODS

- PPT presentation
- Demonstration
- Group discussions
- Sharing Experience

Activity Process and Procedure (Use slides 13 – 14)

- Facilitator to ask participants to demonstrate transplanting of rice seedlings in their small groups
- Each group to assess the activity of one another group with a mark out of ten
- Discussion to center on best transplanting technique
- PowerPoint presentation to solidify the knowledge gained from the discussions

2.2.2 Learning Bundle 3: Placement of granules

Activity Seven: Fertilizer application using supergranules (20 minutes)

FACILITATION METHODS

- Field activity
- Demonstration/Video
- Group discussions
- Sharing Experience

Activity Process and procedure (Use slides 15 – 16)

- Move to nearby field, ask participants in 4 groups (each with a portion of the field) to:
    - o Demonstrate how the granules should be placed
    - o Discuss the best method of granule placement

- The PowerPoint presentation will be used to reinforce the field experience

2.2.3 Output Evaluation: *What have the learners learnt? Which aspect did they enjoy the most? What would they like to see improved?*
Are there any gender differences in the exposure to the information? Practices? Knowledge?

2.6. Agronomic recommendations related to UDP and the conditions for optimal performance of UDP

2.3.1 Learning Activity Bundle3: Irrigation, fertilization, crop maintenance, harvest and post-harvest activities

Activity Eight: Irrigation of fields (20 minutes)

FACILITATION METHODS

- Field activity/Video
- Group discussions
- Sharing Experience
- PowerPoint Presentation

Activity Process and Procedure (use slides 17 – 19)

- Group discussions with probing questions that include:
  - What is the planting density that participants use in their fields?
  - How many seedlings per stand?
  - How much water should be used in irrigation? How can they ensure that it is the correct amount?
  - What is the importance of using the correct amount of water?
  - PowerPoint presentation to reinforce information gained from the group discussions

Activity Nine: Fertilization, Crop maintenance, harvest and postharvest activities for the rice crop (20 minutes)

FACILITATION METHODS

- Field activity/Video
- Group discussions
- Sharing Experience

Activity Process and Procedure (use slides 17 – 19)

• Facilitator to take participants through the agronomic processes of fertilization, crop maintenance as well as harvest and postharvest activities with a field demonstration/video session and use probing questions in paired discussions which include:

- What fertilizers are applied to the rice fields?
- What role can organic manure applications play in the rice fields?
- How much manure and inorganic fertilizers should be applied?
- How do we carry out weeding?
- What are common pests and diseases that affect rice plants during growth?
- At what point do you i.) drain the rice fields? ii.) Harvest the rice? iii. Thresh the rice?
- How do we dry the rice grains? How do we determine that it is sufficiently dry? (facilitator to demonstrate moisture content calculation)
- Which is the best way to store the rice grains?
- PowerPoint presentation and videos (if available) to reinforce the information

2.3.2 Output Evaluation: *What have the learners learnt? Which aspect did they enjoy the most? What would they like to see improved?*
Are there any gender differences in the exposure to the information? Practices? Knowledge?

2.4. The conditions for optimal performance of UDP technology

2.4.3. Learning Activity Bundle 4: Types of soil and seed varieties

Activity Ten: Types of Soils (Tr. Manual pg. 6) (15 minutes)

FACILITATION METHODS

- PPT presentation
- Group discussions
- Sharing Experience
- Observations

Activity Process and Procedure (Use slide 23)

Facilitator to get the participants to discuss about the types of soils they know and which are suitable for crops like rice. If possible, have samples of different soil types for learning purposes and thereafter, the participants can carry out a soil identification exercise in nearby fields.

Activity Eleven: Seed varieties used in rice production (Tr. Manual pg. 30) (30 minutes)

FACILITATION METHODS

- PPT presentation
- Group discussions
- Sharing Experience
- Posters and Brochures (seed varieties)

Activity Process and Procedure (Use slide 24 – 25)

Small group discussions with sharing of information on the rive varieties that the participants know. This can be followed by an identification activity of presented rice seed varieties (samples or poster pictures) with probing questions that include:

- Do all rice varieties respond well to UDP technology?
- What are the desirable characteristics of the rice varieties?
- What is the difference between ordinary and certified seeds?

2.4.3 Output Evaluation: *What have the learners learnt? Which aspect did they enjoy the most? What would they like to see improved?*
Are there any gender differences in the exposure to the information? Practices? Knowledge?

2.5. The benefits and constraints related to UDP

2.5.1. Learning Activity Bundle 5: Benefits and constraints of UDP in rice and other crops

Activity Twelve: The benefits and constraints related to UDP (20 minutes)

FACILITATION METHODS

- PPT presentation
- Group discussions
- Sharing Experience

Activity Process and Procedure (Use slides 26 – 28)

Facilitator to use small group for the participants to discuss their experiences and expectations on the benefits and possible constraints of UDP technology. Probing questions include:

- What do you as participants expect from the use of UDP?
- Do you see any challenges in the use of UDP technology?
- Can it be used for your other crops?

2.5.2. Output Evaluation: *What have the learners learnt? Which aspect did they enjoy the most? What would they like to see improved?*
Are there any gender differences in the exposure to the information, practices, knowledge?

2.6. Outcome evaluation (with feedback):

Facilitator to provide evaluation questions based on learning outcomes using open-ended and/or close-ended questions.

(A set of Likert scale against statements on the improvement e.g. of the knowledge of the participant; positive change in attitude towards some practices; increased motivation to carry out a practice or confidence to implement a practice. The scale will be strongly disagree to strongly agree.)

(If you want to carry out a Quiz, then prepare the quiz as a handout and then prepare answers for learners to check their performance)

3. KEY TERMS : provide definitions and illustrations of key terms for learners to refer

UDP: Urea Deep Placement

Tillage: Breaking down of soil lumps in the field to obtain a fine tilth

NPK Fertilizer: Nitrogen, Phosphorus and Potassium fertilizers

4.0 BIBLIOGRAPHY (SOURCE):

acknowledge sources of materials you used to prepare the outreach material including authors.

- Agricultural practices of UDP technology. Technical advisory note. IFDC Accra, Ghana.

- Fertilizer Deep Placement. IFDC Solutions. Internal Publication. IFDC Muscle Shoals, Alabama, USA.

5. ADDITIONAL RESOURCES-FURTHER READING:

-Bhattarai, S.P., M.C. Palada, D.J. Midmore, D. Wu, R. Salas. 2011. On-farm evaluation of fertilizer briquettes and low-cost drip irrigation for smallholder vegetable production in Cambodia. Irrigation and Drainage, 60: 318-329.

-Khalil M. I., F. Buegger, M. Schraml, R. Gutser, K. G. Richards and U. Schmidhalter. 2009. Gaseous Nitrogen Losses from a Cambisol Cropped to Spring Wheat with Urea Sizes and Placement Depths. In Soil Fertility & Plant Nutrition. Soil Sci. Soc. Am. J. 73:1335-1344.

6. Annex with all support materials:

Formatted and structured materials on:

-Slide Deck to be used (by each Activity bundle and each activity)

-Manual of Training

-Training Evaluation form (see below)

-TRAINING VIDEOS/CHARTS/BROCHURES

Training Evaluation Form.

Please rate your satisfaction in the training workshop on a 1 to 4 rating scale (1 = Dissatisfied, 2 = Somehow satisfied, 3 = Satisfied, 4 = Highly satisfied).

Training elements	Rating scale			
	1 Dissatis-fied	2 Somehow satisfied	3 Satisfied	4 Highly satisfied
Training objectives				
The training objectives were relevant, realistic and clearly defined.				
Training content				
The training content was relevant, adequate, well organized and easy to follow.				
The training event was flexible to accommodate the learning needs/expectations of participants.				
Training process and methods				
The training process and methods helped me better understand the training content.				
Training facilitators provided helpful comments, feedback and examples.				
Training materials				
Training materials were relevant, well-organized, adequate and easy to read.				
The balance between presentations and practical sessions was good.				

Learning and intention to apply learning				
I have gained adequate knowledge and skills from the training program.				
I can apply the knowledge and skills gained in my work context.				
Overall Assessment				
Overall, how satisfied are you with the training workshop?				
Source: Sali Atanga Ndindeng and Ernest Assah Asiedu				

Acknowledgement

Compact coordinator: Ekwe L. Dossa
Technology Experts: Upendra Singh; Ekwe L Dossa
Additional Guidance from: Prof Maina Muniafu
Extension Material Template was developed by FARA and AFAAS

In case of any need to make changes to the materials or to add further information, please contact: Ekwe L. Dossa at edossa@ifdc.org

The development of this set of outreach materials has been coordinated by the TAAT Capacity Development and Technology Outreach Team at FARA, in collaboration with AFAAS.

TAAT CDTO Coordinator: Krishan Bheenick
Knowledge Management & Outreach Officer: Benjamin Abugri
Agribusiness and Gender Expert: Karen Munoko
Capacity Development Officer AFAAS: Dr Samson Eshetu
Instructional Design Consultant: Prof Maina Muniafu

Design & Layout: *FARA Knowledge management learning and Communications Team*

MODULE 8.0 TAAT SORGHUM & MILLET COMPACT TECHNOLOGY OUTREACH MATERIAL

MODULE 8.0 TAAT SORGHUM & MILLET COMPACT TECHNOLOGY OUTREACH MATERIAL

Module 8.1. Dual-Purpose Sorghum & Millet Varieties

This set of outreach materials has been developed jointly by the Sorghum & Millet Compact, led by ICRISAT-Mali and the Capacity Development and Technology Outreach led by FARA.
This module is one of a series on related modules:

Guide for users:

This guide is meant for agricultural extension and advisory services workers, trainers, development agents, practitioners, lead farmers, and technologists to facilitate the provision of information on the steps needed in the crop-livestock integration areas.

Targeted audience

The target audience are Extension Workers, AS and Lead Farmers.
The target population is composed of 70% male, 30% female, out of which 30% are Youth.

Estimated time:

5 ½ Hours + ½ hour for evaluation and feedback (6 hours in total)

Assumption:

This is a face-to-face training. It will be possible only if there is no situation preventing from such gathering.

Caveat:

ICIRSAT developed technologies are of public domain. Hence, they are accessible to anyone who is willing to adopt and use them.

About TAAT:

TAAT is a key priority of the African Development Bank's agricultural transformation agenda also known as the Feed Africa Strategy. TAAT is essentially a knowledge and innovation-based response to the recognized need for scaling up proven technologies across Africa aiming to boost productivity, and to make Africa self-sufficient in key commodities. CDTO FARA leads the Capacity Development arm of TAAT as an enable compact while ICRISAT leads the Sorghum & Millet Compact of TAAT.

1.0 Introduction

1.1. Background

The dual-purpose sorghum varieties provide grains for human consumption, high quality stem for livestock feed and stem with juicy sucrose for direct human consumption and industrial use. They have good drought tolerance and stay green (50% to 61% of progenies) characters as confirmed under Guinean and Sudan-savanna ecologies. The dual-purpose sweet sorghum evaluated in 2014 on station showed high grain yield, from 2.4 to 5.2 t/ha for Caudatum plant type and from 1.0 to 4.0 t/ha for Guinea plant type.

1.2. Rationale of the module

The dual-purpose sorghum varieties are high yielding (both grain and Stover), and well adapted to farmers conditions and local food processing. This increases interest of Agro-industries using Stover choppers/grinders to fabricate composite sorghum Stover and cotton grain residues or groundnut/cowpea haulms for animal feed.

1.3. Learning Outcomes:

By the end of this module, participants will be able to:

1. Explain the definition of a Dual-purpose variety
2. Describe how to produce good quality sorghum & millet grain and stover
3. Demonstrate how to process the stover if sorghum & millet
4. Describe how to maintain the stover chopper

2.0. CONTENT

2.1 Pre-evaluation of learners (with feedback)

2.1.1 Learning Activity Bundle 1

Activity One: General introduction to Sorghum & Millet production techniques and Stover processing (20 minutes)

FACILITATION METHODS

- Presentation
- Experiential learning (learning by doing)
- Group discussion
- Demonstration Field visit
- Hand outs
- Sharing Experience

Before the training session, the facilitator will establish some facts about the audience to enable sharing of experiences and peer learning within the group.

The following topics will be addressed during the training:

- Background of Sorghum & Millet production (Importance, challenges/ constraints, animal feed, opportunities);
- Presentation of the Package (Varieties, GAPs, Stover quality, Comparative advantages);
- Stover Processing and Utilization;
- Demonstration of the Stover chopper machine;
- Storage and conservation of Grains and Stover;
- Marketing;
- Supporting illustrations (Flyers, Leaflets, Videos, etc.)

Activity Two (for trainees who are familiar with the sorghum & millet production): Stover processing (40 minutes)

FACILITATION METHODS

- Presentation
- Role Playing
- Experiential learning (learning by doing)
- Group discussion
- Hand outs
- Sharing Experience

The following topics will be addressed during the training:

- Stover Processing and Utilization;
- Demonstration of the Stover chopper machine;
- Storage and conservation of Grains and Stover;
- Marketing;
- Supporting illustrations (Flyers, Leaflets, Videos, etc.)

Stover milling machine

2.1.2. Output Evaluation: *What have the learners learnt? Which aspect did they enjoy the most? What would they like to see improved?*
Are there any gender differences in the exposure to the information, practices, knowledge?

For this pre-evaluation section, please summarize the context of the participants – some are new, others have experience, both positive and negative; hygiene and health are important; what we will be covering in the following session

2.2. Definition of dual-purpose varieties

2.2.1 Learning Activity Bundle 2

Activity Three: Understanding the definition of a Dual-purpose variety (30 minutes)

FACILITATION METHODS

- Presentation
- Group discussion

2.2.2. Output Evaluation: *What have the learners learnt? Which aspect did they enjoy the most? What would they like to see improved?*
Are there any gender differences in the exposure to the information, practices, knowledge?

2.3. Quality of sorghum & millet grain and stover

2.3.1 Learning Activity Bundle: Producing good quality sorghum & millet grain and

Activity Four: Producing good quality sorghum & millet grain and stover (100 minutes)

FACILITATION METHODS

- Presentation
- Group discussion
- Handouts
- Sharing Experience

Activity Five: Harvesting grain and stover (120 minutes)

FACILITATION METHODS

- Presentation
- Group discussion
- Handouts
- Sharing Experience

2.3.2. Output Evaluation: *What have the learners learnt? Which aspect did they enjoy the most? What would they like to see improved?*
Are there any gender differences in the exposure to the information, practices, knowledge?

2.4. Processing of stover

2.4.1 Learning Activity Bundle

Activity Six: Processing the stover (30 minutes)

FACILITATION METHODS

- Presentation
- Role Playing
- Experimental learning (learning by doing)
- Group discussion
- Hand outs
- Illustrated posters
- Video
- Sharing Experience

2.4.2. Output Evaluation: *What have the learners learnt? Which aspect did they enjoy the most? What would they like to see improved?*
Are there any gender differences in the exposure to the information, practices, knowledge?

2.5. Maintaining Stover Chopper

2.5.1 Activity Seven: Maintaining the stover chopper (20 minutes)

Activity Seven: Maintaining the stover chopper (20 minutes)

FACILITATION METHODS

- Presentation
- Experimential learning (learning by doing)
- Group discussion
- Video
- Sharing Experience

2.5.2. Output Evaluation: *What have the learners learnt? Which aspect did they enjoy the most? What would they like to see improved?*
Are there any gender differences in the exposure to the information, practices, knowledge?

2.6. Outcome evaluation (with feedback):

Provide evaluation questions based on learning outcomes using open-ended and/or close-ended questions.
(A set of Likert scale against statements on the improvement e.g. of the knowledge of the participant; positive change in attitude towards some practices; increased motivation to carry out a practice or confidence to implement a practice. The scale will be strongly disagree to strongly agree.)

(If you want to carry out a Quiz, then prepare the quiz as a handout and then prepare answers for learners to check their performance)

3. KEY TERMS: provide definitions and illustrations of key terms for learners to refer

FARA: Forum for Agricultural Research in Africa

GAP: Good Agronomic Practices

ICRISAT: International Crop Research Institute for the Semi-Arid Tropics

4.0 BIBLIOGRAPHY (SOURCE):

https://www.researchgate.net/publication/276382578_Yield_and_Forage_Value_of_a_Dual-Purpose_Sorghum_Hybrid

https://www.k-state.edu/smil/whatwedo/projects/pastprojects/Zangre.html

https://www.researchgate.net/publication/231995734_Dual-purpose_landraces_of_pearl_millet_Pennisetum_glaucum_as_sources_of_high_stover_and_grain_yield_for_arid_zone_environments

https://www.ilri.org/news/dual-purpose-sorghum-varieties-improving-food-and-feed-security-crop-livestock-farmers-southern

ICRISAT annual reports 1990 – 2018

5. Annex with all support materials Formatted and structured materials on:

1. Slide Deck to be used (by each Activity bundle and each activity)
2. Handout on Sorghum & Millet Production
3. Handout on Stover processing
4. Photo Props
5. Outcome Evaluation form
6. Other Handouts

Acknowledgement

Compact coordinator: Ekwe L. Dossa
Technology Experts: Upendra Singh; Ekwe L Dossa
Additional Guidance from: Prof Maina Muniafu
Extension Material Template was developed by FARA and AFAAS

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Design & Layout: *FARA Knowledge management learning and Communications Team*

MODULE 9.0 TAAT Wheat Compact Technology OUTREACH MATERIAL

MODULE 9.0 TAAT Wheat Compact Technology OUTREACH MATERIAL

Module 9.1. Wheat Technology Toolkit

This set of outreach materials has been developed jointly by the Wheat Compact, led by ICARDA and the Capacity Development and Technology Outreach led by FARA.

Guide for users:

The potential for growing wheat in sub-Saharan Africa (SSA) is great but yields are low due to a number of factors leading to a 60% reliance on importation. The TAAT Wheat compact led by the International Center for Agricultural Research in the Dry Areas (ICARDA) thus aims to scale up and enhance the adoption of proven technologies and innovations across Africa, expanding domestic wheat production and commercialization for achieving wheat self-sufficiency and also spearheading transformational impact-raising productivity, production, farmers' income, value addition and job creation. This guide consists of training material from brochures, manuals and relevant papers to help in achieving this aim and is meant for agricultural extension and advisory services workers, trainers, development agents, practitioners, lead farmers, and technologists to facilitate the provision of information on the steps needed in improving wheat yields for farmers in the SSA region. Within it, there is a combination of technologies based on appropriate seed varieties as well as seed bed and agronomic practices that maximize yield.

Targeted audience

The target audience at wheat farmers in Africa.
The target population is composed of 70% male, 30% female, out of which 30% are Youth.

Estimated time:

4 ½ Hours + ½ hour for evaluation and feedback (5 hours in total)

Assumption:

This is a face-to-face training. It will be possible only if there is no situation preventing from such gathering.

Caveat:

The material in the training module is available for use with the appropriate acknowledgment of the source.

About TAAT:

TAAT is a key priority of the African Development Bank's agricultural transformation agenda also known as the Feed Africa Strategy. TAAT is essentially a knowledge and innovation-based response to the recognized need for scaling up proven technologies across Africa aiming to boost productivity, and to make Africa self-sufficient in key commodities. CDTO FARA leads the Capacity Development arm of TAAT as an enable compact while ICARDA leads the Wheat Compact of TAAT.

1.0 Introduction

1.1. Background

Demand for wheat in regions such as sub-Saharan Africa (SSA) will increase by 60% by 2050 A.D. There are however many challenges that wheat production is facing in this region including climate change (with exacerbated drought and high temperature episodes), cost of inputs going beyond farmer affordability, increased disease and pest attacks and declining yields among others. Yields are expected to decrease by 20 – 30% in many countries of Africa. In 2025, wheat consumption in Africa is projected to reach 76.5 MMT of which 48.3 MMT would be imported accounting for 63.3 per cent of wheat demand at the current status quo. Almost all countries of North Africa (Algeria, Egypt, Libya, Morocco and Tunisia), Nigeria in West Africa, Ethiopia and Sudan in East Africa and South Africa accounted for 80 per cent of wheat imports.

1.2. Rationale of the module

The rising demand for wheat concurrently with declining yields from various factors calls for the development of technologies that give the farmers in SSA an opportunity to improve on their yields and thus have better income generation capacities from their wheat production. Ultimately, the burden of wheat imports will be reduced in SSA countries releasing foreign exchange to other sectors and at the same time improving on food security.

1.3. Learning Outcomes:

By the end of this module, participants will be able to:

1. Describe the significance of heat tolerant wheat varieties in SSA
2. Illustrate why working as a group to adopt new techniques offers more returns and livelihood opportunities
3. Demonstrate practices that lead to higher wheat production
4. Describe methods of crop protection and wheat harvest

2.0. CONTENT

At the end of each Learning Activity Bundle, there is a need to implement an output evaluation using an electronic or print form from the annex.

2.1 Pre-evaluation of learners (with feedback)

2.1.1. Learning Activity Bundle 1: Awareness raising and sensitization meeting

Activity One: (30 minutes) This activity enables the facilitator to meet with local leaders and knowledgeable stakeholders to:

- Identify training participants
- Get an understanding of the wheat production methods of the region
- Achieve positive attitudes towards the heat tolerant and raised bed irrigation systems
- Get the support of the local leaders and agree on suitable training times, procedures and venues

FACILITATION METHODS

- PPT Presentation
- Group discussion
- Hand outs
- Sharing Experience

- Before the training session, the facilitator will establish some facts about the audience to enable sharing of experiences and peer learning within the group.

- The facilitator will also carry out a gender analysis using the FARA matrix for identification of gender-based constraints (see Table 1), in order to identify potential actions to address the constraints.

- Start by pairing up the participants and get them to ask each other a series of questions on the wheat production activities, varieties and cultural practices in the region.

Table 1: Learners' pre-evaluation sheet

Entre-preneur by chain node	Descrip-tion of activities under each node of the value chain	Roles and responsibilities			Roles and responsibilities		
		M	F	Y	Male	Female	Youth
Input supply: e.g how do you access seed for planting?							
Production: How much yield do you get per acre? How can you improve the production output from your field?							
Processing: e.g. Where is your wheat processed?							
Marketing: e.g. What profit are you currently making from your wheat crop?							

Activity Two (for trainees who are familiar with the wheat production): General introduction to wheat production in SSA (20 minutes)

FACILITATION METHODS

- PPT Presentation
- Group discussion
- Hand outs
- Sharing Experience

Activity Process and Procedures

The following topics will be addressed during the training:

- Why wheat production is important in Africa?
- Which countries lead in wheat production? What are the possible reasons for this?
- Major challenges for wheat production in SSA
- Are your yields improving? If yes/no why?
- What is the heat tolerant wheat technology?

Possible responses

- Wheat is a staple food in many SSA countries.
- Wheat production in SSA suffers the effects of reducing or lack of irrigation water supplies, declining soil fertility, monocropping and threats from emerging diseases such as the temperature tolerant and aggressive yellow rust races, and the recent epidemics of Ug99 stem rust in East Africa.
- Leading countries include
- Possible reasons are favourable climate, irrigation, using of new techniques, etc.

2.1.2. Output Evaluation: *What have the learners learnt? Which aspect did they enjoy the most? What would they like to see improved?*
Are there any gender differences in the exposure to the information, practices, knowledge?

For this pre-evaluation section, please summarise the context of the participants – some are new, others have experience, both positive and negative; hygiene and health are important; what we will be covering in the following session

2.2. New wheat technologies and IP platforms

2.2.1 Learning Activity Bundle 2: Using IP platforms to improve individual farmer livelihoods

Activity Three: Describing the various wheat production techniques (30 minutes)

FACILITATION METHODS

- PPT Presentation
- Group discussion
- Shared Experience
- Charts and handouts

Activity Process and Procedures

The facilitator leads discussions with the participants in groups of 3 – 4 with the following queries:

o Can you identify the new wheat varieties?

o What is the importance of ensuring good conditions for growth of the new wheat varieties?

o Why does it make sense of the producer to consider raised-bed irrigation in their region?

o How much do you stand to benefit financially from using a new technique such as raised bed irrigation with new wheat varieties? (Facilitator to guide learners with a simplified economic analysis including the initial investments that have to be made and the benefits from final yield. Are there any incentive schemes that the local government may have in place to support the them?

Activity Four: Describing the Wheat Compact Innovation Platform (IP) (30 minutes)

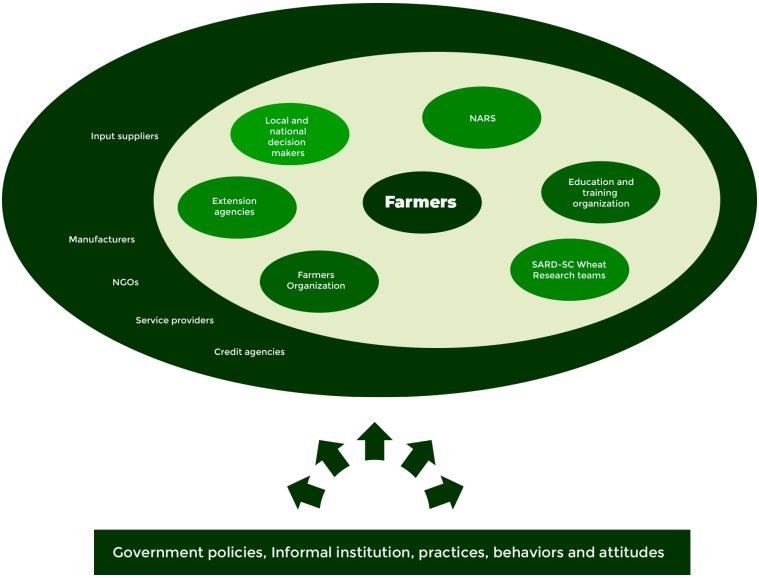
FACILITATION METHODS

- PPT Presentation
- Group discussion
- Shared Experience
- Video
- Charts and handouts

Activity Processes and Procedure (PPT 3 -4)

Facilitator will take the participants through the wheat IP platform summarizing the process of establishing the collective as an IP, joint decision making, land preparation as a block, irrigation to several blocks, engagement of the producers in the management or supervision of the blocks, group marketing by the IP/ cooperative, and happy families.
A few of the challenges to look out for should also be mentioned.
Handouts can be the adapted materials locally about the location of these blocks, varieties on offer, local financing schemes etc.

Fig. 1. Innovation Platform (IP) for the wheat compact



Facilitator information for sharing with participants:

The Wheat Compact adopted Innovation Platform (IP) approach as a guiding principle in its improved wheat technology validation, popularization and dissemination.
The IP framework at strategic (policy) and operational (ground) level provides an excellent forum to bring all wheat value chain actors together and define their roles and responsibilities. Hence multi-stakeholders like farmers, seed producers, inputs providers, extension, research, NGOs, traders, financial institutions, agro-processors, and policy makers are engaged along the wheat value chain.
The Innovation Platform facilitates rural entrepreneurship, job creation,

empowering women and youth, market linkages and transformation. So, input provision, wheat production, seed production, value addition and service provision are some of the business opportunities areas in wheat value chain where youth and women could benefit.

2.2.2. Output Evaluation: *What have the learners learnt? Which aspect did they enjoy the most? What would they like to see improved?*
Are there any gender differences in the exposure to the information, practices, knowledge?

2.3. Wheat production

2.3.1 Learning Activity Bundle: Practices that lead to higher wheat production

Activity Five: Preparing for and participating in the establishment of the raised bed (irrigation) plot (30 minutes)

FACILITATION METHODS

- PPT Presentation
- Group discussion
- Handouts
- Video
- Sharing Experience

Activity Process and Procedure:

Facilitator to get related information from sections 4.1 of Irrigated Wheat Production Brochure TAAT Ethiopia 2019 and (PPT 5 – 7).
Important elements to emphasize include land preparation (location, organizing owners for joint management of the plot or leasing it to the IP and becoming co-managers of production, collective organisation of mechanization, irrigation, etc.).
Facilitator to ensure group discussions (use fishbowl technique if possible) to ensure that the participants (i) acquire knowledge of what is required in the process (ii) attain a positive attitude on the process especially if the producer may feel they are losing control over their land (iii) have a sense of engagement with the process as they collectively discuss the issues and move towards making a collective decision to go ahead.

Activity Six: Agronomic practices in wheat production on a raised bed (irrigation) plot (60 minutes)

FACILITATION METHODS

- Presentation
- Group discussion
- Handouts
- Sharing Experience
- Record Keeping

Activity Process and Procedure:

Facilitator to get related information from sections 4.2 and 4.8 of Irrigated Wheat Production Brochure TAAT Ethiopia 2019 and (PPT 8 – 21).
Facilitator to take the participants through understanding of wheat growth stages (Zadoks and Feekes Scales) good practices in sowing wheat and should cover topics such as certified seeds, sowing depth, row spacing, mechanical sowing which can be contrasted with traditional methods of smaller implements for land preparation.
Emphasis should be placed on the importance of timing activities with development stage rather than growth, and the differences in varieties that are available, and how they fit into the local season.
NB. Facilitator query participant knowledge of seed varieties in the region and carry samples or pictures of them. Recommended seed rates for the region must also be found out.
Facilitator should carry out a practical exercise where participants calculate development based on degree day calculations, estimate the dates of germination, emergence, leaf emergence, floral initiation, anthesis, maturity so that they appreciate why records are important (see section 4.0 of Irrigated Wheat Production Brochure TAAT Ethiopia 2019).

Activity Seven: Fertilizer application and Irrigation management (20 minutes)

FACILITATION METHODS

- PPT Presentation
- Group discussion
- Handouts
- Demonstration
- Sharing Experience
- Illustrations (including photographs)
- Video

Activity Process and Procedure:

Facilitator to use sections 4.9 – 4.10 of Irrigated Wheat Production Brochure TAAT Ethiopia 2019 and (PPT 22 - 25).
Emphasis on purpose of fertilizer application, nitrogen management in wheat as well as achieving high nitrogen efficiency, phosphorus management, organic fertilizer applications and integrated nutrient supply and management. For irrigation, facilitator should take participants through a demonstration exercise that shows irrigation management (including schedules, methods, timings with wheat growth stages and the techniques as well as advantages of furrow irrigated raised bed).

2.3.2. Output Evaluation: *What have the learners learnt? Which aspect did they enjoy the most? What would they like to see improved?*
Are there any gender differences in the exposure to the information, practices, knowledge?

2.4. Crop Protection and Wheat Harvesting

2.4.1 Learning Activity Bundle: Management of diseases and techniques in the harvest of wheat

Activity Eight: Crop protection practices in wheat production (20 minutes)

FACILITATION METHODS

- PPT Presentation
- Group discussion
- Handouts
- Demonstration
- Sharing Experience
- Illustration (including photographs)

Activity Process and Procedure:

Facilitator to use sections 4.11 of Irrigated Wheat Production Brochure TAAT Ethiopia 2019 and (PPT 26 – 34).
In this section, facilitator expounds on the topics of:
Use of disease resistant wheat varieties, Green bridge management / volunteer wheat control, Seed treatments, Use of certified wheat seed, Fungicide application, Wheat disease control by crop rotation, Scouting. Insect pest management, weed management and Bird (Quelea quelea) damage.

Activity Nine: Preparations for harvesting of wheat (20 minutes)

FACILITATION METHODS

- PPT Presentation
- Group discussion
- Handouts
- Demonstration
- Sharing Experience
- Illustration (including photographs)
- Video

Activity Process and Procedure:

Facilitator to use sections 4.12 of Irrigated Wheat Production Brochure TAAT Ethiopia 2019 and (PPT 35 – 38).
Monitoring for maturity, difference in maturity requirements for different uses, harvesting options – small scale and mechanical harvesting options; contract harvesting; preparation for storage, sale, options for warehousing and warehousing dockets as payment guarantees

FACILITATION METHODS

- PPT Presentation
- Group discussion
- Handouts
- Demonstration
- Sharing Experience
- Illustration (including photographs)
- Video

Activity Process and Procedure:

Facilitator to use sections 4.12 of Irrigated Wheat Production Brochure TAAT Ethiopia 2019 and PPT 38.
Facilitator to lead a discussion on the storage methods used by participants as well as those they know of. The importance of each of them needs to be emphasized.

2.4.2. Output Evaluation: *What have the learners learnt? Which aspect did they enjoy the most? What would they like to see improved?*
Are there any gender differences in the exposure to the information, practices, knowledge?

2.5. Outcome evaluation (with feedback):

Provide evaluation questions based on learning outcomes using open-ended and/or close-ended questions.
(A set of Likert scale against statements on the improvement e.g. of the knowledge of the participant; positive change in attitude towards some practices; increased motivation to carry out a practice or confidence to implement a practice. The scale will be strongly disagree to strongly agree.)

(If you want to carry out a Quiz, then prepare the quiz as a handout and then prepare answers for learners to check their performance)

3. KEY TERMS: provide definitions and illustrations of key terms for learners to refer

FARA: Forum for Agricultural Research in Africa

GAP: Good Agronomic Practices

ICARDA: International Center for Agricultural Research in the Dry Areas
Raised Bed (Irrigation) – A technique of furrow ploughing that enables retention of rain/irrigation water for a longer period of time

4.0 BIBLIOGRAPHY (SOURCE):

acknowledge sources of materials you used to prepare the outreach material including authors.

Wuletaw Tadesse, Zewdie Bishaw, Solomon Assefa, (2018) "Wheat production and breeding in SubSaharan Africa: Challenges and opportunities in the face of climate change", International Journal of Climate Change Strategies and Management, https://doi.org/10.1108/IJCCSM-02-2018-0015 https://www.k-state.edu/smil/whatwedo/projects/pastprojects/Zangre.html

5. Annex with all support materials Formatted and structured materials on:

1. Slide Deck to be used (by each Activity bundle and each activity)
2. Irrigated Wheat Production Brochure TAAT Ethiopia 2019.
3. Photo Props
4. Outcome Evaluation form
5. Other Handouts

Acknowledgement

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MODULE 10.0 TAAT YOUTH ENABLER OUTREACH MATERIAL

MODULE 10.0 TAAT YOUTH ENABLER OUTREACH MATERIAL

Module 10.1. Business Plan Development

This set of outreach materials has been developed jointly by the Youth Enabler Compact, led by IITA Youth in Agribusiness and the Capacity Development and Technology Outreach led by FARA.
This module is one of a series on related modules:

The other modules are;
Record Keeping for Successful Business Enterprise
Marketing of business farm Products/Produce

Guide for users:

This material is designed to assist Agricultural extension and farm advisory service workers, trainers, facilitators, and lead farmers in disseminating the knowledge of business plan development to serve as road map that clarifies direction for implementing business goals and objectives.

Targeted audience

All those interested in writing business plan. However, specific target group is the youth (both male and female) from different disciplines or backgrounds engaged in an agribusiness enterprise.

Estimated time:

3 Hours + ½ hour for evaluation and feedback (3½ hours in total)

Assumption:

It is assumed that the beneficiaries of this training module have at least a post-secondary education (National Diploma, Higher National Diploma, and Degree) and are actively engaged in agribusiness.

Caveat:

Business plan is a living document which requires periodic revision because as the business grows from one phase to another, there may be a need to change business

About TAAT:

TAAT is a key priority of the African Development Bank's agricultural transformation agenda also known as the Feed Africa Strategy. TAAT is essentially a knowledge and innovation-based response to the recognized need for scaling up proven technologies across Africa aiming to boost productivity, and to make Africa self-sufficient in key commodities. FARA's CDTO leads the Capacity Development arm of TAAT as an enabler compact while IYA leads the Youth enabler compact of TAAT.

Citation:

IYA & FARA (2020) Business Plan Development: TAAT Youth Enabler outreach material, Version 1.

1.0 Introduction

1.1. Background

In agricultural business, the farmer is the most important person because he or she is an entrepreneur with the activity of farming being considered a business. He or she is responsible for the management and success of his or her business. Examples of agricultural businesses are production of crops such as rice, cassava, sorghum, and maize, rearing of livestock such as poultry and fish, as well as processing and packaging of agricultural produce and products. There is a need for farmers to have a sound knowledge of how to develop a winning business plan for them to run profitable, viable and sustainable businesses and to win capital for business implementation.
This material is designed to build capacities of farmers/Agripreneurs on how to develop a bankable business plan.

1.2. Rationale of the module

Many practicing farmers and potential farmers/Agripreneurs need business plans for many reasons but they lack the skills to develop one. Even when they give it out for consultants to develop, more often than not, they deliver low quality outputs. This training material covers both the narrative parts of the business plans that shows the goals, the objectives, of a business as well as the strategies to implement them. It also covers the basic financial plan analysis of the business.

1.3. Learning Outcomes:

By the end of this module, participants will be able to:

1. Carry out a business overview with an understanding of what a business plan is and its importance to business owners

2. Identify issues that are addressed in an agribusiness plan

3. Create a marketing plan for agricultural products

4. Outline the production and operational plan for a business venture

5. Design an organisational, management and financial plan for a business venture and carry out a business analysis

6. Identify gender roles and responsibilities in enterprise development

2.0. CONTENT

At the end of each Learning Activity Bundle, there is a need to implement an output evaluation using an electronic or print form from the annex.

2.1 Pre-evaluation of learners (with feedback)

2.1.1 Learning Activity Bundle 1: INTRODUCTION

Activity One: In this activity, the facilitator seeks to establish the participants level of knowledge and experience of the module topic. (20 minutes).
For this pre-evaluation section, please summarise the context of the participants – some are new, others have experience, both positive and negative.

FACILITATION METHODS

- PPT Presentation
- Group discussion
- Sharing Experience

Activity Process and Procedure:

o Before the training session, the facilitator will establish some facts about the audience to enable sharing of experiences and peer learning within the group.

o Start by pairing up the participants and get them to ask each other a series of questions (through pre-prepared slides with illustrative photos) such as whether they remembered writing a proposal or an academic research dissertation/thesis. What was their experience? Why was it important? Was the proposal successful? Any parallel between a business plan and a proposal?

Activity Two: aiming at those who are not beginners in the group) (20 minutes)

FACILITATION METHODS

- PPT Presentation
- Group discussion
- Sharing Experience

Activity Process and Procedure:

- Introduce the topic of the module (PPT 2-4) of the slide deck; the contents draw attention onto the definition of a business plan and the importance of a business plan to the business owners

- Facilitator leads the learners to discuss stakeholders interested in agribusiness plan (PPT 5)

- What an agribusiness plan should address (PPT 6), basic question agribusiness plan must answer (PPT 7) and component of the business plan (PPT 8-12) is then introduced.

Table 1: Learners' pre-evaluation sheet

Entre-preneur by chain node	Descrip-tion of activities under each node of the value chain	Roles and responsibilities			Roles and responsibilities		
		M	F	Y	Male	Female	Youth
What kind of Input supply is required for an agribusiness? *Possible response: Seeds, Herbicides, fertilizers, feeds, vaccines*							
What are the possible Production activity in agriculture: e.g. *Possible response: crop production, animal husbandry, small livestock such as poultry*							
What are the processed products from cassava *Possible response: garri, flour, starch*							
Why is Marketing important *Possible response: sales, prevent loss and wastages especially of perishable product*							

2.2. Business Overview

2.2.1 Learning Activity Bundle 2

Activity Three: PPT Slide 13 – 17. Business Overview-mission, vision and objectives (30 minutes).

FACILITATION METHODS

- PPT Presentation
- Group discussion
- Sharing Experience

Activity Process and Procedure:

Participants should deliberate on these questions.

- What is the difference between mission statement and vision statement?
- How useful is a business plan to the business owner?

Activity Four: (PPT Slides 18-21). Marketing plan (20 minutes)

FACILITATION METHODS

- PPT Presentation
- Group discussion
- Sharing Experience

Activity Process and Procedure:

Facilitator to get the learners to share knowledge about different marketing strategies they have used in the past.

The following questions can stimulate discussion.

- How many of you have ever marketed /sold any goods
- How do you sell your farm produce/products?
- Who were you target audience?
- How did you reach them?
- Did you make a good sale?
- What lessons did you learn?

2.2.2. Output Evaluation: *What have the learners learnt? Which aspect did they enjoy the most? What would they like to see improved?*
Are there any gender differences in the exposure to the information, practices, knowledge?

2.3. Production/Operational plan

2.3.1 Learning Activity Bundle 3

Activity Five: Production/Operational plan (PPT slides 22-29) (20 minutes)

FACILITATION METHODS

- PPT Presentation
- Group discussion
- Sharing Experience

Activity Process and Procedure:

Facilitator carries out an interactive learning on production plan with learners sharing experiences on their operational procedure.

The learners should discuss their understanding of production plan by randomly answering the following questions

1. What are the items, tools and equipment required for your farm business operation?
2. At what stage of operation do you need this items/equipment?
3. What time of the year do you plant a particular crop and why?
4. At what time of the year is there glut in the market?
5. What is the adaptation strategy for glut or scarcity?

Sharing Experience

Using the slide 26 provided in the slide deck, facilitate the discussions around the topics below

- Do you have a record keeping process?
- How have you been keeping a production plan?
- What was your experience?

2.3.2. Output Evaluation: *What have the learners learnt? Which aspect did they enjoy the most? What would they like to see improved?*
Are there any gender differences in the exposure to the information, practices, knowledge?

2.4. Organizational, management and financial plan

2.4.1 Learning Activity Bundle 4

Activity Six: Organizational, management and financial plan (PPT Slides 30-35) (50 minutes)

FACILITATION METHODS

- PPT Presentation
- Group discussion
- Sharing Experience

Activity Process and Procedure:

o The facilitator should emphasize the importance of good and effective staff/ personnel for a successful agribusiness
o Ask learners to share experiences on personnel recruitment, management and result

Using slides 33 to 35 in the slide deck, facilitate the following queries:

DISCUSSION QUERIES

1. What type of record should be kept in farm business?
Possible answers: financial record, production record, processing record, weather record

2. How frequent should the record book be updated?
CHOICES: (a) at the end of the production/processing cycle, (b) daily and (c) at the end of the year.
N.B: Use this opportunity to emphasize that farm records must be updated daily to avoid missing information.

3. What are the evidence of good record keeping
   - o Write down all enterprise transactions in an orderly manner
   - o There must be something to show that you received or paid out money
   - o Proof of every transactions including small amounts of cost transport ,

envelopes, pens etc.

4. How do you determine the profitability of an agribusiness enterprise?

5. Using Tables 1 and 2 the facilitator will take the participants through the calculations of gross margin for cassava enterprise

Example of how to calculate gross margin of an enterprise is provided in Table 1 while Table 2 is to be provided for trainees to develop gross margin for an enterprise of their choice.

Table 1: Example of Gross Margin Calculation for Cassava Enterprise.

	Unit	Cassava local variety without Fertilizer (1 ha)			Cassava improved variety with Fertilizer (1 ha)		
		Quantity	Price (Naira)	Total (Naira)	Quantity	Price (Naira)	Total (Naira)
1. Variable Costs (Money Out)							
Inputs							
Insecticides	Litres	0	600	0	3	600	1,800
Fertilizer	Bags 50kg	0	2,500	0	6	2,500	15,000
Cuttings	Bundles	60	150	9,000	60	160	9,600
Cost of Inputs				**9,000**			**26,400**
Labour							
Land clearing	Man-day	8	1,000	8,000	8	1,000	8,000
Ploughing /ridging	Man-day	10	1,000	10,000	10	1,000	10,000
Planting	Man-day	5	1,000	5,000	5	1,000	5,000
Supplying / replanting	Man-day	2	1,000	2,000	10	1,000	10,000
Fertilizing	Man-day	0	1,000		6	1,000	6,000
Weeding 1	Man-day	4	1,000	4,000	4	1,000	4,000
Weeding 2	Man-day	2	1,000	2,000	2	1,000	2,000
Harvesting cassava	Man-day	7	1,000	7,000	21	1,000	21,000
Labour needs + costs	MD	38		**38,000**	66		**66,000**
Variable Costs (Naira)				**47,000**			**92,400**
2. Gross revenue (Money In)							
Yield x Price of Sale	Kg	6,000	7.5	**45,000**	25,000	7.5	**187,500**
Cuttings	Bundles	150	150	**22,500**	150	160	**24,000**
Total money in	Naira			**67,500**			**211,500**
3. Gross margin (Money In **MINUS** Money Out)				**20,500**			**119,100**
Unit Cost (NAIRA/kg) Variable Costs / Yield				**11.3**			**3.7**
Labour productivity (NAIRA per MD) Gross revenue – fnput Cost L iabour needs				**1,539**			**2,805**
Capital Productivity Gross margin / Variable Costs				**0.44**			**1.31**

Source: GTZ Farmer Business School Training Note

Exercise for Trainees to calculate gross margin for an enterprise using the Table 2

		Crop : Surface Area Size (ha) :		
	Unit	Quantity	Price (Naira)	Total (Naira)
1. Variable Costs (Money Out)				
Inputs				
Cost of Inputs				
Labour				
	Man-day			
	Man-day			
	Man-day			
	Man-day			
	Man-day			
	Man-day			
	Man-day			
	Man-day			
	Man-day			
	Man-day			
Labour needs + costs	MD			
Variable Costs (Naira)				
2. Gross revenue (Money In)				
Yield x Price of Sale	Kg			
Total money in	Naira			
3. Gross margin (Money In **MINUS** Money Out)				
Unit Cost (NAIRA/kg) Variable Costs / Yield				
Labour productivity (NAIRA per MD) Gross revenue – fnput Cost L iabour needs				
Capital Productivity Gross margin / Variable Costs				

2.3.2. Output Evaluation: *What have the learners learnt? Which aspect did they enjoy the most? What would they like to see improved?*
Are there any gender differences in the exposure to the information, practices, knowledge?

2.5. Business analysis

2.5.1 Learning Activity Bundle 5

Activity Seven: Business risk and SWOT analysis. (PPT Slide 36- 37) (20 minutes)

FACILITATION METHODS

- PPT Presentation
- Group discussion
- Sharing Experience

Activity Process and Procedure:

- The facilitator should use slides 36, to provide a case scenario in which a farmer bought 100 chickens and lost 60 overnight
- Encourage participants to discuss what might have happened.
- Using slide 37, discuss the agribusiness environment in terms of SWOT

2.5.2. Output Evaluation: *What have the learners learnt? Which aspect did they enjoy the most? What would they like to see improved?*
Are there any gender differences in the exposure to the information, practices, knowledge?

2.6 Outcome evaluation (with feedback):

Facilitator to provide evaluation questions based on learning outcomes using open-ended and/or close-ended questions.

Outcome evaluation	Possible feedback
Why must you have a business plan?	It helps in understanding the profitability of a business
What are the components of a business plan?	Business overview, marketing plan, production plan, organization, management and financial plan
What is a business plan?	A business plan is a document setting out goals and objectives of an enterprise including methods of achieving them
What are your business objectives?	this should include turn over, staff strength, customer base
Describe your products and the marketing strategies	this include promotional strategies such as sample sales and distribution strategies such as wholesale, retail sales
Describe your production process.	for crop production; land preparation, planting, weed management, harvesting e.t.c
what form of business ownership are you adopting?	sole proprietorship/ partnership/ limited liability company
What is the total start-up capital estimation for your business?	this is peculiar to varying business
What are the risks involved in your business and how will you mitigate them?	climate change, flood, theft, fire,e.t.c

3. KEY TERMS: provide definitions and illustrations of key terms for learners to refer

A Business Plan: Is a document in which an identified business idea is described and analyzed, examining its technical, economic and financial feasibility

Variable costs: Variable costs = Cost of inputs + cost of labour.
These are the money spent on inputs and labour. They are called variable costs because they vary with the size of the field or level of production and can be associated with particular plots of land cultivated. The variable costs only last for one production cycle. Variable costs for crop enterprise include seeds, fertilizer, sprays, hired labour and sundry crop expenses. To finance the next season an entrepreneur must save enough money the variable costs.

Gross income or revenue: Gross revenue = Yield x Sale price
This the value of production expressed in monetary terms. It is the income from the sale of products/produce from the enterprise. It includes estimated value of products that have been consumed, given away as gifts and value of the product still in the farm.

Gross Margin: Gross margin = Gross income - Variable costs
The gross margin is the benefit of using the land expressed in monetary terms. It indicates whether there was profit or loss. The comparison between the gross margins of different enterprises helps in choosing which enterprise that generates more income and in making a decision which enterprise to continue or drop.

Fixed costs These are costs that have to be paid whether production takes place or not. They can also be services that fixed inputs/costs that last for more than one production cycle. Fixed costs include hired labour, machinery depreciation, land, buildings and interest on capital.

4.0 BIBLIOGRAPHY (SOURCE):

GTZ. Farmer Business School Training Note. USAID

5.0 Annex with all support materials Formatted and structured materials on:

6. Slide Deck to be used (by each Activity bundle and each activity)
7. Manual of business plan development.
8. Training Evaluation form for valuation of training.

Training elements	Rating scale			
	1 Dissatis-fied	2 Somehow satisfied	3 Satisfied	4 Highly satisfied
Training objectives				
The training objectives were relevant, realistic and clearly defined.				
Training content				
The training content was relevant, adequate, well organized and easy to follow.				
The training event was flexible to accommodate the learning needs/expectations of participants.				
Training process and methods				
The training process and methods helped me better understand the training content.				
Training facilitators provided helpful comments, feedback and examples.				
Training materials				
Training materials were relevant, well-organized, adequate and easy to read.				
Training time and duration				
Adequate time was allotted for practical sessions and discussion.				

The balance between presentations and practical sessions was good.				
Learning and intention to apply learning				
I have gained adequate knowledge and skills from the training program.				
I can apply the knowledge and skills gained in my work context.				
Overall Assessment				
Overall, how satisfied are you with the training workshop?				

Acknowledgement

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