Republic of Rwanda
Ministry of Agriculture and Animal Resources

TWIGIRE MUHINZI

FARMER FIELD SCHOOLS
IN RWANDA

TRAINING OF
MASTER TRAINERS & FACILITATORS

RWANDA AGRICULTURE BOARD

BTC RWANDA

July 2017

Ministry of Agriculture and Animal Resources (MINAGRI)
Rwanda Agriculture Board - RAB
The Belgian Development Agency - BTC

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Citation: Somers R, Higiro J, Salama SG, Busogoro JP, Ndabamenye T (2017) Farmer Field Schools in Rwanda, Training of Master Trainers and Facilitators

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Preface

This publication describes the capacity building of Farmer Field School (FFS) Master Trainers and Facilitators in Rwanda as implemented by the Rwanda Agriculture Board (RAB), the implementation agency of the Ministry of Agriculture and Animal Resources (MINAGRI) under a support program financed by the Belgian Cooperation between 2008 and 2016. The document is based on various reports by FFS Pathway East Africa Company LTD.

Training FFS Master Trainers and Facilitators should only be done by qualified FFS Master Trainers. This publication can be used by such qualified Master Trainers to remind them about all the different activities that should be undertaken. They will certainly remember the various exercises from their own training and will be able to implement them while organizing training for others.

Even though this publication contains a lot of details it should not be considered as a manual to be used by individuals or organizations who have not graduated from a training course for FFS Master Trainers.

We sincerely hope that this publication will inspire individuals and organizations to choose for the FFS approach to build the capacity of farmers. Over the years, the FFS approach has proven over and over again to be effective to increase productivity and foster solidarity among farmers. The specific way of implementing FFS in Rwanda made the approach more cost effective and therefore scalable to reach millions.

FFS Master Trainers and Facilitators can be found all over the world. We have added the contact details of the Rwandan Master Trainers and the Cooperatives of FFS Facilitators. They can be hired to train facilitators and farmers respectively. For contact details of FFS Master Trainers outside Rwanda as well as for other FFS publications, we refer to the Global FFS Network established by the Food and Agriculture Organization of the United Nations (FAO): http://www.fao.org/farmer-field-schools/en.

The authors wish to thank everyone who contributed to the success of FFS in Rwanda as well as everyone who builds on this success in order to serve more Rwandan farmers.

Acronyms & Abbreviations

AESA	Agro Eco System Analysis
BTC	Belgian Development Agency
BXW	Banana Xanthomonas Wilt
CIP	Crop Intensification Programme
CMC	Community Mobilization Campaigns
CMT	Cultural Management Trial
CPT	Crop Protection Trial
CSA	Climate Smart Agriculture
FAO	Food and Agriculture organization of the United Nations
FCP	Farmer Crop Protection
FFS	Farmer Field School
FYM	Farm Yard Manure
GAP	Good Agricultural Practice
GBV	Gender Based Violence
IMT	International Master Trainer
IPM	Integrated Pest Management
IPPM	Integrated Production and Pest Management
M&E	Monitoring and Evaluation
MINAGRI	Ministry of Agriculture and Animal Resources
MT	Master Trainer
MTT	Master Trainers Training
NA	Not available
NE	Natural Enemy
NFE	Non Formal Eductaion
NGO	Non Government Organisation
PA	Pest Alone
PRA	Participatory Rapid Appraisal
PTD	Participatory Technology Development
RAB	Rwanda Agriculture Board

RBC	Rwanda Biomedical Centre
RC	Result/Conclusion
RWAMREC	Rwanda Men's Resource Centre
SPAT	Strategic Plan for the Transformation of Agriculture
T/Ha	Ton/Hectare
TOT	Training of Trainers
WAP	Weeks after planting
WBP	Weeks before planting

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CHAPTER 1

FARMER FIELD SCHOOLS IN RWANDA

Farmer Field Schools - The Rwanda way

The Farmer Field School approach is a group based learning approach that teaches farmers how to experiment and solve problems independently.

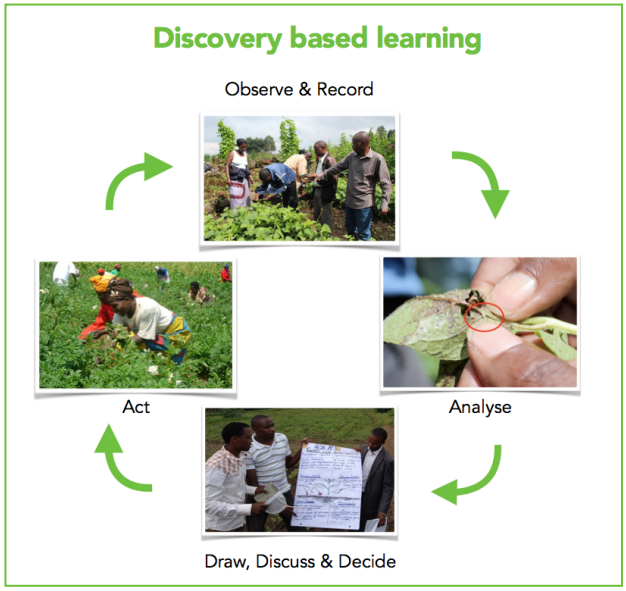
Farmer Field Schools build up the capacity of farmers by offering an experimental learning experience in the Farmer Field School (FFS) plot. *Farmers are organized in FFS groups which are facilitated by FFS Facilitators. In the FFS, the plant is the teacher and the FFS plot is the school. The FFS approach builds the skills and capacity of farmers to identify and analyze problems, to conduct experiments aiming at developing local solutions appropriate to local specific challenges. Based on the principle "Learning by doing" farmers truly develop their decision making skills which helps them to handle current and future challenges effectively and thus farmers become progressively managers of their own economic activities. Each FFS group needs a competent facilitator (with strong technical and facilitation skills) to lead FFS group members through the hands-on learning process. Each FFS group has its own experimental learning plot in which the groups gets together on a weekly basis.*

The ***FFS approach is not new****. In fact, it has been around since 1980. It was introduced by FAO in Asia and has been implemented in about 100 countries. In most FFS programs, the FFS facilitators are either Government staff or NGO staff. In Rwanda, we* ***deliberately choose to train farmers as facilitators****. This seriously reduces the cost of the implementation since farmers do not require mission allowances and a car to travel to a group. However, the facilitators are paid for the work they do. They receive a facilitation allowance which covers also the costs for transport and communication. Another advantage of having farmers as facilitators is that they love to be in the field. They are not thinking about a next job somewhere in an office.*

*The facilitators play a key role in success of FFS. I****t is very important that good facilitators are selected and that they are well trained!*** *The training of FFS Facilitators should only be done by qualified FFS Master Trainers.*

The golden rule in FFS is that ***we do not want to tell the farmers what to do****. Instead, we want to give them the opportunity to discover by themselves what works best. So indeed,* ***the plant is the teacher****! Instead of saying: this is the best variety for you, we let them grow the new variety right next the variety they already know.*

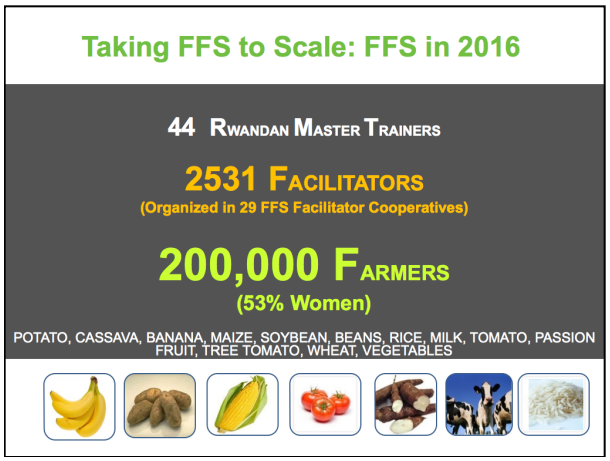
The experience that farmers get in FFS is a ***real discovery based learning.*** *In fact, it is a circle of learning: Observe, record, analyze, discuss, take action and next week observe again to see the result of your action. The objective of this approach is to build the decision making skills of farmers. They learn how to take smart decisions based on observation and analysis.*

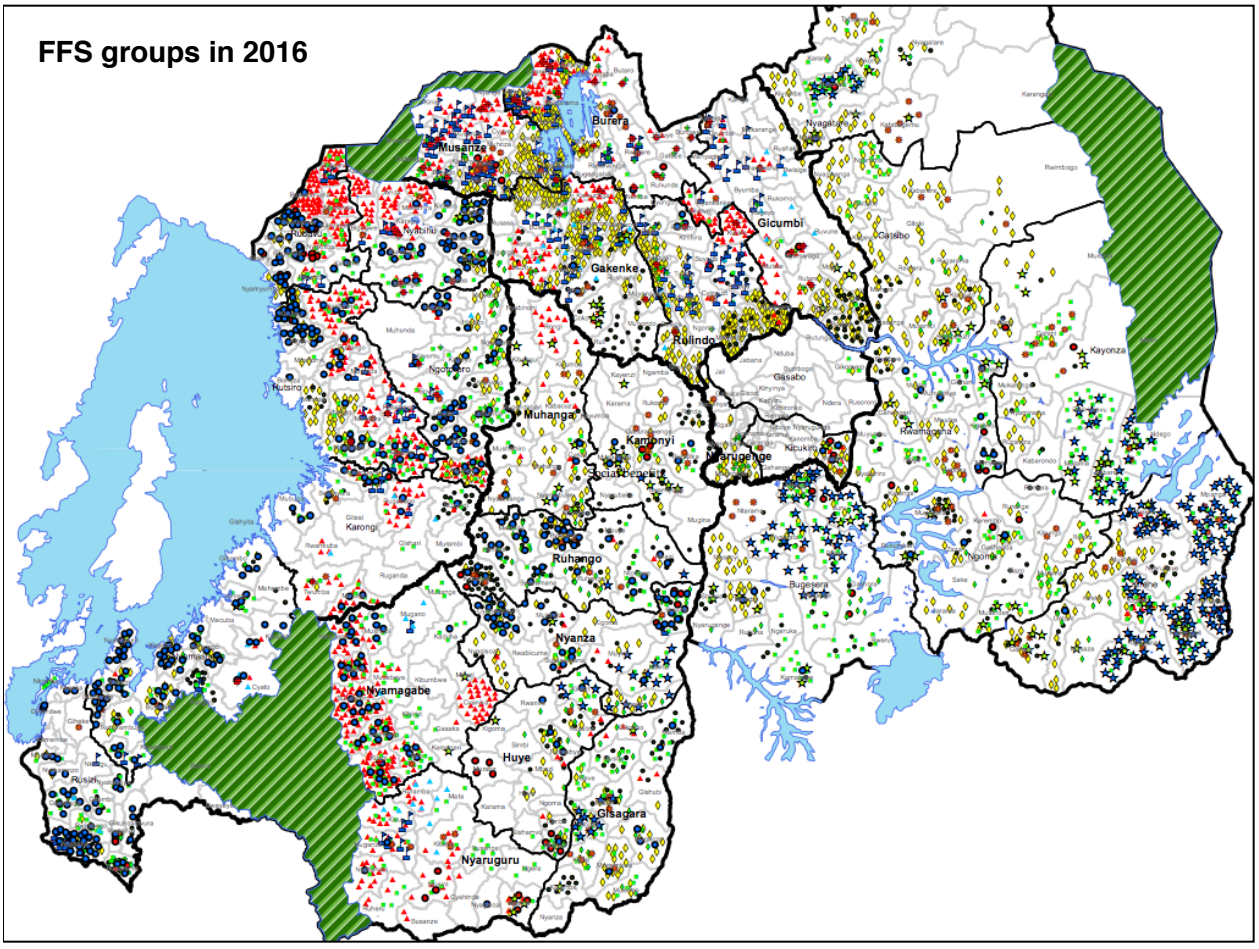


Key results of FFS in Rwanda

Outreach

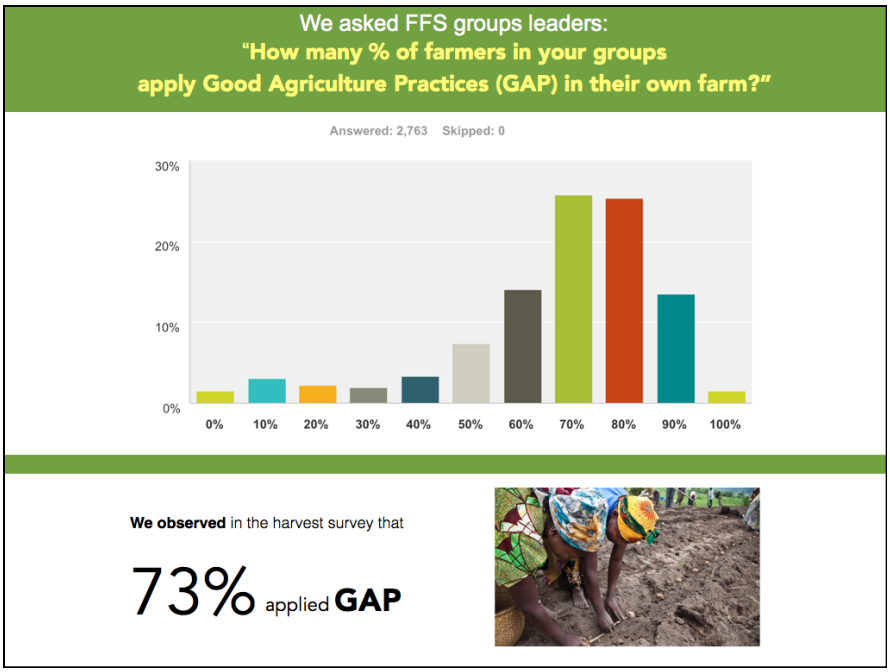
A total of 44 Rwanda Master Trainers and more than 2500 FFS Facilitators have graduated. By 2016, they worked with more than 8.500 FFS groups have been created, involving over ***200.000 farmers****, of which more than half women. In 2017A, the Rwandan government has invested in the creation of an additional 2500 groups involving an* ***estimated additional 60,000 farmers. The map shows that the FFS groups*** *are created in 30 districts of Rwanda. Since 2015, FFS in integrated in Twigire Muhinzi, the National extension model. Within the model, the FFS Facilitators fulfill a double role: (1) Direct capacity building of farmers through the facilitation of FFS groups and (2) Indirect capacity building of farmers through the training of Farmer Promoters.*

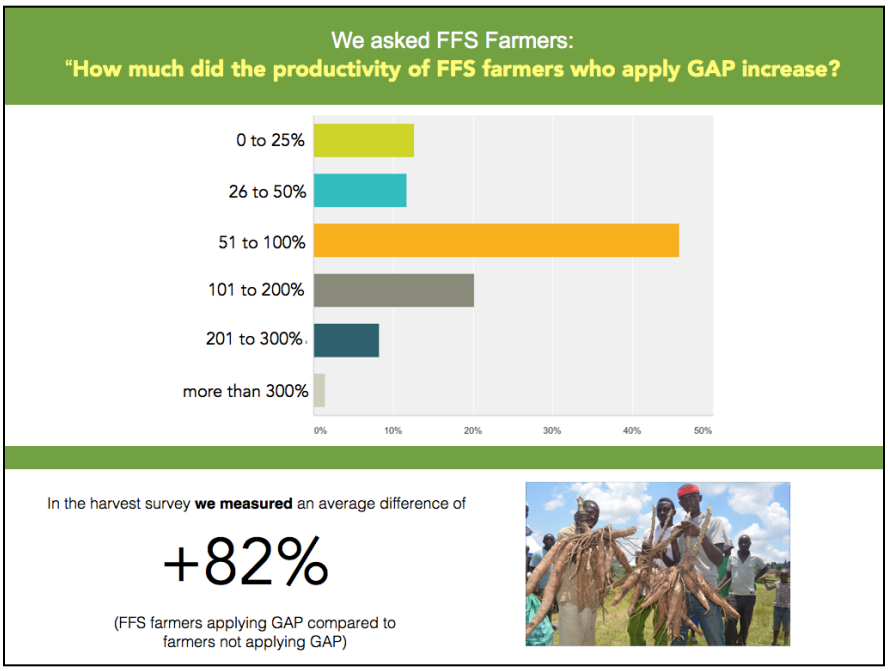




Economic Benefits

*A **large scale assessment in almost 3000 villages with FFS groups conducted** in 2015 **showed that** FFS groups leaders estimated that about **70 to 80%** of the **FFS farmers applies good agricultural practices (GAP)** in their own farm. When enumerators visited 1440 farmers for the harvest survey in the same season, they observed that **73% was applying GAP.** The 3000 participants in the survey estimated that the **productivity of FFS farmers applying GAP increased between 50 and 100%.** The results of the harvest survey revealed that FFS farmers who do apply GAP (73% of all FFS farmers) produce 82% more than all farmers, trained and non trained, who do not apply GAP. The productivity of all FFS farmers compared to all non trained farmers was 45% higher.*

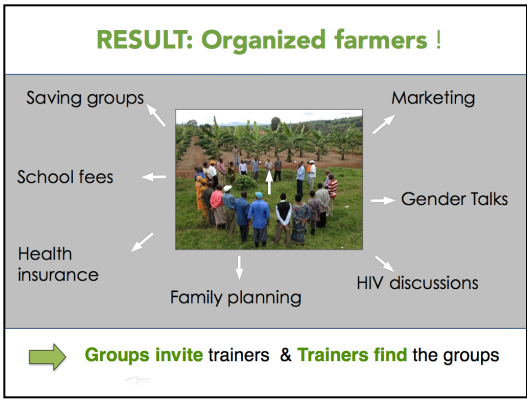




Social benefits

The FFS methodology was introduced by the IMP project as a solution to promote Integrated Pest Management practices. It quickly became clear that FFS does not only bring good agricultural practices which results in increased production but it also brings important social benefits. A very important often overlooked result is the fact that farmers are organized in strong groups. This brings many direct and indirect benefits. It should be noted that strong groups are the results of many efforts:

- *First of all, when FFS farmers join a FFS groups they do so on a **voluntary basis**. They all **commit** to be an active member of the group. All members have a **common interest.***
- *A FFS group has internal rules. Each group has a **constitution and by-laws.** For example, if one member does not participate in group activities, he/she can be expelled from the group.*
- *Each group has an **elected committee** with clear functions.*
- *To set up strong groups, you need a **strong facilitator.** The training curriculum for facilitators includes many activities that build the up skills of facilitators to build strong groups.*
- *The facilitators ensure that **all group members are actively involved** in the learning activities as well as in other group activities. The larger group is often divided in smaller mini groups to ensure that everyone is involved.*
- *The FFS sessions include **group dynamic exercises** which ensure that farmers keep on having fun and which strengthens the bound between the members.*
- *The groups **meet very regularly,** usually one time each week.*
- *A typical FFS session includes a **special topic.** This can be anything from an in depth discussion about a specific disease to family planning, health insurance, gender topics, nutrition, marketing, another crop.*



Strong groups cannot be taken for granted. It is only after serious investment in training the facilitators that strong groups can be created!

Farmer Facilitators became professional service providers

*After the intensive training program which included coaching while working with a first FFS group, all FFS facilitators officially graduated. They received a certificated from the Minister of Agriculture and Animal resources as well as a badge which they should wear when they work as facilitator. After graduating, the **FFS Facilitators of each districts have created FFS Facilitator's cooperatives who work as professional service providers.** All FFS Facilitator cooperatives signed a performance contract with RAB and the District (3 party contract). They are also available to work for development projects, NGO's, Farmer organizations and private companies.*

Training of Master Trainers and Facilitators

The Rwandan Government, supported by the Belgian Cooperation, has made a great effort to train a good number of Rwandan FFS Master Trainers and Facilitators. The various trainings build different kind of skills including ***technical skills, facilitation skills and group building skills.***

Training of 44 Rwandan Master Trainers

The Rwandan Master Trainers are selected among the staff of the Rwanda Agriculture Board (RAB). They followed a training course that lasted ***two seasons****. The training was provided by qualified* ***international Master Trainers****. In the first season, they received a 10 day intensive training at the start of the season followed by a two days of training per week for a 16 week long period. In the same time, they were assisting with the training of Facilitators, which was also provided by the international Master Trainers. In the second season, the Master Trainers organized their first training of FFS Facilitators, while being coached by the international Master trainers. At the end of the learning process, they officially graduated as FFS Master Trainer.*

Training of 2531 FFS Facilitators

The FFS Facilitators are selected among the farmers by the farming community. They followed a training course that lasts a complete season. ***The training was provided by qualified FFS Master Trainers.*** *During the whole season, they receive* ***3 days training per week****. In the same season, they start working with their own FFS group. So after receiving training on a specific topic, they immediately have an opportunity to put it into practice. Also, when they encounter difficulties during implementation, they have immediately the opportunity to discuss it will fellow facilitators and master trainers. At the end of the learning process, they officially graduated as FFS Facilitator.*

CHAPTER 2

PRINCIPLES AND METHODS

USED DURING THE TRAINING OF MASTER TRAINERS & FACILITATORS

The FFS approach Farmer is a particular capacity building approach that aims at improving the decision making skills. The approach follows a number a key learning principles and approaches. This chapter gives a quick overview of the key principles and methods used.

Key Principles that guide the FFS learning process

- ***The field is the primary learning resource***. *Learning activities take place in the field and are based on what is happening in the field.*
- ***Experience forms the basis for learning***. *The activities that take place in the field and their farms form the basis for discussions and analyses by farmers who arrive at concepts which they test and improve through further field activities.*
- ***Decision-making guides the learning process***. *Training focuses on analysis of agro ecosystem. The combination of analytical methods, ecological principles, and basic crop management practices helps farmers gain insights into the ecological interactions in a crop and provide them with greater confidence in making crop management decisions.*
- ***The training curriculum is based on local conditions of the FFS***. *The FFS curriculum and materials are based on the local conditions, problems and needs of farmers in the FFS.*
- ***Training last the entire cropping season***. *Farmers acquire a firm understanding of relevant management concepts for each growth stage of the crop as well as the factors that influence crop management decision-making at all stages of plant's growth.*
- ***Learning by doing*** *All trainees practice extensively their functions. Master Trainers train a first group of facilitators before graduation. Facilitators train a first group of farmers before graduation. During the training of Master Trainers and Facilitators, trainees practice their facilitation skills. Through stimulating positive criticism among trainees, they truly learn from each other.*

Key Methods used during the FFS learning process

The methods used in FFS are based on Adult learning and non-formal education:

- ***Discovery-based learning techniques*** *allow adults, like farmers, to learn through self-discovery. These discovery-based learning techniques include field observations, critical analysis of their observations, and taking appropriate actions based on their analysis. In the FFS, several discovery-based tools, such as the agro-ecosystem analysis (AESA), 'ballot box' pre- and post-tests, moving exams, and insect and disease zoo exercises, are used to facilitate the adult learning process.*

- ***Experiential learning methods*** *allow adults, like farmers, to learn through the continuous sharing of their experiences. In an FFS setting, the trainers act more as facilitators rather than technical experts. The learning process considers the fact that farmers, as adult learners, have acquired considerable knowledge, which when shared to their co-farmers will allow every individual farmer to acquire new knowledge.*

- ***Participatory approaches*** *allow farmers to develop their camaraderie, teamwork, cooperation, and unity as a group. It is through their group actions that the acquisition of new knowledge is facilitated. These group activities include agro-ecosystem analysis (AESA), planting, weeding, and other cultural management operations, as well as field day, folk media, and graduation ceremonies preparations.*

- ***Brainstorming in small and big groups****. Dividing the participants into smaller groups every time they tackle specific issues or concerns ensures their active involvement in the training. The outputs in small group sessions should always be validated in big group sessions through participatory discussions. Sufficient time must be utilized for participatory discussions and sharing of experiences among the participants, both in small and big group sessions, to ensure that all relevant ideas or experiences are gathered and validated.*

- ***Question and answer****. Participants should always be ready to pose 'what if' scenarios during participatory discussions. On the other hand, the participants must be encouraged to ask questions and give answers, both in small and big group sessions, to allow clearer resolution of all issues and problems to be raised during sessions.*

CHAPTER 3

BRIEF OVERVIEW OF THE **TRAINING SCHEDULES**

Training Schedule for Master Trainer's Course

Training session	Routine activities	Special topics
10 Day Initiation	Group dynamic exercises	Norm Setting & leveling expectations
		Creating host teams
		Development of Activity schedules
		Participatory techniques for Gap analysis, Needs Assessment, Problem & Solution identification
		Developing good facilitation skills
		Concept of non formal eduction
		Role play
		Basic concepts and fundamental elements of FFS
		Land preparation, sowing, spacing, intercropping, soil management, IPM
		Setting up FFS experiments
		Curriculum development & Crop calendar
		Ballot box pre-test & Moving exam
		Agro- Eco System (AES) and AES Analysis
		Insect collection and classification
		Pest and Diseases
		Record keeping
		Village immersion
		Setting up a Facilitator Training course
1st two-day session	Group dynamic exercises	Use of bio-fertilizers
	AESA	Seedling pests
	Plant morphology	Village follow up
	Quiz	Insect zoo for Parasitoids and Predators
2nd two-day session	Group dynamic exercises	Insect zoo evaluation
	AESA	Disease and insect pathogen cultures
	Plant morphology	Biological control of pests (IPM)
	Quiz	

3rd two-day session	Group dynamic exercises	Evaluation of disease and insect cultures
		Setting up disease cultures (Viral and fungus)
	AESA	Role play
	Plant morphology	Seedling pests and disease
	Quiz	Fertilizer Management
4th two-day session	Group dynamic exercises	Evaluation of Insect zoos & Disease cultures
		Setting up insect zoo (Stalk Borer, Plant hoppers and Their NEs) & discussion about their management
	AESA	Group dynamics (conflict management)
	Plant morphology	Cultural growth practices for maize and beans
	Quiz	
5th two-day session	Group dynamic exercises	Role play (being a natural enemy)
	AESA	Insect zoo + discussions about Spiders & Predators
	Plant morphology	Folk Media
	Quiz	Weeding management
6th two-day session	Group dynamic exercises	Evaluation of insect zoos
	AESA	Set up insect zoo for Predators and Parasitoids
	Plant morphology	Maize based cropping systems
	Quiz	Weeding management
7th two-day session	Group dynamic exercises	Insect zoo + discussion: Syrphid Fly Maggot Predation on Aphids
	AESA	Aphids Management
	Plant morphology	Field day preparation
	Quiz	Leadership
8th two-day session	Group dynamic exercises	Insect zoo: evaluation + new: parasitized and insect pathogen
	AESA	FFS ground working activities
	Plant morphology	Role play (folk media)
	Quiz	Erosion and soil conservation

9th two-day session	Group dynamic exercises	Insect zoo evaluation
	AESA	Creative problem solving
	Plant morphology	Role play (selecting a mate & public speaking)
	Quiz	Farmer breeding and seed production
10th two-day session	Group dynamic exercises	Sharing experience of ground working activities
	AESA	Problem Analysis and Solving assessment
	Plant morphology	Concept of decision making
	Quiz	Overcoming group weaknesses
		Preparing the field day & graduation
		Proper harvest time discussion
11th two-day session	Group dynamic exercises	Preparation of field day and graduation
12th two-day session	Group dynamic exercises	Field day
		Graduation
13th two-day session	Group dynamic exercises	Collecting harvest data
		Analysis & presentation of trial results (Productivity & Return on Investment)
		Field visit: Marketing and product utilization of maize
		Post Test
		Course evaluation
14th two-day session	Group dynamic exercises	Action planning

Training Schedule for Facilitator's course

Training session	Routine activities	Special topics
1st three-day session	Group dynamic exercises	Norm Setting & leveling expectations Creating host teams Development of Activity schedules Gap analysis & Needs Assessment Problem & possible solution identification Develop a crop calendar Fundamental elements of FFS
2nd three-day session	Group dynamic exercises	Developing good facilitation skills FFS group formation **Saving** Basic concepts of FFS Integrated Pest Management (IPM)
3rd three-day session	Group dynamic exercises	Why group dynamics is important? Setting up experiments Land preparation
4th three-day session	Group dynamic exercises	Field design & layout Sowing, spacing, intercropping, soil managemet
5th three-day session	Group dynamic exercises AESA	Germination assessment Agro- Eco System (AES) and AES Analysis Objectives of FFS
6th three-day session	Group dynamic exercises AESA	**Record keeping** Adult learning and non formal education
7th three-day session	Group dynamic exercises AESA	Weeds and Weeding Management **Gender part 1**

8th three-day session	Group dynamic exercises AESA	Morphology of Soya bean plants **Gender part 2**
9th three-day session	Group dynamic exercises AESA	Pest & Diseases Insect collection and classification
10th three-day session	Group dynamic exercises AESA	Setting up a ballot box test
11th three-day session	Group dynamic exercises AESA	**Post harvest**
12th three-day session	Group dynamic exercises AESA	Participatory monitoring & evaluation Exchange visit
13th three-day session	Group dynamic exercises AESA	Seed multiplication Farmer Field Day **FFS group Income generation**
14th three-day session	Group dynamic exercises AESA	Planning the next season **FFS group sustainability**
15th three-day session	Group dynamic exercises AESA	Evaluation harvest result
16th three-day session	Group dynamic exercises	FFS Network Graduation

CHAPTER 4

DESCRIPTION OF VARIOUS **FFS ACTIVITIES**

OVERVIEW OF FFS ACTIVITIES

1. *Participatory Norm Setting and Leveling of Expectations*
2. *Formation of Host Teams and Host Team Functions*
3. *Development of Season-long Activity Guide and Weekly Activity Schedule*
4. *Knowledge gap analysis and Training Needs Assessment*
5. *Crop Problem Identification and Possible Solution*
6. *Crop calendar & Curriculum Development*
7. *Selection of Facilitators*
8. *FFS Establishment and Implementation Standard Procedures and Activities*
9. *Learning about the historical background of FFS*
10. *Fundamental Elements of FFS*
11. *Building Facilitation Skills*
12. *FFS Group Formation & Group Leadership*
13. *Repetition of the basic aspects of FFS*
14. *Group dynamics: Principles and Examples*
15. *Role-play*
16. *Adult Learning Principles & Non Formal Education*
17. *Integrated Pest Management (IPM)*
18. *Setting up Experiments in FFS*
19. *Field Design and Layout*
20. *Introducing Agro Eco System*
21. *AESA*
22. *Weed classification and Weeding Management*
23. *Plant Morphology*
24. *Pest and Diseases, Insect classification*
25. *Insect and Disease Zoo*
26. *Ballot box test*
27. *Participatory M&E*
28. *Development of Facilitator recording book*
29. *Seed Multiplication*
30. *Field Day & Graduation*
31. *Evaluation of FFS activities at Harvest*
32. *Savings, Income Generation and FFS Group Sustainability*
33. *The Men Engage Gender Approach*
34. *HIV awareness raising*
35. *Evaluating the 3 party contract*

ACTIVITY 1

PARTICIPATORY NORM SETTING AND LEVELING OF EXPECTATIONS

About the session

Objectives

- To let participants define their own set of rules
- To identify what participants expect from the training

How was it facilitated?

- Question and Answers
- Discussion in small and large group

The use of the participatory training approach starts with the participatory norm setting and leveling of expectations by the participants for the season-long training course. The participatory norm setting allows the participants to define their own set of rules to be followed for the duration of the training course. The leveling of expectations, on the other hand, rationalizes the choice of classroom and field-based activities to be expected or undertaken in order to achieve the learning objectives of the training course from trainees own point of view. Furthermore, leveling of expectations put together what the trainees expect to achieve during and by the end of the training course.

Example of Participatory Norm Setting by participants

a) Things that will make participants happy

- ✓ Participants to be given chance to contribute their ideas
- ✓ To respect each other
- ✓ Facilitator to talk loud enough so everyone can listen well
- ✓ Telephones to be set in the vibration mode
- ✓ To respect time
- ✓ To have frequent group dynamics, body exercises and brain teasers
- ✓ The facilitator to be able to explain again if something is not clear
- ✓ To speak when given chance

- ✓ To keep the environment clean
- ✓ To have a daily evaluation
- ✓ To watch the television

b) Things which may annoy participants

- ✓ Not speaking loud enough
- ✓ Frequently going outside
- ✓ Not following what is being taught
- ✓ Sleeping during class time
- ✓ Lack of assistance if someone feels sick
- ✓ Not able to follow the norms
- ✓ Under table discussions
- ✓ Not respecting others ideas
- ✓ Theft
- ✓ Prostitution

c) Agreed punishment

- ✓ Standing in front of the class and sing vernacular song while clapping hands
- ✓ Sent back home in case of big offense or persistence in breaking norms
- ✓ Before someone is sent back home the Host Team must call him for warning and further observations
- ✓ To inform the leadership from where he/she came from about sending him back

Example of Leveling of Expectations

What participants expect to gain in the training course for Facilitators in Soybean in Nyamata, Bugesera District:

- To get knowledge on soybeans cultivation
- To learn and be able to teach others
- To know more about RAB
- To visit other farmers growing Soya beans
- To know about Nyamata because it is my first time in Bugesera
- To meet other farmers coming from different parts of Rwanda
- To be more knowledgeable on how to improve my agriculture
- To know how to increase soybean production
- To know how to improve the value of the Soybean

ACTIVITY 2

FORMATION OF HOST TEAMS AND HOST TEAM FUNCTIONS

About the session

Objectives

- To ensure active participation of all trainees
- To assist the trainers with facilitation and smooth implementation

How was it facilitated?

- Participants are randomly divided in groups

The participants are randomly divided into small permanent working groups known as host teams. In each small group gender balance need to be considered. The main task of the host team is to assist with overall facilitation. The smaller groups also facilitate easy discussion and information sharing between its members. Each day, another host team is responsible for the good order of the day.

The functions of the host teams are discussed with all participants.

Example of a host team in a Training for Facilitators

Group 1 (TWURWUBAKE) Ikivugo: Dushyize hamwe, Dukemura Ibibazo bitwugarije (Motto: We come together, resolve our problems)

No	AMAZINA (NAMES)	Igitsina (Gender)	Icyo bashinzwe (Position)
1	Mushimiyimana Alexis	M	President
2	Mukarushema Beatha	F	Imibereho myiza
3	Gahizi Ezechiel	M	Umujyanama
4	Bavuliki Hassan	M	Umutekano

5	Mukurarinda Vincent	M	Amakuru
6	Mukagatera Vestine	F	Umujyanama
7	Rwandege Joseph	M	Morale
8	Gasasira J. Baptiste	M	Umwanditsi
9	Nirere Esperance	F	Umugenzuzi
10	Nizeyimana Faustin	M	Umugenzuzi

Note: In this TOT there were 8 host teams of each 10 people. Some other examples of mottos:

- *Resolve problems ourselves by looking answers especially on soybean crop*
- *Join our forces to take care of soybean crop and strive for self-reliance*
- *Increase yield, give priority to soybean crop and ensure food security*
- *Work hard to develop ourselves and fight poverty*

With regard to the host team function, a participatory discussion among the participants and trainers was undertaken to define the role of the host team. Thus, the host team functions are enumerated below:

- Acts as time (during breaks, classroom sessions and field-based activities) and attendance (of participants during classroom sessions and field-based activities) keepers;
- Records daily activity proceedings and participants' attendance in a training log book;
- Coordinates with the master trainers to ensure the timely availability of training materials, equipment, and field supplies;
- Leads daily prayers, ice breakers, and group dynamics (upon request of the master trainers) activities;
- Assists the master trainers and small groups in securing flip charts and other materials during their presentations; and
- Summarizes and records results of daily training activity evaluations.

ACTIVITY 3

DEVELOPMENT OF SEASON - LONG ACTIVITY GUIDE AND WEEKLY ACTIVITY SCHEDULE

About the session

Objectives

- To ensure that the schedule allows for everyone to participate in all activities
- To avoid wasting time
- To increase ownership

How was it facilitated?

- Question and Answers
- Plenary session

The participants and trainers discuss on a weekly activity schedule in order to make it feasible for them to be present at all times. In order to get the most out of the training days, the participants agree that:

- Participants and Trainers travel from their respective districts early enough in order to arrive in the afternoon before the morning training session.
- Daily sessions at 8:00 am and end at 5:30 pm.

Typical daily activity schedule

TIME	ACTIVITY
8:15-10:30	Morning sessions
10:30-11:00	Coffee break
11:00-01:30	Morning sessions
01:30-02:30	Lunch
02:30-04:00	Afternoon sessions
04:00-04:15	Break
04:15-05:15	Evening sessions
05:30	Session evaluation and closing prayer

Example of a weekly activity schedule for training course of Facilitators

DAY	ACTIVITIES	
	AM	PM
SUN	TRAVEL TIME & ARRIVAL OF PARTICIPANTS & IMT &MTs	
MON	▪ Agro-ecosystem Analysis (AESA)/Insect Collection on Farmer Crop Protection (FCP) and IPM ▪ AESA Reporting and participatory discussions to arrive at common decision making on FCP & IPM plots	Special Topics ▪ Group dynamics, energizer, brain teaser, local dancing
TUE	▪ Special topic	▪ Special Topics ▪ Group Dynamics
WED	▪ Special Topics	Visit the TOT study plot ▪ Group Dynamics ▪ Evaluation and Planning for next week ▪ Travel time for MTs to Rubona for MTT sessions
THU	TRAVEL TIME TO RESPECTIVE DISTRICT	

Example of a weekly activity schedule for training course of Master Trainers

DAY	ACTIVITIES	
	AM	PM
WED	TRAVEL TIME & ARRIVAL OF PARTICIPANTS & MASTER TRAINERS	
THU	▪ Agro-ecosystem Analysis (AESA)/Insect Collection on Crop Protection Trial (CPT) ▪ AESA Reporting (CPT) ▪ Setting-up of Insect /Disease Zoo Exercises ▪ Reporting: Last Week's Insect/ Disease Zoo Exercises	▪ Feed-backing & Critiquing of Weekly Activities During 'Training Breaks' ▪ Group Dynamics ▪ Special Topics
FRI	▪ AESA/Collection of Insects & Specimen for Morphology Study on Cultural Management Trial (CMT) ▪ Maintenance of the MMT Learning Field ▪ Drawing & Identifying Morphological Parts of Maize & Common Beans	▪ Special Topics ▪ Group Dynamics ▪ Evaluation & Planning for Next Week's Activities
SAT	TRAVEL BACK TO RESPECTIVE ZONES	

ACTIVITY 4

THE GAP ANALYSIS AND TRAINING NEEDS ASSESSMENT EXERCISES

About the session

Objectives

- To identify what participants know (and don't know)
- To adapt the training curriculum to specific needs
- To find solutions for local challenges

How was it facilitated?

- By working in groups per zone
- Discussion and brainstorming

Gap analysis (based on knowledge gaps and production constraints) and training needs assessments are carried out, in collaboration between the trainees and trainers. The objective is to develop and/or fine tune the training curriculum so that it is demand driven and site specific.

Example of Gap Analysis and Training Needs Assessment of a training of Facilitators on Soybean

Based on the results of a gap analysis the major crop protection and cultural management problems in soybean production were identified, classified, and prioritized. On the other hand, pest and disease problems were noted.

The most commonly mentioned cultural management issues by farmers, according to the TOT participants were those related to inappropriate fertilizer management, inadequate location-specific varieties and limited knowledge on suitable intercropping options.
As an example, the results from group discussion from Eastern Province are presented below.

Assessment of what participants know

ACTIVITY	WHAT WE KNOW	WHAT WE DON'T KNOW
1. Site selection	-	▪ Nature of the soil.
2. Land preparation	▪ Soil erosion control. ▪ Cultivation ▪ Ploughing	▪ Field measurement
3. Fertilizer application	▪ Organic fertilizer (10T/ha) spread in the field.	▪ Application of chemical fertilizer.
4. Planting	▪ Season A: planting in October. ▪ Season B: planting in March	▪ Planting density: spacing.
5. Seeds selection	-	▪ Soybean varieties adapted in each region
6. First weeding	▪ Weeding is done fifteen (15) days after planting when the crop has four (4) leaves.	▪ How many times to weed and how to weed.
7. Pests and diseases management	▪ Pests management: pigeons, rabbits, hens, monkeys.	▪ Soybean diseases and some other pests.
8. Harvesting	▪ Preparation of dryers.	▪ How Soybean is harvested. ▪ Materials used in harvesting. ▪ How to select seeds.
9. Storing	▪ In the bags.	▪ Time for storage ▪ Soybean storage ▪ Chemicals used for Soybean storage.
10. Marketing	▪ Only informal market	▪ How to get good market
11. Soybean processing	-	▪ Soybean products

ACTIVITY 5

CROP PROBLEM IDENTIFICATION AND POSSIBLE SOLUTION

About the session

Objectives

- To enable the participants to become aware of soybeans problems from their respective zones
- Participants to share ideas on soybeans problems as identified from other zones those which are similar and those which are different
- Also the Master Trainers learn the level of understanding from participant

How was it facilitated?

- Participatory discussion in small (zonal) groups based on guide questions followed by critical discussion in big group.

Example of Soybean Problem Identification and Possible Solution from a training of Facilitators

Presentation of the results from Southern Province

PROBLEMS	SUGGESTED POSSIBLE SOLUTIONS (by participants)
1. What is the favorable condition for growing soybean? What is the exact timing?	▪ Soybean should be planted in a well prepared field with enough manure regardless of season
2. What are the specific recommendations for soybean seeds in different areas?	▪ Seeds for planting must come from seed multipliers.

3. Planting and management of soybean?	▪ Soybean can be intercropped with other crops.
4. What is the weeding frequency? When?	▪ Weeding is done once at 21 days after planting (DAP)
5. What are the major pests of soybeans?	▪ We know rodents and pigs can severely infest soybean
6. How to control pests and diseases?	▪ Spraying pesticides (insect pests and diseases) and herbicides (weeds).
7. When to harvest soybean? What are the signs of maturity and how to harvest soybean?	▪ Depends on the variety. ▪ When it is dry enough. ▪ By uprooting the whole plant. ▪ By cutting at the soil surface.
8. How to process soybean after harvesting?	▪ Drying, threshing, winnowing, grading and then storage or marketing. ▪ Roasting, porridge, soup, milk, and normal cooking…

ACTIVITY 6

PARTICIPATORY DEVELOPMENT OF A CROP CALENDAR & TRAINING CURRICULUM

About the session

Objective

- To enable the participants to study and understand the soya bean crop calendar of their respective zones
- Participants to be implement soya bean agronomical practices according to the crop calendar and also to share ideas on soya bean crop calendar as proposed by other zone.
- Participants to have the knowledge and be able to develop the crop calendar with their respective FFS groups and be submitted to the FFS coordinators, to enable easy follow up and supply inputs in time.
- Also the Master trainer to learn what is happening in different zones, for proper advises
- Participants are able to develop a training curriculum based on the knowledge gap analysis, the training needs assessment, the problem/ solution assessment and the crop calendar.

How was it facilitated?

- Participatory discussions in small groups according to prevailing situations in their respective zones presented and critiqued in large group.

Example of Soybean Crop Calendar developed in a training of Facilitators

SOYBEAN CROP CALENDAR (EASTERN PROVINCE, TWO SEASONS)

Activity/Rainfall	Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct		Nov		Dec	
Rainfall				X	X	X	X	X	X	X	X						X	X	X	X	X	X	X	X
Site selection		X	X	X											X	X	X							
Land preparation		X	X	X											X	X	X							
Seed preparation		X	X	X											X	X	X							
Manure/fert preparation	X	X	X	X										X	X	X	X							
Manure application																								
Planting					X	X	X											X	X	X				
In org fert application																								
Soil loosening						X	X												X	X				
Weed control							X	X	X											X	X	X		
Pest &Disease control						X	X	X	X	X	X								X	X	X	X	X	X
Harvesting	X	X	X									X	X	X										
Threshing & winnowing	X	X	X									X	X	X										
Drying	X	X	X									X	X	X										
Seeking markets	X	X	X								X	X	X	X										X
Marketing	X	X	X									X	X	X										
Storage	X	X	X									X	X	X										
Value addition																								

FFS Curriculum and Action Plan Development

What is a Curriculum?

- Curriculum refers to the entire learning program provided by school;
- Curriculum entails all learned subjects, field studies, special topics, exercises and field activities (crops, livestock, soil management activities, among others);

What is an FFS Activity Plan?

Sequence (steps) of activities that must be performed well for a strategy to succeed and implement FFS. The action plan has three (3) major elements:

- Specific activities or tasks (what to be done and by whom);
- Timeline or time horizon (when to be done);
- Resource allocation (materials needed, funds, expertise, others)

FFS action plan can also refer to FFS activity guide or FFS action program; take note that an action plan implements the curriculum; action plan must be SMART:

- *Specific* (Be specific with what type of problems FFS will solve and will it be solved; type of innovation an FFS desires to bring; issues to be addressed, others);
- *Measurable* (participants should assess improvements and changes over certain period of time; develop a benchmark or baseline and compare success. Note: measurable does not necessarily mean quantitative but also qualitative;
- *Attainable* (within farmers own resources, capabilities, and less external inputs, among others); and
- *Realistic* (reflects peoples' needs; will give positive impact to the community members).
- *Time-based* (time- or period-specific).

Essential elements to develop an FFS Curriculum and Action Plan

- Assessment of production constraints
- Problem and possible solution identification (prioritized)
- Gap analysis and training needs assessment (learning topics specified)
- Seasonal crop calendar
- List of designed field studies
- List of pre-determined special topics
- List of 'less traditional IPM topics

Various steps in developing FFS training curriculum:

- Determine field activities and learning topics (based on need assessment, crop calendar, problem identification, and others)
- Design field studies

- Plan number of meetings per season
- Plan 'routine' activities during FFS (AESA, insect zoo, disease zoo, and others)
- Plan special topics
- Plan 'less traditional IPM topics' (cross-cutting issues like marketing, health, gender, and others)
- Plan farmer exchange visits and related activities
- Plan participatory monitoring and evaluation (PM&E)

Sample FFS Action Plan Table (Activity Guide)

TIMING	FIELD ACTIVITY	ROUTINE ACTIVITY	SPECIAL TOPIC	Responsible	RESOURCES
Pre-planting (WBP)					
After Planting (WAP)					
Post Harvesting (WAH)					

Group Exercise (by zones):

a. Develop FFS curriculum and its implementation plan of anyone crop or livestock of your choice (be detailed);
b. Design two (2) field studies of your choice. For each explain;
    i. Title of study;
    ii. Background (why it is important for farmers);
    iii. Hypothesis (ideas to be tested)
    iv. Objective of the study (both learned objectives and technical objectives);
    v. Time needed;
    vi. Materials needed;
    vii. Procedures;
c. Assessments taken (type, frequency, how and when to record data and analysis
d. Suggestions for evaluation

ACTIVITY 7

SELECTION OF FACILITATORS

About the session

Objectives

- To ensure that appropriate facilitators are selected
- To ensure that the selection is a participatory process

How was it facilitated?

- Agree on criteria of a good facilitator
- Discuss on different steps of practical organization
- Imagine various challenges and share possible solutions

The quality of FFS implementation depends largely on the quality of the facilitators. Therefore, a very important first step is the selection of a good facilitator. In Rwanda, it has been decided to select facilitators from the farmers' communities. This selection process is done by farmers themselves after having been sensitized about the selection criteria. Practically, the characteristic of a good facilitators are discussed with the farmer group. Based on these criteria, the group decides who they propose as facilitator. The process of selecting the candidate facilitator is fully the mandate of the farmers to select themselves the person in which they have confidence according to the criteria. However, it is good if the local authority also approves the candidate.

The selection criteria are:

- The candidate facilitator has to be an active farmer in the selected commodity
- The candidate facilitator has to be recognized by his community as honest and
  accountable ("inyangamugayo" in Kinyarwanda)
- He/She has to commit the time d to follow residential training of trainers (ToT) session during the whole season
- The candidate facilitator has to have a minimum level of literacy with skills in reading and writing

- The candidate FFS facilitator has also to commit to be available and patient to ensure training of farmers after the session of ToT.
- The candidate FFS facilitator has to commit to continue to train several new FFS groups in the years that follow the TOT training. He/She will be paid for that work.

It is worth noting that a good facilitator is not necessarily the best farmer or the village leader. **Most important is the willingness to learn and to share**. The community members should have a high level of trust in the facilitator. The facilitator must commit to spend a lot of time on learning many new skills as well as on training the other farmers.

ACTIVITY 8

FFS ESTABLISHMENT AND IMPLEMENTATION STANDARD PROCEDURES AND ACTIVITIES

About the session

Objectives

- To familiarize participants with the complete concept of FFS

How was it facilitated?

- Presentation
- Question and Answers

An important part of the training of Master Trainers is to build their capacity to plan a whole training cycles for training new FFS Facilitators. This chapter provides an overview of the whole process. The various topics are presented, discussed and practiced in multiple exercises. Three phases are recognized in the cycle:

- **Establishment** refers the identification, design and preparation of activities
- **Implementation** refers to the actual implementation phase of the season-long activities
- **Monitoring and evaluation** refers to the continuous monitoring and evaluation

Overview of FFS Establishment and Implementation Procedures

1. *Training of Facilitators*
2. *Ground Working*
3. *Awareness raising: community meeting with the whole community (introducing the FFS to community or cooperatives)*
4. *Identification of focal activity (often called the 'FFS enterprise')*
5. *Identification of participants (FFS members)*
6. *Identification of learning site*
7. *Participatory planning of FFS activity guide (developing season-long FFS group action plan)*
8. *Implementation of FFS Season-long learning Session*
9. *Conducting Field Day (Farmers' Open Day)*
10. *Graduation*
11. *Follow-up (Post-FFS Activities)*
12. *Participatory Monitoring and Evaluation*

1. Training of Trainers

- Development of 'initial' Training of Trainer (TOT) curriculum (tentative);
- Development of TOT budget
- Identification of TOT participants (using a definitive criteria for selection);
- Identification and selection of TOT venue (qualify the TOT venue)
- TOT participants' invitation procedure and letters (be specific on objectives, what you will provide, training duration, others
- Output: TOT graduates, tentative FFS curriculum, FFS budget, action plans

2. Ground Working (Preparatory FFS Activities)

- To be started at least a month before FFS initiation with an initial survey (explore if the area has suitable potential for an FFS)
- Get advice and approval of community opinion leaders
- Identify opportunities for collaboration between the facilitator and the community
- Plan (a date) for awareness raising (community) meeting with the whole community

3. Awareness raising: community meeting with the whole community (introducing the FFS to community or cooperatives)

- Introduce the project
- Introduce FFS methodology with its specific characteristics
- Provide community members with a clear picture , a real view of FFS and what they should expect
- Give chance for selection of FFS members (select FFS volunteers using an appropriate selection criteria or things to observe when making a

selection, such as gender, household distribution, age, literacy levels, religion, don't segregate disabled)

4. ***Identification of focal activity (often called the 'FFS enterprise')***

- Note: Can also be suitably done during the awareness meeting; sometime it is done on ministry or project levels after PRA
- Note: FFS budget can also come here
- Ensure the FFS is targeting the right activity and problems (demand-driven, local needs)
- Ensure there is a potential for FFS to solve these problems
- Ensure both FFS groups and facilitators have an opportunity to discuss and agree upon the focal activity and problems or needs identified

5. ***Identification of participants (FFS members)***

- FFS take place in the community (target people who are involved in farming activities and farming decision-making
- It is easy to choose those who are loud, educated, and rich (avoid such influence)
- Reach people who will benefit most in their participation (e.g., women who work mostly in the field)
- Identify and select 25-30 participants who will find FFS relevant to their development
- Create a group with common interest (people with major interest in focal activity)

6. ***Identification of learning site***

- Select learning site that has required conditions to facilitate learning (according to the community or enterprise)
- Note also strategic location for community sensitization (near passable road); strategic location for members' attendance; reasonable plot size; non-risk study site; site should represent the issue to be addressed or learned

7. ***Participatory planning of FFS activity guide (developing season-long FFS group action plan)***

- Note that budget can also come here
- Be focused; the group action plan should set out a clear road map identifying what FFS will achieve and how it is going to be achieved
- Create feeling of ownership among FFS group members; this will enhance commitment and sustainability
- Pool resources, synchronize efforts and avoid duplications

8. ***FFS implementation (season-long learning activities for farmers)***

- Participatory introduction

- Leveling of expectations
- Host team/small group formation
- Group leadership formation
- Creation of attendance registrar
- Develop 'learning contracts'
- Participatory norm setting
- Crop or animal management (learning by doing)
- Ecosystem and agro-ecosystem analysis (concept of 'what is this?')
- Discovery-based learning activities (AESA, validation trials, comparative studies, field experiments, insect zoo, disease zoo, insect, diseases, weed collection and identification, 'ballot box' and 'group 'moving exam' exercises)
- PM&E ('ballot box' exams)
- Group dynamics and ice breakers

9. Conduct of field day (farmers' open day)

- Folk media
- Field study results presentation
- Share FFS group learning experiences to non-FFS farmers, invited guests, project leaders, policy makers, donors, others
- Experiences from visitors
- Others

10. Graduation: why graduation?

- Motivation to sustain post-FFS activities
- Appreciation of his/her knowledge gained
- Recognition
- Added-value learning
- Advocacy for policy makers

11. Post-FFS activities (follow-up)

- Networking/alumni associations
- Second topic (business FFS, processing, others)
- Farmer-researchers (participatory technology development [PTD] activities)

12. Participatory monitoring and evaluation

- Increase accountability and transparency and thus permit continuous monitoring and evaluation
- Train farmers on how to organize and manage themselves better

ACTIVITY 9

LEARNING ABOUT THE HISTORICAL BACKGROUND OF FFS

About the session

Objective of this session

- Participants know where FFS started
- Participants understand that IPM is the entry point of FFS
- Participants are able to explain to farmers where FFS originated

How was it facilitated?

- By using short guide questions and participatory discussions, and video if possible

Experience has shown that it might be good for trainees to understand where FFS originated and why it was developed. Ideally, some old videos of the early FFS work are shown to the participants.

Origin of FFS

FFS started in Indonesia in 1989.
The word Farmer Field School was originated from two Indonesian words **SEKOLAH LAPANGAN**, which means ***Sekolah*** = Field and ***Lapagan*** = School; So sekolah lapangan means ***Field School***

Why FFS was started?

- After prolonged use of pesticides some pests and disease causing organisms developed resistance to pesticides
- Pesticides caused soil pollution and became detrimental to soil health
- Pesticides were expensive and resulted to diminishing returns to farmers benefits
- Pesticides caused serious human health hazards

Due to the above mentioned reasons farmers decided to respond through development of Integrated Pest Management initiatives in working groups known as FFS groups. Hence IPM was the entry point of FFS.

Integrated Pest Management (IPM) = The starting point of FFS

Not all of farmers in Indonesia were able to apply pesticides in their fields because they were costly. However, farmers noticed that farmers who were not applying pesticides or rarely applied them had higher yields than those intensively using pesticides. It is at this stage when farmers and extension agents came together and discussed to opt for Integrated Pest Management techniques. At that time, the government had also imposed some strict laws on the use of pesticide. The national IPM program started to improve farmer organizations, empowering them towards proper management skills and better decision making. Not by instructing what to do but empowering them through education to make better use of their existing knowledge to be able to handle their own problems/on farm decisions. The training program took place in the farmer's fields. The crop was the teacher and the field was the class while farmers were the students. Each farmer was presented his/her idea to the group and the group of farmers discussed, improved and get it into practiced.

The spread of FFS

FFS from Indonesia was adopted in Bangladesh, Philippine, Vietnam, Cambodia and many others. In Africa, FFS started by early 1995 in Zimbabwe on cotton, then in West Africa – Ghana, Ivory Coast, Benin, Mali, Ivory Coast, Bukina Faso and Sudan. In late 1990's FFS started in East Africa, 1999 in Kenya and Uganda, Tanzania in and now in Rwanda since 2009. Currently FFS is implemented in more than 90 countries and an estimated 12 million farmers have been reached.

ACTIVITY 10

DISCOVERING THE FUNDAMENTAL ELEMENTS OF GOOD FFS

About the session

Objectives

- The participants to be able to distinguish FFS group from other community groups
- Participants to be technically strong when forming and managing FFS groups

How was it facilitated?

- By using short guide questions and participatory discussion to be able to differentiate FFS groups with other community groups

Elements and qualities of FFS: What makes a good FFS?

Any good FFS has 5 essential elements:

- *A group*
- *An experimental field*
- *A qualified Facilitator*
- *A training curriculum*
- *A Program Leader*

If one of these elements is missing, the training program adopted and implemented cannot be considered as an FFS program. It can be simply recognized as a training program but it cannot be considered as an FFS one.

1. **The Group** (farmers)

FFS approach uses adult learning methods. Farmers learn through implementing all activities themselves They get the opportunity to exchange about what they observe in comparison to their initial knowledge and skills. To facilitate the exchange, there is a need to create an organized group with 25 to 30 members.

Practically, the group is put in place under guidance of the FFS facilitator after being trained on how to form and facilitate FFS groups in the TOT training.

Participation in the FFS group is performed at a voluntary basis as all trainees must have chosen freely to participate. All farmers commit to work together both for analyzing the prevailing situation and undertaking the actions which are judged necessary according to the collected data.

In summary, a group of FFS Farmers has a common interest or common problem and commit to learn together to find solutions. They commit to meet regularly (every week for seasonal crops) in the experimental study plot. A group should have a good gender balance, include people of different ages and only 1 member per households can be member of the group.
Each group selects a committee and develops rules and regulations (constitution and by-laws). Finally, group members respect each other, are transparent, cooperate with each other and apply democracy.

2. The study field (or experimental plot)

The learning process achieved in FFS program is mainly based on two components which are (i) theoretical lessons and (ii) practical lessons organized and achieved in the study plot. The theoretical lessons aim at providing knowledge and capacity to understand the basic principles explaining all the phenomena observed in the field at all development stages. On the other side, the practical lessons organized in the study plot (figure 2) help farmers to acquire all the practical skills to manage the commodity of study and to develop the appropriate solutions in view of overcoming the various challenges.

In each study plot, a number of experiments are undertaken. This includes comparison between various varieties, comparison between fertilizers, weeding trials etc. Each study plot must also have the following two main component: the FP (farmers' practices) plot and (2) the IPM-ICM plot. In the FP plot, farmers are requested to carry out the usual practices they are using in their own plots while in the IPM-ICM plot, the complete application of improved/appropriate practices or innovations is applied. This establishment of the 2 components provides an interesting occasion to all trainees to compare the proposed innovations with their own practices and this prepares them to be capable to take decision based on the real field facts.

Practically, the site of FFS study plot is selected by farmers in a place which is easily accessible and presenting the suitable characteristics for the commodity of study. In most cases, the site is hired by the group which has to find agreement for compensation to be provided to the owner of the plot.

In summary, the field is:

- The field is the CLASS
- The crop, (animal) is the **TEACHER**
- The field provides most of the training materials
- The field tells us what to learn and the time to learn something
- 75% of all FFS activities take place in the **FIELD**

- Discussions can take place in a good place (under the shade or tree) close to the field
- The field is non risk environment where farmers are free to learn
- The 'field' can also be animal shed/house, soil pits, fish pond etc

3. The Facilitator

The learning process for farmers is facilitated by a qualified facilitator. The importance of selecting a good facilitators is already discussed above under Activity 7 and the quality of a good facilitator will be discussed in Activity 11. The training of Facilitators is intensive , season-long, in depth and aims at building technical, facilitation and group building skills.

4. The Curriculum

All the FFS related types of training address the real issues prevailing at the field. In this frame, elaboration of the training curriculum has to be done taking into account the challenges to be solved or the innovations to be disseminated. A preliminary gap analysis is the way to establish the main challenges hampering production and which needs to be addressed. The training curriculum is developed in a participatory way.

In summary, the curriculum is

- Participatory developed and includes all learning program/topics/subjects
- Follows natural cycle of its subject = seed to seed, means from land preparation to harvesting, egg to egg
- Integrates cross-cutting issues/topics like marketing, nutrition, HIV/AIDS, gender, etc.
- Includes group dynamic exercises and ice breakers
- is demand driven curriculum =designed to satisfy farmer needs and interest

5. The Program Leader

Implementation of the FFS activities requires resource mobilization. Especially the training of Master Trainers and Facilitators is costly. Furthermore, the facilitators are not volunteers. They need to be paid for the services they provide, especially when they work with various groups at the same time.

A program leader is responsible to mobilize the resources and to coordinate all FFS activities.

The fundamental elements of FFS

1.FFS plot

- The field is the CLASS,
- The plant (animal) is the TEACHER,
- The field provides most of the training materials like plants, pests and real problems
- The field tells us what to learn and time to learn something
- Almost 75% of all FFS activities take place in the FIELD,
- The field can also be animal shed, soil pits, fish ponds, etc
- FFS is about practical, hands-on topics.

3. FFS Facilitator

- The facilitator must be technically and methodologically strong,
- He/she must be a graduate of FFS Facilitators Training,
- He/she must respect others and their opinions,
- He/she must be a good time manager,
- He/she must be in control of the group.

4. The program

- Capable to support field facilitators
- Keep close watch on the FFS activities
- Linking FFS to other players in Twigire Muhinzi
- Responsible for monitoring and evaluation

2. FFS group

- Group of farmers with a common interest,
- Made up of men and women,
- Farmers of different range of age,
- Group composed of 25 to 30 members,
- Not based on family or religious relations.
- On voluntary basis

5. The curriculum

- The FFS curriculum follows the natural cycle of its subject (crop, animal, soil, or handicrafts), and is season long "seed to seed" or "egg to egg".
- It lists chronologically all the topics to be covered during the whole season commodity cycle, including group dynamics as well as cross-cutting issues Gender, HIV/AIDS, family planning etc.
- It must be participatory developed,

ACTIVITY 11

BUILDING FACILITATION SKILLS

About the session

Objectives

- The participants understand the importance of qualified facilitators
- The participants understand the difference between facilitating and teaching

How was it facilitated?

- By using short guide questions and participatory discussion
- By practicing a lot and by providing positive critical feedback to each other

Qualities of A Good Facilitator

It is often said that the success of an FFS program implementation in a community rest on the ability of FFS facilitators to sustain active participation among the FFS participants during and even after a season-long FFS session. This is the primary justification for a rather unique training methodology (e.g., participatory, experiential, and discovery-based approaches) and time frame (e.g., season-long) required to develop a good FFS facilitator.

Taking a cue from these requisites, the participatory discussions on the 'Qualities of a good facilitator' among trainees and trainers are focused on comparing the difference between a 'boss' (likened to a teacher) and a 'leader' (likened to a facilitator). After lengthy exchanges of ideas, opinions, and experiences, the following a summary is presented in the table below.

In conclusion:

- Instead of providing 'right' answers, facilitator creates an environment to engage FFS participants in critical thinking and arrive at answers by themselves;
- Facilitator poses problem, facilitates FFS participants to search causes and analyze situations, discover solutions then come up with an action plan;

Difference between a 'boss' (teacher) and a 'leader' (a good facilitator)

'BOSS' (TEACHER)	'LEADER' (GOOD FACILITATOR)
▪ Drives employees (participants)	▪ Coaches (facilitates) them
▪ Depends on authority	▪ Depends on goodwill
▪ Inspires fear	▪ Generates enthusiasm
▪ Says 'I'	▪ Says 'We'
▪ Places blame for the breakdown	▪ Fixes the breakdown
▪ Knows how it is done	▪ Shows how it is done
▪ Uses people (participants)	▪ Develops people (participants)
▪ Takes credit	▪ Gives credit
▪ Commands	▪ Asks (appeals)
▪ Says, 'Go'	▪ Says, 'Let's go'

ACTIVITY 12

FFS GROUPS FORMATION AND IMPLEMENTATION

About the session

Objectives

- Participants are able to understand how to form FFS groups
- To identify the difference between procedures for forming communal and FFS groups
- Participants to be able to form proper FFS groups

How was it facilitated?

- By short questions and discussion to share ideas and be able to detect the weakness and strength when forming and running groups.
- The suggested procedure/format to be followed when forming FFS groups

Proposed procedure for FFS groups formation

Activity/ Igikorwa	Responsible/ Abagikora	Objective/Topic Ikigamijwe	Output/ Ikigombwa kugerwaho	Expected problems/ Ibibazo Tools/ Group dynamic
1 day To meet with leaders	Facilitator Leaders	To explain To make appointment with cooperative leaders/ Local leaders	To confirm the date/ time and place to meet with the farmers Who is to invite the farmer	-Prolonged time to meet -not meeting all of needed members

2nd preparation meeting	- Facilitator - Coop/ local leaders - Agronomist - Farmers	-Introduction of facilitator -Briefing about IPM project - Overview on the FFS approach - To agree on the date , time, place where to meet with farmers *(The leaders have the responsibility to introduce the facilitators to farmers, and explain in brief what is it about the project and the FFS approach)*	To have volunteered 25-30 farmers *(consider gender, religion, political parties, distance of travel, age, must be real farmers)*	-less than 25 participants -more than 30 participants -many men/ women -only older farmer - failure to volunteer themselves THINK OF TEAM WORK
1-3/4 Meeting with the group	- Facilitator - Group members	- select leaders - develop constitution - select the study crop - develop a crop calendar - To agree the FFS meeting day - to set the group norms - gap analysis - baseline survey - agree for FFS meeting schedule -how to get a study plot -to divide the group into sub group	- the group to have the leadership -contribution on the constitution setting - to have the study crop - to have a crop calendar -to have the study plot - to have the crop calendar - to have a definite day and time when to meet - to be able to know what they need to be taught	- facilitator failure to express him/herself
5 meeting with the group	Facilitator Group members	To survey various site where study plots are to be sited Observe natural vegetation, soil depth , fertility, erodability	To be able to select desirable TOT plot Consider soil type, previous crop, neighboring vegetation/ crops	-Sites previously planted with the same crop - Sites subjected to pests and diseases -Poor soil characteristics,
6 th meeting	Facilitator, group Members	-Historical background of FFS -Why FFS -Basic concept of FFS -Characteristics of FFS -Objectives of FFS -FFS meeting schedule	FFS members to understand the FFS methodology and targets of the program	

Group Leadership

Each FFS groups needs to elect a committee. First the functions of each committee member are explained and discussed. The facilitator needs to ensure that all group members have well understood all responsibilities. The facilitator should remind participants that women are good leaders too! Therefore, there should be a good gender balance in the groups committee.

Once all members have well understood the concept, various candidates for the committee functions can present themselves. When there is more than one candidate for a function, the group will elect the best candidate after the candidates have explained to the group why they believe they are the best person for that specific function.

It is crucial that the group members themselves elect the committee members!

ACTIVITY 13

REPETITION OF THE BASIC CONCEPT OF FFS

About the session

Objectives

- To introduce or repeat the important elements of FFS
- The understand that the FFS methodology is particular

How was it facilitated?

- Remind trainees that everything is this session is repetition of what they learned earlier
- By asking participants to think about the key features in small groups - a competition between the groups can make trainees think harder!
- Find creative ways to remember the key points

Features of a Farmer Field School (FFS)

5 fundamental elements

a. ***The group***. This entails a group of farmers, normally 25-30, with common interest of learning, solving a particular problem or seeks for new innovations. The FFS group meets regularly and has leadership.

b. ***The field.*** All learning activities in FFS take place in the field and not in class building. It is thus commonly known as a '*school without walls*' The '*field is the class*' and the '*crop is the teacher*'. In FFS learning is by doing, hands-on.

c. ***The curriculum.*** Learning follow crop cycle and that is what makes the FFS curriculum. FFS curriculum is season long based on the life cycle of its subject. It is also known as '*seed to seed*' or '*egg to egg*' learning cycle.

d. ***The facilitator.*** In FFS facilitator is not an instructor but somebody who helps farmers to generate knowledge. Facilitator needs to be technically strong, that is why projects spend resources in ToT etc. It is very important that the facilitator should have good qualities.

e. ***Program leader.*** Good program leader is a necessity for achieving good FFS results. The program leader is needed to support FFS program through resource mobilization and coordination.

Furthermore, for FFS to be more effective, should consist of at least the following **season-long, weekly half-day activities that include:**

- *Agro-Ecosystem Analysis:* Farmers learn from direct experience and critical analysis of plant health, water, weed, soil and nutrient management, plant disease surveillance, and observation and collection of insect pests, predators, and parasitoids;

- *Group Dynamics:* By undertaking group dynamics activities, farmers also learn relevant socio-cultural aspects such as team building and leadership training;

- *Special Topic:* Specific issue or concerns like good seed selection, biodiversity conservation, composting, post harvest and processing, marketing, etc., allow farmers to have deeper understanding of relevant technical issues in crop production

The key principles that guide an FFS learning process:

- *The field is the primary learning resource.* All learning activities take place in the field and are based on what is happening in the field.

- *Experience forms the basis for learning.* The activities that take place in the field and their farms form the basis for discussions and analyses by farmers who arrive at concepts which they test and improve through further field activities.

- *Decision-making guides the learning process.* Training focuses on analysis of crop ecosystem. The combination of analytical methods, ecological principles, and basic crop management practices helps farmers gain insights into the ecological interactions in a crop field and provide them with greater confidence in making crop management decisions.

- *The training curriculum is based on local conditions of the FFS.* The FFS curriculum and materials are based on their appropriateness, the local conditions, problems, and needs of farmers in the FFS.

- *Training last the entire cropping season.* Farmers acquire a firm understanding of relevant management concepts for each growth stage of the crop as well as the factors that influence crop management decision-making at all stages of plant's growth.

ACTIVITY 14

CONCEPT AND EXAMPLES OF GROUP DYNAMICS

About the session

Objectives

- To develop the participants into a closer knit team;
- To establish a learning climate that is enjoyable as well as fruitful;
- To help participants experience and be able to identify such aspects of teamwork as mutual support, the importance of individual roles to a team's success, and behaviors that can build or hinder teamwork; and
- To helps participants to experience what can be accomplished by working together.

How was it facilitated?

- Through introducing various kinds of ice breakers, games and exercises, followed by a participatory discussion

The concept of groups dynamics and ice-breakers were delivered to the participants as these are important learning assets in FFS. Group dynamics exercises are meant to help counter negative attitudes and perceptions resulting from group interactions among participants and facilitators during the learning process.

If properly done in FFS sessions, group dynamics activities will:

- Be important asset in the success of FFS undertakings
- Becomes a necessary activity as they are liked by farmers
- Be a common tradition and practice in the FFS
- Be a non-negotiable FFS component activity

In the context of FFS, group dynamics maybe defined as:

- Activities or exercises carried out with the purpose of enhancing group learning activities (e.g., team building, cohesiveness, problem solving)
- Physical and active, while others are brain-teasers
- Group experiences fun while sharing experiences

Types of group dynamics activities based on objectives:

- To energize participants (e.g., reduce boredom, tiredness, or sleepiness)
- To enhance participation (e.g., every member of a group are likely to participate, when done in group, it shy-type participants to participate as every member is given a chance to offer his/her ideas)
- To strengthen learning topics (e.g., can be achieved in a form of a role-play, brain-teasing, or brain-storming exercise)
- To enhance (increase) problem-solving skills (e.g., puzzles, brain-storming will make participants think and find alternatives in solving problems)
- To assist in solving conflicts (e.g., conflicts within and outside the group, enemies in a group can become friends by working together)

Things to remember (hints) when setting-up group dynamics activities:

- Should be adapted to local and cultural context and should not offend people
- Be clear about what you want to achieve in the exercise
- Plan and prepare for the exercises
- Be aware of appropriate moment and time (e.g., not when people are tired, after eating, etc.)
- A good exercise should involve everyone; choose games in which everyone can participate (e.g., take note of disabilities)
- Avoid exercises that involve different body-touching among the participants

Setting-up group dynamics activities (e.g., be sure that it has):

- Title or name
- Learning objectives
- Materials needed
- Time requirement
- Procedures
- Lessons to be learned

<u>Some examples of Group Dynamics Exercises</u>

1. Nine-Dot Game

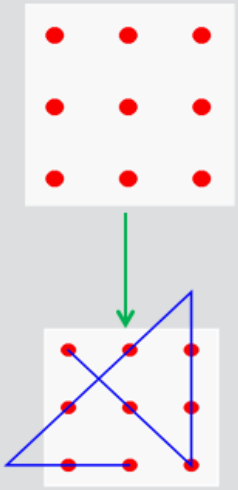
Purpose: To be aware of the concepts, objectives, and approaches of the FFS initiative to the problem and issues of farmers in a local area.

In this exercise, we ask farmers to try to join all the nine dots with only four straight lines, and without lifting the pen from the page. Then we ask farmer to share their results. After getting the results, ask the farmers:

- Why was it difficult to find the way to do this at first?
- How did we overcome the problem?

Discuss how this relates to solving other problems (e.g., very often we need to look outside the things that we think are the problem, to understand the real causes before we can go about solving them). In this game, we had to look outside the square to find the solution.

Example of an Ice Breaker: 9 dot game



Objectives

To raise awareness about creativity and conditions that favor and constrain it

Duration: 5-10 minutes

Materials Paper and Pen

Methodology

1. Draw 9 dots on a sheet of paper, as shown
2. Ask the participants to connect all nine dots using only 4 lines and without lifting the pen.
3. The participants can work individually on the exercise but a few participants can work on the problem on a sheet of newsprint in front of the group.
4. If no one can solve the problem, show them how to do it (see picture).

Discussion & Conclusions

- Discuss why they did not manage to solve the problem themselves? Why did they only look within the square formed by the dots, and why didn't they look beyond? What restricted their creativity?
- Conclude that for creativity it is necessary that people must dare go beyond their usual habits, they should not feel restricted and need a supportive environment.

2. *FFS claps*

In the PFS, many different types of claps are used to energize the participants and also to welcome or thank a contributor.

Example:
1. The PFS clap: two rounds of three fast claps followed by one loud clap.
2. The OK clap: three fast stamps with one foot on the floor, three fast claps followed by the OK sign formed by the fingers.
3. The praise clap: three fast stamps on the floor, two fast claps followed by stretching the arms towards the person being welcomed or thanked.
4. The rain clap: the arms are raised above the head and the fingers are moving fast (like rain coming down), slowly the arms are lowered in a wide circle until they are down, followed by a loud clap with the hands.
5. The energy clap: the right arm is spinning around next to the body (like the wings of a helicopter) first slowly then faster. When the speed is at its fastest, a loud clap with the hands follows.

3. *Body Language*

All participants stand in a circle and give each other some space. A facilitator demonstrates how we can write letters and numbers with our bodies. Laughing ensured!

4. *Animal Sounds: Finding One's Group*

All participants receive a small paper with the name of one of 4 kinds of animals. Everyone starts walking around while making the sound of that animal. Ultimately, there should be 4 groups with all the participants with the same animal in the same group.

Purpose: To illustrate individual's need to belong (e.g., need to be accepted).

The group dynamic exercise emphasizes individual's need to belong or the need to be accepted. Thus during processing, a facilitator accepts all answers. Accepting all answers will encourage participants to share in the discussions as well as give them the feeling of respect.

Process the activity when each participant has found his group. Ask the following questions to everyone:

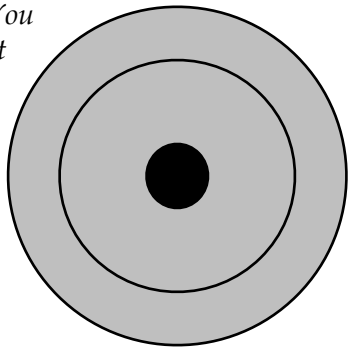
- Did you enjoy the game?
- How did you feel when you could not find your group?
- Did you think farmers will want to come back to FFS if they feel they do not belong?
- How can we make farmers feel accepted in the FFS?

5. *Animal acting - Just for fun*

Ask everyone to stand up and stand 2 meters apart from each other. Everyone now pretends to be an eagle. Stretch out your arms and fly… soar through the sky. Look at each other on how we are doing!
Now choose another animals to act, for example an owl. Stand still and only move you head from right to left….
Now ask people to be a Lion or an antilope. The Lions move slowly towards the antilope and the suddenly jump and shoot out as loud as they can: AAAAARRRGGHHHH!!!!!!!

6. *Target*

Ask everyone to stand on one leg and to close their eyes. You will see that it is difficult to stand still. Now draw a point on a flip chart. Ask participants to stand on one leg again but focus their eyes on the point on the flip chart. Now it will be easier to stand still.



<u>Learning</u>: When we are focused and we know where we want to go, we are stronger.

7. Rabbit - Wall - Hunter

The group is divided into two groups. The two groups play against each other. Each group has to choose to be Rabbit, Wall or spear. For rabbit, you put your hands like rabbit ears and you bend you legs; for wall, you make yourself tall with you hand high in the air; for hunter, you act like you are going to throw a spear.
The groups first discuss about what they will be. The whole groups has to be the same. Then the groups prepare for battle. Encourage them to sing, shout and dance as they are going to a war. Two groups stand opposite to each other. At the given time, everybody becomes a rabbit, a wall or a hunter.
Now we check which group wins:

- Rabbit wins from the Wall because it can jump over it
- Wall wins from Hunter as it can stop the spear
- Spear wins from Rabbit as it can kill the rabbit

The groups that wins gets a point. Play until one group has 3 points.

Purpose: To demonstrate the value of planning and coordination in a successful teamwork. Participants also learn that each character has weaknesses and strengths.

8. Simon says ...

Draw a circle on the ground. Everyone stands outside the circle.
One persons gives the direction, while the others have to follow the instruction, but only when he/she start the instruction with : Simon says…
Example:
Simon says inside (the circle): Everyone must jump inside the circle
Simon say outside (the circle): Everyone must jump outside the circle
Inside: you must stay where you are
Simon says inside when you are already inside: you must jump up remaining inside the circle.
Gradually, the instructor will talk faster and make it more difficult:
Whoever makes a mistake is out.

9. Lion and goats - dividing groups

Participants are requested to roam around the room as if they were goats grazing. The facilitator explains that a lion is approaching and that only the goats that are in groups of a certain number, for example groups of six will be safe. When the lion comes, participants must act quickly and form groups of the exact number. This is repeated until the desired numbers of groups are formed.

10. Dancing and signing

In FFS, participants sign and dance a lot. This is always a good energizer. Ask participants to compose their own songs about their experiences in FFS.

STEP AHEAD FARMER

Ref: Step ahead farmer we Go forward
We thank RAB who brought FFS
Facilitators you gave us, made of us experts
in agriculture now our Soy is the best.

1: We use updated techniques
Improved seeds to boost the yield
We use Rizobium with all fertilizers
Manure and chemicals
now our Soy is the best
.
Ref

2: The plants help us in many ways
It takes place in nutrition
It provides economic means
And we step ahead going forward
Now our Soy is the best.

Ref

3: We urge our supporter RAB to stay close to us
To provide technical support as well as in knowledge
So our Soy will remain the best.
our Soy is the beeeest----------

TUZAGUKUNDA RWANDA RWACU

Let's sing Farmer Field Schools, in Twigire muhinzi Approach, let's talk about FFS that dignified us. Before we were poor, now look we are rich, because we were trained to invest less and gain more money.

REF: We will love you our Rwanda, Kigali Farmers and RAB, you trained us on nutrition, now we eat vegetables and mushrooms from our own fields.

Since long ago, we used to lack yield, our children were Malnourished, now look mushroom gardens, we operate in groups , we farm and get good yield, we are now food secured and we grab Money.

REF

Thanks Twigire Muhinzi, health insurance, and land consolidation, in our District of Musanze we farm with Good agriculture services. We thank the Government of Unity that trained our Farmer promoters who taught us Integrated pest Management IPM, AESA and HIV prevention, and now we have improved our livelihood

REF

ACTIVITY 15

PRACTICING FACILITATION SKILLS THROUGH ROLE PLAY

About the session

Objectives

- Improving facilitation skills through practice
- Learn to critically observe others
- Learn to accept comments from others

How was it facilitated?

- Some participants play the role of facilitator, while others play to be farmers
- Role play about various situations which can happen in a group
- Groups discussions

This exercise aims at improving facilitation skills and serves as group building skill as well. The following procedure is employed:

a. Each small group (zone) was requested to select an 'actor-facilitator' among themselves and the rests as the 'actor-farmers';
b. The 'actor-facilitator' portrayed a role of an FFS facilitator while the 'actor-farmers' portrayed their roles as FFS farmers;
c. The 'actor-facilitator' was asked to put into action all the good characteristics of an FFS facilitator that the small group knows, as well as the proper way to answer the question 'what is this?'
d. Each small group (zone) then critiqued the role play presentations of the other small groups;
e. A participatory discussion was later undertaken to summarize the good characteristics of an FFS facilitator and the proper ways of answering the question 'what is this?', in an FFS context.

After all the small groups were through with their respective role-play presentations, lengthy participatory discussions ensued. In this regard, a number of worthwhile observations were noted down by each small group, namely:

a. Some 'actor-facilitators' role played good characteristics such as using the participatory, experiential, and discovery-based approaches;

b. Some 'actor-facilitators' and 'actor-farmers' portrayed how to address conflict management related to concerns like uninterested or less active FFS participants;
c. Some 'actor-facilitators tend to act like a boss rather than a leader while others were directly answering farmers' questions
d. Some groups have very long presentations while others displayed good time management.

During leveling-off for a common understanding of an effective FFS facilitator, a number of key areas were suggested by the IMT to the big group for consideration in their FFS facilitation, namely:

Methods of facilitation

a. Answering a question with another question
b. Posing 'what if' scenarios, and
c. Facilitating 'uninterested', 'domineering', and 'shy' participants.

Attitudes of facilitators

a. Coming ahead of the scheduled time;
b. Working with the group as a participant;
c. Acting as a model;
d. Putting oneself (facilitator) as coequal of the participants.

ACTIVITY 16

ADULT LEARNING & NON-FORMAL EDUCATION (NFE) METHODS

About the session

Objectives

- To understand the difference between adult and child learning
- To create an excellent environment for adult learning
- To apply good skills for adult learning

How was it facilitated?

- Implement discovery based techniques
- Learning by doing
- Theoretically by asking short question and discussions

What is learning?

- Process of acquiring some new knowledge, attitudes & practice (KAP)
- Not a sole preserve of younger people; adults do continue to learn, to grow & to change; nobody is too old to learn

Who qualifies as an adult?

- As individual: responsible for his/her own life; self-directing
- Biological: physically mature
- Legal: 18 years old (as stipulated by law)
- Social: performs adult roles (as parent, livelihood earner, head of households)

How learning takes place among adults?

- *Existing popular knowledge recognized and valued.* Participants already possess knowledge; synthesis of popular knowledge with existing scientific knowledge strengthens learning experience
- *New knowledge built on existing knowledge.* As people begin to appreciate what they already know, they are more open to seek new information, thus enhancing the learning process
- *Participants learn to exercise control.* Emphasizes active participation to generate their own knowledge; take responsibility for their own learning;

constitutes a powerful impetus to learn and exercise control over their learning

- *Learning becomes a collective process.* As a result, participants learn to get together, collectively seeking & analyzing information
- *Learning creates informed options.* Collective analysis opens up various alternatives, debated based on concrete information; participants are able to accept and reject options on an informed basis; creates a sense of empowerment, on confidence that information was understood and interpreted
- *Actions emerge out of this analysis.* Involvement in the process of analysis creates a sense of ownership of that knowledge and willingness to transform that situation; participants then are able to take concrete actions

Basic Difference between Child learning and adult learning

In a participatory discussions on 'Creating an effective environment for adults to learn in an FFS setting' participants compared the basic differences between child learning and adult learning.

PARAMETERS	CHILD	ADULT
1. Nature of learners	▪ Children have less knowledge & experience	▪ Adults possess relevant knowledge & experience to be used in learning process
2. Motivation to learn	▪ External pressure from parents or teachers; competing for grades; consequences of failure	▪ Driven by internal motivation (desire for recognition, increase confidence or self-esteem; better quality of life)
3. Role of trainer/teacher	▪ Possesses expertise & authority; source of knowledge & information	▪ Facilitates process; participants' experiences are acknowledge & use
4. Learning need	▪ Application for 'real' life & future	▪ In response to needs relevant to present situation
5. Content	▪ Experts decide on learning (formal & uniform curriculum)	▪ Participant-centered; emphasis on process
6. Orientation	▪ Subject matter-centered; emphasis on content mastery	▪ Participant-centered; emphasis on process

7.Methodology	▪ Information transfer from teacher to student	▪ Sharing stimulates learning between or among peers thru participatory processes

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Adult learning as an experiential process

- Experiences something directly, then;
- Reflects on experiences as something new or related to other experiences, then;
- Develops some concepts, which he/she;
- Uses in subsequent action & derives new set of experiences.

Adult learning and non-formal education (NFE) techniques

Participants are exposed to many adult learning and non-formal education (NFE) techniques during their training course

- *Discovery-based learning techniques* allow adults, like farmers, to learn through self-discovery. These discovery-based learning techniques include field observations, critical analysis of their observations, and taking appropriate actions based on their analysis. In the FFS, several discovery-based tools, such as the agro-ecosystem analysis (AESA), 'ballot box' pre- and post-tests, moving exams, and insect and disease zoo exercises, are used to facilitate the adult learning process.

- *Experiential learning methods* allow adults, like farmers, to learn through the continuous sharing of their experiences. In an FFS setting, the trainers act more as facilitators rather than technical experts. The learning process considers the fact that farmers, as adult learners, have acquired considerable knowledge, which when shared to their co-farmers will allow every individual farmer to acquire new knowledge.

- *Participatory approaches* allow farmers to develop their camaraderie, teamwork, cooperation, and unity as a group. It is through their group actions that the acquisition of new knowledge is facilitated. These group activities include agro-ecosystem analysis (AESA), planting, weeding, and other cultural management operations, as well as field day, folk media, and graduation ceremonies preparations.

ACTIVITY 17

CONCEPT AND PRACTICES OF INTEGRATED PEST MANAGEMENT (IPM)

About the session

Objectives

- Participants to have a concrete understanding of IPM, how to apply IPM, why to apply IPM and when to apply IPM.

How was it facilitated?

- By using short guide questions and participatory discussion
- Visiting various fields with and without IPM techniques for comparison

IPM PRINCIPLES AND TECHNIQUES

What is integrated pest management (IPM)?

Integrated pest management (IPM) is the careful consideration of all available pest control techniques and subsequent integration of appropriate measures that discourage the development of pest populations and keep pesticides and other interventions to levels that are economically justified and reduce or minimize risks to human health and the environment. IPM emphasizes the growth of a healthy crop with the least possible disruption to agro-ecosystems and encourages natural pest control mechanisms.

Some negative aspects of pesticides

a) The continuous use of pesticide has lead to development resistance to some pests and other disease causing organisms.
b) Pesticides are costly, and sometimes the proper ones are not available to most of farmers in rural areas
c) Pesticides have restrictions when using them
d) Application of pesticides without protective gears, failure to follow instructions may cause human health risks, where by toxic substances/ residues accumulates in the food chain

e) Improper handling of pesticide may seriously damage the environment by killing living organisms in a certain ecosystems

What are the basic principles of IPM?

- Growing a health crop in a healthy soil
- Conservation of natural enemies
- Regular visits and observations and assessment of the crops
- Empowering farmers to make them becoming experts
- Continuous improvement of soil fertility
- Safe exploitation of the genetic diversity/crop varieties,

1. ***Grow a healthy crop in a healthy soil***

Question: How can we maintain our crop healthy?

- Follow all IPM techniques
- This will allow our crop/livestock to recover more quickly from the environmental, management, pests and or disease stress
- It will enable our the crop to develop natural defense against pests and disease attacks

2. ***Conserve natural enemies*** (farmer and environmentally friendly)

- These will help to put free biological control for living organisms to facilitate suitable good biodiversity,
- Avoid killing beneficial insects and encourage them to live freely and to multiply and, whenever possible, breed and release them into the field.

3. ***Observe the field regularly***

Many changes may occur in the field at any time. So visiting our field regularly will enable us to know what problems occur in field. Thoroughly observation and early discovery enables timely and proper decision making and quick action.

When pests or disease are observed in the field, it is important to assess:

- At what time does it occur?
- Which stage of growth/life cycle is most destructive?
- Which plant parts is affected?
- How long is the life cycle?
- What conditions favors their multiplication?
- What are the host plants?
- What other crops/plants are not affected?
- How do they spread?

4. Farmer to become an expert

Through FFS, farmers will gain confidence and be able to make thoroughly observations and deep discussion in order to come up with various proper options on ***what, how, where, when, why***, and eventually what to do in their fields if there is a problem. They are fully involved through discussion in small groups, participating practically in all activities***, (Hands on)*** and also from field and farmer ex- change visits. Normally farmers are proud when given chances to contribute their ideas. Being praised will encourage them to learn from their neighbors and do more in their field and sometimes to compete to each other. Through this the impact spread more quickly too many farmers at a low cost.

5. Continuous improvement of soil fertility

Soil fertility is a determinant factor for the growth and vigor of the plants which has an important influence of the health of the crop. Keeping an appropriate soil fertility level in a given plot allows having plants which can resist or tolerate pests and diseases attacks and thus allows reaching a satisfying production level. It is thus fundamental to take into consideration that successive production on the same plot contributes to take away nutrient elements and fertility maintenance necessitate replacing the exported elements through application of fertilizers.

For example, in the specific case of striga control in cereal production systems (maize and sorghum), it has been noticed that application of fertilizers and more specifically organic fertilizers has a direct and rapid positive consequence on striga control as the population of striga per unit surface is significantly reduced while the growth of the cereal crop is boosted and the production significantly increased. In conclusion, maintenance of a good level of soil fertility is completely part of the pests and diseases control strategy.

6. Safeguard genetic diversity/crop varieties,

Existence of various varieties within a crop species is a positive property to be taken into consideration for the purpose of pests and diseases control as well as for ensuring diversification of agricultural products to be availed at the market. In the context of pests and disease control, it has to be reminded that pathogens and pests exists as populations grouping different strains or races within a given pathogenic or pest species. These strains or races have different properties in terms of virulence and aggressiveness to the various crop varieties. There are relationships between crop varieties and pathogenic/pests races or strains where some relations are compatible (meaning that the strain arrive to develop and cause diseased damages) while some others are non-compatible (meaning that even if the presence of the strain in contact with the plant tissues, there is no development of the disease). The balance between plant and pathogenic/pest populations are dynamics as a result of selection pressure. If only a limited number of varieties are grown, there are selection pressure processes leading to development of the only strains/races which are compatible with the grown varieties resulting in a predominance of these particular strains within the pathogenic populations. In these conditions, there is a phenomenon of resistance breakdown as the plant varieties which are grown are affected by a predominant

population of compatible strains. As solution to this constraint, it is necessary to avoid/limit this phenomenon of selection pressure through deploying the genetic diversity of the crop which might contribute to keeping a balance among pathogen populations avoiding thus predominance of some particular races or strains.

IPM Practices and Techniques includes

a) Proper site selection
b) Proper land preparation
c) Use proper planting material
d) Proper spacing
e) Timely planting and planting depth
f) Timely weeding and weeding frequency
g) Mulching and use of cover crops
h) Pruning and de suckering
i) Water management
j) Control of pests and diseases include;
    - Use of resistant varieties
    - Use of clean planting materials
    - Use of early maturity varieties
    - Planting crops with barriers
    - Proper field hygiene/sanitation, very important after harvesting
        - Destruction of infected plant residuals
        - Isolation distance
    - Quarantine
    - Logging of diseased plants
    - Use of natural enemies (biological control)
    - Intercropping and crop rotation
    - Land fallow
    - Timely harvesting
k) Soil fertility management

Key elements of Integrated Pest Management (IPM)

How?

- Proper site selection
- Proper land preparation
- Good planting material
- Right spacing between plants
- Timely planting at right planting depth
- Timely weeding and weeding frequency
- Mulching and use of cover crops
- Pruning and de suckering
- Good water management
- Regular field observation to allow early identification of a problem

The RESULT

A healthy crop

Conservation of natural enemies

Reduced pesticide use

Control of pest and diseases

Improved soil fertility

Increased production

Farmers become experts!

Important components of IPM identified in a brainstorming session during the training of Master Trainers

a. ***Resistant varieties:*** Selecting pest-resistant varieties best for local growing conditions, and maintaining healthy crops, is the first line of defense. Farmers and agricultural technicians can jointly evaluate new improved varieties by comparing them with farmers' popular varieties regularly through participatory technology development (PTD) activities to identify new ones that will outperform their popular varieties.

b. ***Biological control:*** Natural biological processes and materials can provide control, with minimal environmental impact, and often at low cost. The main focus here is on promoting beneficial insects that eat target pests. It includes conservation of natural predators or augmentation of natural predators. Biological insecticides, derived from naturally occurring microorganisms (e.g., Bt, entomopathogenic fungi, viruses, and nematodes), also fit in this category.

c. ***Mechanical or physical control:*** Should a pest reach an unacceptable level, mechanical methods are the first options to consider. They include simple hand-picking, erecting insect barriers, using traps, and tillage to disrupt breeding of insect pests. Uprooting, rouging, or de-leafing can also be undertaken to reduce inoculums during early development of plant diseases.

d. ***Cultural control:*** Keeping an area free of pest-conducive conditions by removing or storing waste properly, removing diseased areas of plants properly, timely planting, crop rotation, inter-cropping, late water floods, sanding, and the use of disease-resistant varieties.

e. ***Chemical control:*** As a last resort, chemical insecticides must be used in manner least disruptive to biological control. Synthetic pesticides are generally used only as required and often at specific times in a pest's life cycle. Many of the newer pesticide groups are derived from plants or naturally occurring substances (*e.g.*: nicotine, pyrethrum and insect juvenile hormone analogues), but the active component may be altered to provide increased biological activity or stability.

ACTIVITY 18

SETTING UP EXPERIMENTS IN FFS

About the session

Objectives

- Learning how to set up experiments based on gap analysis
- Solving location-specific problems

How it was facilitated?

- By using Participatory Technology Development techniques

Example from the training course for Master Trainers

A Cultural Management Trial (CMT) component was established in the TOT 'learning field' for the TOT participants to learn the process of solving location-specific problems using the Participatory Technology Development (PTD) approach. Location-specific problems were arrived at after prioritizing the cultural management issues that arose from a previous gap analysis activity. The gap analysis was taken on through a prior Participatory Rapid Appraisal (PRA) conducted by IMT and MTs. A participatory discussion on the gap analysis outcomes among the TOT participants and IMT resulted to the prioritization of cultural management issues and studies that were to be addressed by the TOT participants in their 'learning field'.

a) Variety assessment trials. This part of the study field was planted with various Soybean varieties in order to compare variety performance. A total of 5 Soybean varieties were planted: a) Peka 6, b) SB 8, c) SB 24, d) Saga and e) MZ607. Participants observed performance of varieties under the same management and ecological conditions. Performance issues observed included, i) germination rates, ii) pests and diseases incidences, iii) crop vigour, iv) yield and v) grains quality (size, color etc). The ultimate objective of this study was to make participants aware of the best varieties of Soybean

that will wish to use with farmers in the districts. However, it was agreed that the results from ToT study plots should not be taken as final for decision making since the same varieties need to be evaluated in different local specific environment to assess performance in other agro-ecological conditions. This was then agreed to be done during the ToT that would be carried out in each agriculture zone division.

b) IPM v/s FCP. Pests and disease control. In this part of field study participants compared the ordinary way for pests and disease control used by most farmers of regular spraying chemicals with that of IPM where evaluation is done prior to spraying. Most of IPM options under this category included use of natural enemies, defoliation of diseased leaves, and other cultural management practices. However, spraying can also be part of IPM control and when necessary.

c) Fertilizer application trials. This field study was set to observe fertilizer response to soya beans varieties. The fertilization regimes included application of FYM (at 10tons/ha) and DAP (at 50 & 100 tons/ha), either by mixing FYM with DAP or application of each alone *(reference is made to the field layout maps)*. All fertilizer application regimes were compared with ordinary farmer practices for fertilizer applications.

d) Inter cropping. This field study exposed participants to the desirable Soybean intercrop options and spacing as well as right time to inter crop. Intercropping study was meant to increase knowledge on fertilizer improvement (nutrient balancing and replenishment), pests and diseases management.

Follow up crop growth

Each small group was then assigned to observe a specific CMT study on a weekly basis. Crop morphology and the associated cultural management needs of each crop were discussed on a weekly basis. However, other agronomic and relevant data were collected, summarized, and reported by each small group for critiquing with the whole group on a monthly basis. While these CMT studies would not solve all the cultural management problems of maize, soybean, and common bean in the TOT 'learning field', it would allow the TOT participants to understand the process of solving location-specific problems when they go back to their respective districts.


Late weeding
Early weeding


Late planting
Early planting


Variety Trial


FP
IPM

IPM Research Through FFS

Farmers are very much interested on the yields, quick maturity and less attacked by pest varieties, market, for this reason FFS have a great chance to test and validate on issues like variety performance on:

- Pests and disease tolerance
- What are proper Industrial/Botanical pesticides to apply, application rates, and when to apply
- Identification of varieties most suitable for various soil types, soil depth, and for different AEZ
- Varieties suitable for different land use systems like mixed cropping, inter cropping, mono-cropping
- Variety adoption to various spacing, no of plants of plants per hill
- Variety in relation with planting dates
- Variety response to various types and rates of fertilizer applications method of application

ACTIVITY 19

DESIGN AND LAYOUT OF THE FFS PLOT

About the session

Objectives

- Participant to be able to design the study plot addressing the problems identified during the knowledge gap analysis.
- To have a study plot with different options, giving the chance for farmers to choose which is suitable according to what he/she can achieve

How was it facilitated?

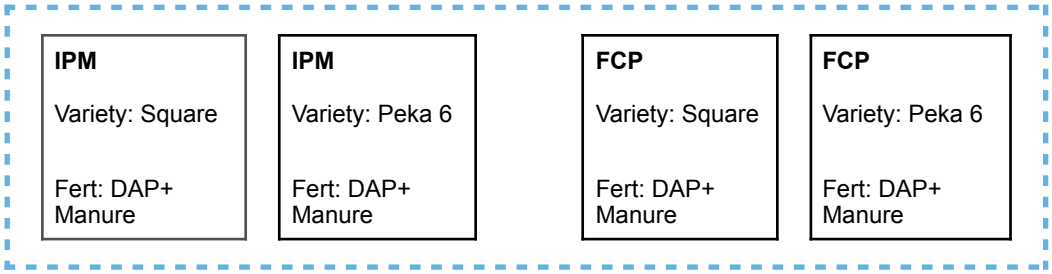
- Participants were actively involved in study plot design and layout
- Each small group is assigned to take care two plots

In line with experiments described in Activity 18, some examples of field designs are presented on the following pages.

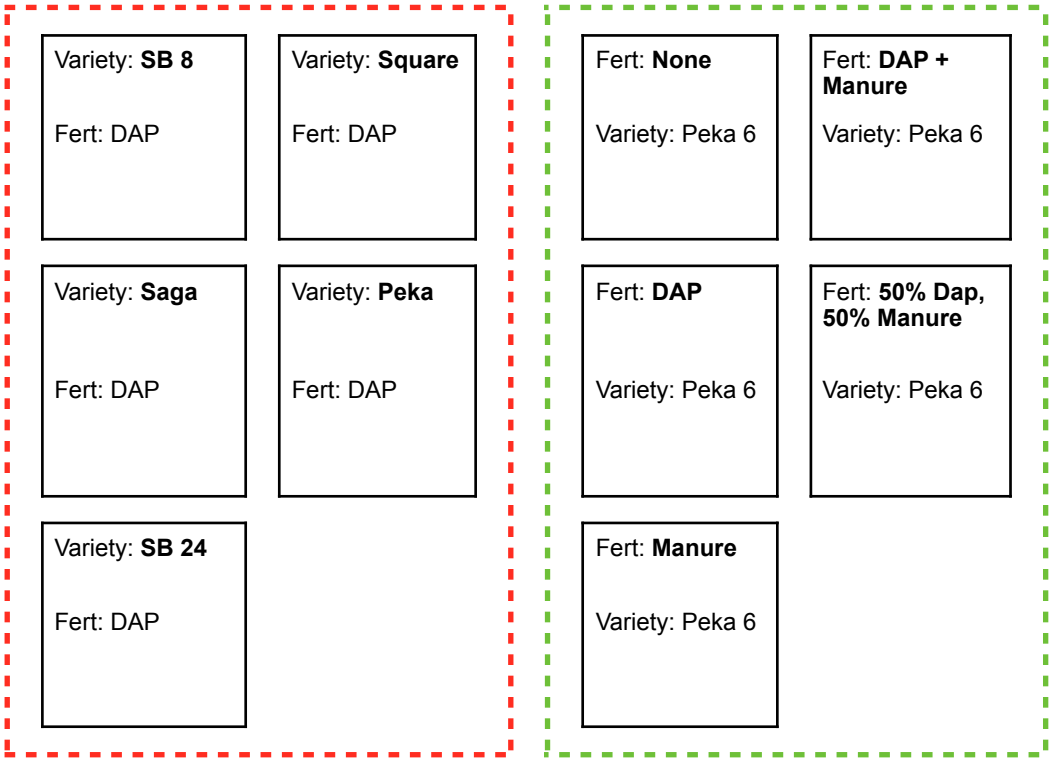
IMPORTANT NOTE:

As shown in 2nd example, it is good practice to repeat each treatment twice, if possible

Example of field layout for TOT on Soya Bean

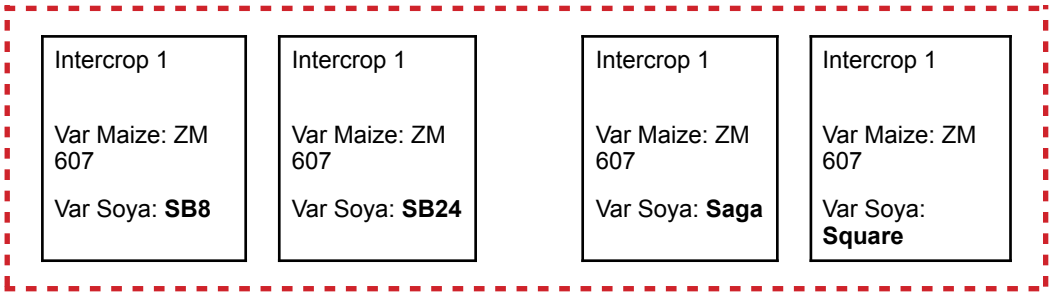


IPM vs FCP trial with two different varieties

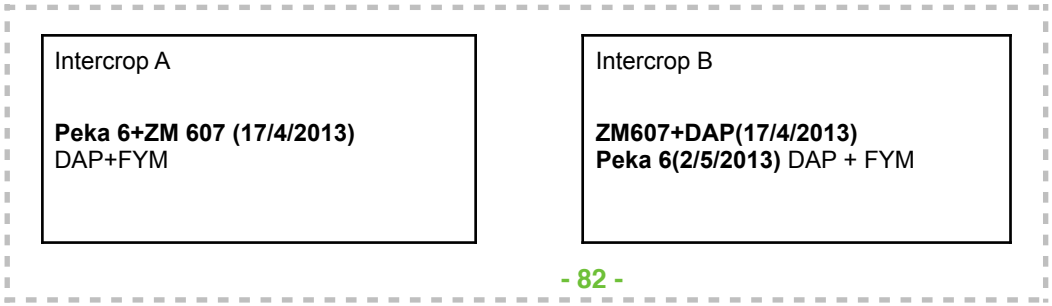


Variety Trial with 5 different varieties

Fertilizer Trial with 5 different fertilizer schemes



Intercropping trial with 4 different soya bean varieties in the same Maize variety



Intercropping trial with the same soya bean and maize varieties, planted at different times

Example for Soya bean and Maize intercropping trial

Objective: To find out the intercropping method that provides optimum yield and maximum profit from a given piece of land

Soybean & Maize planted on the same day Group 1		Soybean Alone Group 5
Path		
Maize planted first & Soybean planted after maize had germinated (Farmer Practise) Group 2		Maize Alone Group 6
Soybean Alone Group 3		Maize planted first & Soybean planted after maize had germinated (Farmer Practise) Group 7
Maize Alone Group 4		Soybean & Maize planted on the same day Group 8

Please Note:

1. Soybean Alone: spacing 40 x20 cm Rhizobium added; Maize Alone: spacing 75x 50 cm
2. Soybean and Maize intercropping maize spacing 100x50cm and soybean spacing 40x20cm
3. Total Area 31x16m; Size per plot 7.5x 7m; Path 1 meter width
4. Rhizobium 1kg per Hectare; DAP 100 Kg per Hectare and Farm Yard Manure 10 Tons per Hectare
5. Date of planting 13th May 2013; Varieties: Maize= ZM 607……and Soybean = SB 8
6. Soil fertility management: FYM applied 10ton/ha
   : DAP applied 100kg/ha

ACTIVITY 20

ECOSYSTEM AND AGRO ECO SYSTEM

About the session

Objectives

- Introduction of the concept
- Participants understand the interaction between living and non living things, visible and non visible things found in different environments
- Participants understand the importance of these identified living and non living/visible and non visible in agriculture production
- Participants are knowledgeable and are able to make observation and eventually derive to proper decision

How was it facilitated?

- By using short guide questions and participatory discussion
- Small groups to visit different sub plots, make observations, identify things found in the particular environment discuss, put the observations on the flip chart and present to the main group for further discussion and decision making.

What is Ecology?

- Identification of different ecologies examples like ecology of human being, bicycle, forest, lake
- What is meant by word system refer human being, bicycle, forest and lake
- What is now the meaning of ecosystem?

Ecos –"oikos" means house or earth
Ecology is made up of – Living things (biotic), non–living things, and physical environment (abiotic, some are visible and others non visible).
Participants must be able to identify and list them with their relationship, for each ecosystem

What is agro-ecosystem?

These are three words, **Agro** = It is a Latin word "agrare"meaning Agriculture, **Eco** –"oikos" means house or earth, **System** = means grouping of parts that

function together as a whole. Thus agro-ecosystem is a unit composed of the total complex of organisms in an agricultural area in relation with the environment which may further be modified by the farmer's own agricultural practices.

What things do we generally consider in agriculture?

Soil, Air, Light, Rain, Water, Soil moisture, Sun, Wind, Weeds/grass, other plants, humidity, diseases, pests, clouds, human beings, animals

How do things mentioned above interact with each other?

Data collection on pests, diseases, natural enemies, soil etc makes the basis for understanding the ecological interactions in the field

ACTIVITY 21

AGRO ECO SYSTEM ANALYSIS

About the session

Objectives

- To guide the participants and be able to make observation and collect useful data for proper decision making
- To encourage observation and analysis

How it was facilitated?

- Theoretically by asking short question and discussions
- Practically in small groups

AESA is a key guide to make observations, to identify the progress of crop in relation to the surrounding ecosystem for proper decision making

What is AESA?

- It is made up of three Greek words
- Agro = agrare which means agriculture
- Eco = oikos which means environment/ surroundings
- System= means interaction
- Analysis=observation the prevailing interaction/ relationship

Importance of AESA

- It helps to tell what is to be done
- It helps to show what was not known before
- It is a good system of keeping records
- It helps to teach farmers who cannot lead
- It enhances better understanding because of participation in small groups
- It helps to tell us the performance about our study plots
- It helps to show us what is to be taught in the next session/season

When to conduct AESA?

- It is important that AESA is done during the morning hours before insects hides themselves due to the increase in temperature.

How often should AESA be done?

- For long period crops such as Banana, Coffee, Citrus may be done once in a month
- For crops like cassava, may be done twice in a month (these stay in the field for at Least one year)
- For crops like maize, Irish potatoes, Sweet potatoes, and horticultural crops, AESA must be done at weekly intervals (such crops stays in the field for 3-6 months)
- For crops like amaranths AESA is done twice a week (such crops stays in the field for shorter period)
- BUT in case of disease and pest occurrence, depending on severity and the goal of the training, AESA can done two times a week for specific and detailed observations and for better understanding

The number of people needed?

- A group of 25-30 people will be divided into sub groups of five members
- This small group will be responsible to conduct the observation on a specific treatment/plot/no of plants, and present their observations to the main group for further discussions

Why a group of 5 people?

- To encourage participation and intensive discussion, for better learning. The smaller the group the more the interactions.

Selection of representative plants

- Equal number of plants must be selected from each plot as representatives without bias from all study plots/treatments/trials

- These selected plants must be marked by number for anyone to identify
- These plants are permanent where observation and data are to be collected at time when AESA is conducted

Determining the parameters to be included in the observations

Parameters will depend on what you want to learn/observe

In a variety trial you want to collect:
- Yield amount in kgs obtained from each plot /variety
- Time to maturity (no of days)
- Resistant to pest, diseases, drought, heavy rainfall

In a fertilizer trial, you want to collect:
Growth performance such as plant height, no of leaves, leaf length, leaf width, no of tillers, canopy, no of branches, tuber sizes, number of tubers per plant,root status at various stages of growth, nutrient deficiency, lab test at flowering stage

Data collection and processing

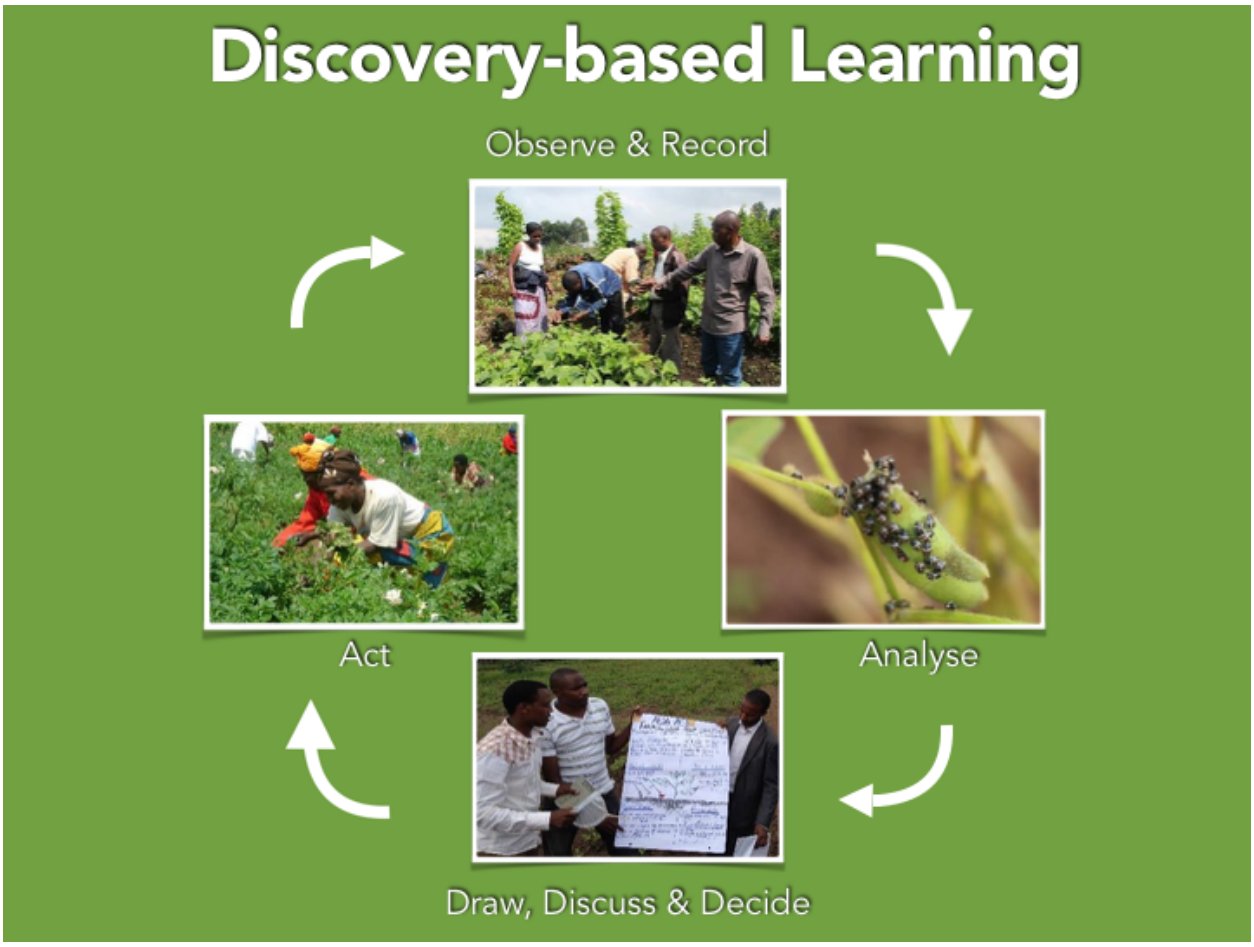
(a) Data collection

Each group of 5 will go to the field and make observations on selected plants, record all about the findings they have found. It is of important to collect the samples of insects, diseases, weeds to be displayed in front of the main group for verification. After data collection, they will do general observations to the whole plot to give equal chances even to non sampled plants, and the soil status.

(b)Data processing

The groups will come out from the field and sit under the shade for discussion and drawing the results on the flip chart according to the AESA format, reflecting the field situation (Introduction, drawing of the plant, data collected (parameters) on plant performance, pest and diseases, insect pest, natural enemies, neutral insects, weeds etc, soil status, and what do they recommend to be done, they need to be specific and analytical in case they found any critical issue like-total number of plants affected in relation to all plants in that plot.

(c) Synthesis and decision-making
Based on all data collected, the groups will discuss what needs to be done. The decision is then presented to the larger group.



Presentation

Every small group will have to present their observations to the main group, for further discussion and recommendations. Group members are given chance to ask questions where they need clarification, at which the members of that small group have to answer before they come to recommendations. Some questions without answers may erupt from discussion, resulting to have a special topic or conducting a trial within a trial for approval and better understanding to group members. The group can also decide to invite someone who can tell more about a specific topic (can be an experienced farmer or an expert) and sometimes the issues can be included in the next growing season.

R*ecommendations*
It is important to keep recommendation specific.

Example of recommendations after ASEA

What	When	How	By Whom
▪ Weeding	▪ First wk may 09	▪ Hand weeding	▪ All group members
▪ Spraying to control Blight	▪ 26/05/09	▪ Mix 20 gm (4 full table spoon) in 20 lt of water	▪ Small group Nyange
▪ Unknown disease	▪ 30/4/09	▪ To invite an expert	▪ Facilitator to invite the expert ▪ Chairperson to invite neighbors ▪ - Group members
▪ Harvesting	▪ 3/5/09	▪ Market information	▪ -Group leaders

Remember:

- All AESA sheets must be kept close to study plot site to be available when needed.
- Nothing has to be done if not indicated by AESA on general recommendation, unless otherwise.
- Each small group must be ready to display the samples they have collected.
- AESA is supposed to be done and get finished on the same day and at specific days.
- The small group will keep on changing to conduct observation on different plot, trials, study plots, to enable them to learn about other plants.

Example of implementation of AESA in the IPM vs FCP trial

In this specific trial, participants compared an Integrated Pest Management (IPM) approaches with the ordinary Farmers' Crop Protection (FCP) practices which are most common for soybean in most of the zones.

The practices under CPT were determined after participants discussion on their own experiences on what farmers normally do. A well-defined FCP practice protocol for soybean was used as the basis for pest and disease control interventions in the FCP plots on a weekly basis.

In contrast, pest and disease management options in the IPM plots were undertaken as a result of a whole group decision based on their weekly Agro-Ecosystem Analysis (AESA) results.

Implementation of AESA on a weekly basis

AESA was conducted in both IPM and FCP field. In the IPM plot, the ASEA recommendation would guide the next thing to do. A whole group decision was arrived at only after critiquing the small groups' AESA presentations and after considering all available environment-friendly pest and disease management options.

The results of the AESA undertaken in the FCP plots was used only by the participants to understand the unfolding phenomena before a previously defined farmers' crop protection intervention was carried out in the FCP plots.

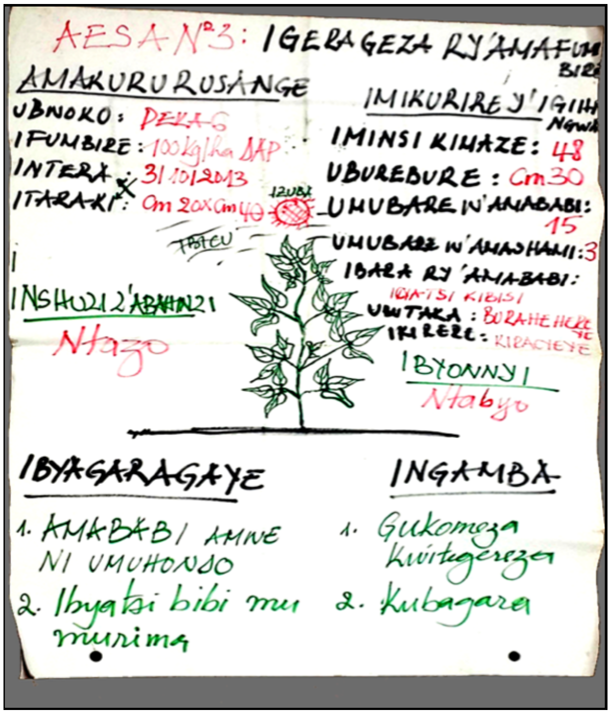
Which data needs to be presented to the group?

It was agreed that a minimum set of data required for background information, agronomic, and weather conditions that are most relevant for decision-making at the time of observations to be gathered for agro-ecosystem analysis (AESA). In this regard, it was agreed that five (5) randomly selected plants would be staked as permanent sample plants for gathering agronomic data.

With regard to developing a simplified AESA presentation format, it was agreed that the data collected be summarized and presented only as average of every parameter observed, such that all data on 'background information' and 'natural enemies' are jotted down at the left side while all 'agronomic' and 'pests' data are at the right side of the flip chart.

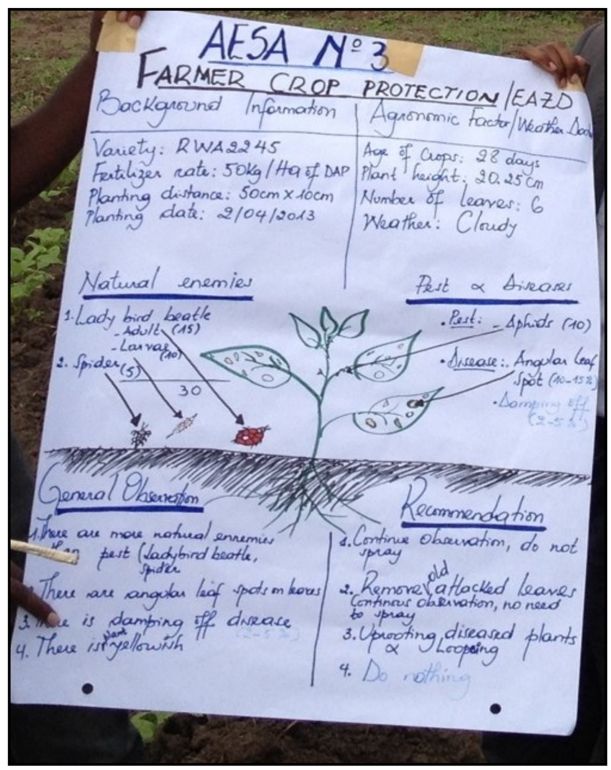
The importance of drawing

It was agreed that all observations will be presented by drawing them on the flip chart showing approximately how they appeared at the time of observations. Drawing is a very powerful tool used in any TOT or FFS sessions to recall the details of field observations. The use of pictures, projectors, illustrated materials should be minimized if the purpose will be to show farmers how insect pests, their natural enemies, disease symptoms, and other field specimens observed look like. As explained earlier therefore, the learning field and their adjacent fields should be used regularly as the 'visual aid' for the TOT or FFS participants. Thus, they should be encouraged to observe and collect live specimens in the field, as often as necessary, for their joint identification and sharing of experiences with the trainers. Lastly, the AESA presentation was meant to indicate a highlight of observations, which was printed down on the left side of the flip chart with the corresponding recommendations or actions to be taken on the right side.


AESA N°3: IGERAGEZA RY'AMAFUMBIRE
AMAKURU RUSANGE
UBWOKO: PEKAG
IFUMBIRE: 100kg/ha DAP
INTERA: 31/01/2013
IMIKURIRE Y'IGIHINGWA
IMINSI KIMAZE: 48
UBUREBURE: Cm30
UMUBARE W'AMABABI: 15
INSHUTI Z'ABAHINZI
Ntazo
IBYONNYI
Ntabyo
IBYAGARAGAYE
1. AMABABI AMWE NI UMUHONDO
2. Ibyatsi bibi mu murima
INGAMBA
1. Gukomeza kwitegereza
2. Kubagara


BIBI


GR: 5 GWIZUMUKAMU
IKUSANYAMAKURU LESA
ISOMO: GUKAMA
UBWOKO: JERSEY
248 kg
UMUKAMO
INSHUTI Z'ABOROZI
INYANGE
URUHU


AESA N°3
FARMER CROP PROTECTION/EAZD
Background Information
Variety: RWA2245
Fertilizer rate: 50kg/Ha of DAP
Planting distance: 50cm x 10cm
Planting date: 2/04/2013
Agronomic Factor/Weather Data
Age of Crops: 28 days
Plant height: 20.25cm
Number of leaves: 6
Weather: Cloudy
Natural enemies
1. Lady bird beatle
-Adult (15)
-Larvae (10)
2. Spider (5)
Pest & Disease
Pest: Aphids (10)
Disease: Angular leaf Spot (10-15%)
Damping off
General Observation
1. There are more natural enemies than pest (Ladybird beatle, Spider)
There are angular leaf spots on leaves
3. There is damping off disease
4. There is yellowish
Recommendation
1. Continue observation, do not spray
2. Remove old attacked leaves
Continue observation, no need to spray
3. Uprooting diseased plants & Looping
4. Do nothing

Agro-ecosystem analysis (AESA) presentation format for maize crop agreed upon by the IMT and MTT participants

AESA No 1 (GROUP 1)
NORTH ZONE

BACKGROUND INFORMATION

Study Plot: IPM (Maize)
Variety: Popular Farmers' Variety
Planting Distance: 75cm x 50cm
Fertilizer Rate: 200kg/ha DAP + 150 kg/ha Urea
Date Planted: 02 April 2013

AGRONOMIC & WEATHER DATA

Date Observed: 14 April 2013
Age of Crop: 16 Days
Plant Height: 40 cm
No. of Leaves: 5
Weather: Sunny

NATURAL ENEMIES
(draw with arrows pointing to where they were observed)

Spiders = 5
Ladybird beetles = 2
Long-horn grasshoppers = 2
TOTAL = 9

PESTS
(draw with arrows pointing to where they were observed)

Short-horn grasshoppers = 2
Semi-loopers = 1
TOTAL = 3

GENERAL OBSERVATIONS	RECOMMENDATIONS
1. There are more natural enemies than pests	▪ Do not spray insecticide to allow more natural enemies to multiply; continue monitoring
2. There are few weeds on the study plot	▪ Conduct spot weeding
3. There are many missing hills	▪ Replant missing hills (gap filling)
4. Portion of the study plot is eroded	▪ Construct erosion control system

ACTIVITY 22

WEED IDENTIFICATION AND MANAGEMENT

About the session

Objectives

- Participants to be able to identify different types and behavior of weeds
- To know the disadvantages and advantages of weeds.
- To know various ways of how weed spreads
- To understand different techniques on how to control weeds

How was it facilitated?

- By short question and discussion
- In small groups to identify different types of collected weeds and their names in Kinyarwanda
- Using real samples of the weeds during the presentation for exposure for everyone

What is a weed?

Weed is any plant that grows where is not wanted (Even if it is useful)

How weeds affect production?

- Weeds compete with crops for water, nutrients and sunlight
- Weeds can harbor insect pests and diseases or form breeding sites for insect pests
- Weeds decreases air circulation between plants hence increases humidity inside the crop. This can lead to more diseases, e.g. fungal diseases (they need humidity to infect a plant)
- Weeds may hinder harvesting operations and lowering crop quality when harvested mixed with the produce
- Some of the weeds like *Striga* feed direct from our crop and making it stunted and eventually with no production

Advantages of weeds

- Weeds can make good compost

- Weeds can be edible to animals &human beings as vegetables
- Weeds can be used as mulch
- Weeds can be used as green manure/tea manure
- Weeds can have medicinal strenght for human beings and livestock / botanicals use
- Weeds can prevent soil erosion (specific circumstance)
- Flowering weeds can be food sources for adult parasitoids wasps that feed in the nectar inside the flowers

Weed Classification

- *Classification 1: Annual or perennial weeds*

    - Annual weeds: These are weeds that germinate, flower, produce seeds and die within one year
    - Perennial weeds: These are weeds that remain in the soil from one year to another. They require more that one year to complete their life cycle. They have deep roots or creeping runners which spread vigorously

- *Classification 2: Broadleaf weeds or grasses*

    - Broadleaf weeds: Germinating seedling have two leaves; Leaves are broad
    - Grasses: Seedlings have only one leaf; Leaves are narrow

Left side: Narrow leaved **Right: Broad leaved**

Weed management

Weed Control is short term activity, focused on killing or removing weeds from the field.

Weed Management (IPM) is long term activity, including a range of activities that support each other. Management of weeds occur during crop growth or even

before sowing the seeds while control happen for existing weeds and prevent a buildup of more weeds (tubers, rhizomes etc)

➢ ***Weed control and management practices***

- Crop rotation; introduce conditions and practices that are unfavorable for a specific weed species
- Use uncontaminated seeds and planting materials
- Mulching; good for both weeds prevention and control.
- Increasing the plant density by creating the shade giving un favorable condition of weed germination
- Compost manure; (animal manures may contain weed seed)
- Use of cover crops
- Relay cropping; sowing seeds for the next crop before the standing crop is harvested
- Prevention from producing seeds; pulling weeds before flowering and not use weeds with seeds for mulching

➢ *Physical control*

- Hand weeding – using hand or hoe etc to cut off or uproot the weeds (note: may damage the roots or increase moisture loss)
- Ploughing
- Mulching

➢ *Chemical control*

- Use of herbicides – Note: compare costs of manual weeding versus costs of applying herbicides

Types of herbicides

Classification of herbicides is categorized into groups as follows;

1. *Contact herbicides* = sprayed on leaves and kill
2. *Systematic herbicides* = taken up by the roots and move within the plant to kill (either sprayed or applied to the soil)

and

1. *Selective herbicides* = kill some plants and not others
2. *Non selective herbicides* = kill all plants even the planted crop

Consideration when using herbicides

a. Herbicides can be expensive unless the labor costs are high
b. Herbicides performance depends on the weather, soil conditions and accurate applications

c. Check details of each herbicide brand carefully – improper use may injure
d. Some herbicides can be dangerous to human or animals e.g. 2,4-D can be damaging or irritating when in contact with the human skin
e. Herbicides can be toxic to both natural enemies, beneficial fungi or insect pests
f. Some herbicides are very persistent in the soil (can stay in the soil for long time)
g. Some herbicides are washed off during rain and loose their effectiveness
h. Continuous use of same herbicide may lead to tolerance or resistance of weeds against that herbicide
i. The best time to apply herbicide is when the soil is moist (for soil herbicide)
j. Apply herbicide in affected spots

➢ **Biological control of weeds by using Natural enemies**

a. These include insects, fungi and nematodes
b. Insects can control weeds by feeding on seeds, flowers, stems, roots, or combination of these
c. Fungi can leave on certain weeds and kill them
d. Nematodes (and fish) for those weeds growing in canals, marshlands, fish ponds etc.
e. Animals and human being feeding on the weeds
f. Resistant varieties
g. Planting other plants like Calliandra

Practical exercise: Collection, Identification, and Classification of Weeds Based on Their Morphology (Appearance) and Growth Duration (Life Cycle)

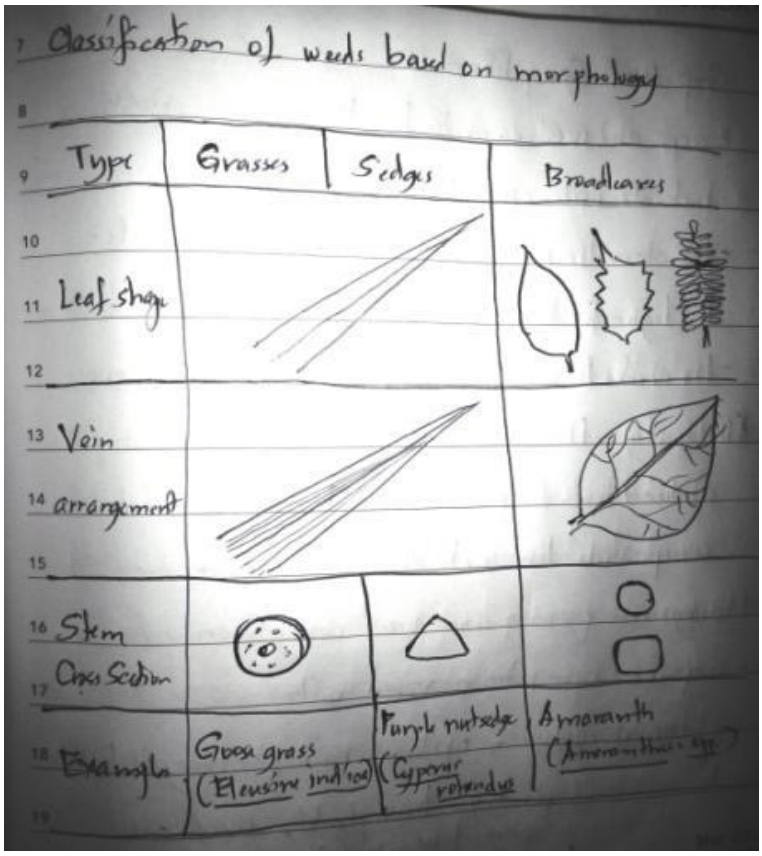
In another discovery-based exercise, the TOT participants, together with the IMT and MTs undertook field exercises, in small groups, to collect, identify, and classify common weeds in the learning and adjoining fields. After collecting the weed specimen, the IMT and MTs joined and assisted the TOT participants in identifying and classifying their field collections. In this regard, the IMT, MTs and TOT participants jointly classified the specimen based on their growth duration (life cycle) and morphology (appearance). Using this method, the different weed species were initially sorted out as either perennial or annual weeds, such that:

- *Perennial weeds:* Some examples of perennial weeds are purple nut sedge (*Cyperus rotundus*), itch grass (*Rotboellia cochinchinensis*), and lantana (*Lantana camara*); and

- *Annual weeds:* Some examples of annual weeds are goose grass (*Eleusine indica*) and amaranth (*Amaranthus sp.*) and aquatic nut sedge (*Cyperus difformis*).

Later on the different perennial and annual weeds were further classified into grasses, sedges, and broadleaves. Using this classification, weeds can be group into grass, sedge, or broadleaf weed, thus:

- *Grass weed* is a weed with distinct nodes and internodes, cylindrical and hallow stems, usually elongated leaves, and veins that are arranged parallel to the midrib of its leaves. Some examples of a grass weed are goose grass (*Eleusine indica*) and wire grass (*Paspalum disticum*);
- *Sedge weed* is a weed with no visible nodes and internodes, triangular stem, elongated leaves, and veins that are arranged parallel to the midrib of its leaves. All its leaves originate from a basal node and terminate on an inflorescence. An example of a sedge is purple nut sedge (*Cyperus rotundus*); and
- *Broadleaf weed* is a weed with usually, but not always, broader leaves than the grass and sedge, cylindrical or rectangular stem, and veins that form networks or arranged perpendicular to the midrib of its leaves. Some examples of a broadleaf weed are jute plant (*Corchorus olitorius*) and amaranth (*Amaranthus sp.*).



ACTIVITY 23

PLANT MORPHOLOGY "THE EXAMPLE OF SOYBEAN" MORPHOLOGICAL PARTS AND THEIR FUNCTIONS

About the session

Objectives

- Designed to equip the participants with an understanding of the soybean plant morphology and the major function of each morphological part for proper decision-making.
- Each participant to be able to draw a soybean morphology

How was it facilitated?

- Using short guide questions and participatory discussions
- In small groups to draw a soybean plant showing its different morphological parts and their functions and presented for critiquing to the main group
- Using alive soybean plant previously planted in plastic bottles

Why is it important to know soybean growth stages?

- To be able to discover what happens at a certain stage and may be to take immediate actions
- To learn two stages in soybean growth (vegetative and reproductive stages)

a) Vegetative stages

	VE	VC	VI	V2	V3	Vn
Plant morphology	Emergence stage -cotyledons (seed leaf) out, 1st leaf and growing point above the soil surface (5-14 days)	-1st two leaves unrolled to opposite sides - cotyledons supply food for 7-10 days	-1 true leave unrolled - 1 internode	-2 true leaves -2 internodes - root node establishment	-3 true leaves - 3 internodes	-1st growth of the plant -Vc-V5-v stage at every 5-7 days - V 5 - R 5 - V stage every 3-5 days -roots 0.5-0.75 in/day

Problems	-Poor seed viability -Moisture -Weeds -Vermins -Planting depth -Temperature	-Moisture -Weeds -Vermins -loss of cotyledons leads to 2-7% yield loss	-Weeds -moisture -Pests -diseases	-weeds -Moisture -Pests -diseases Check for nodulation if present	Weeds -moisture -Pests -diseases	50% loss of the leaves may cause 3% yield loss Weeds -moisture -Pests -diseases
Solutions				If no nodules think of N application		

b) Reproductive stages

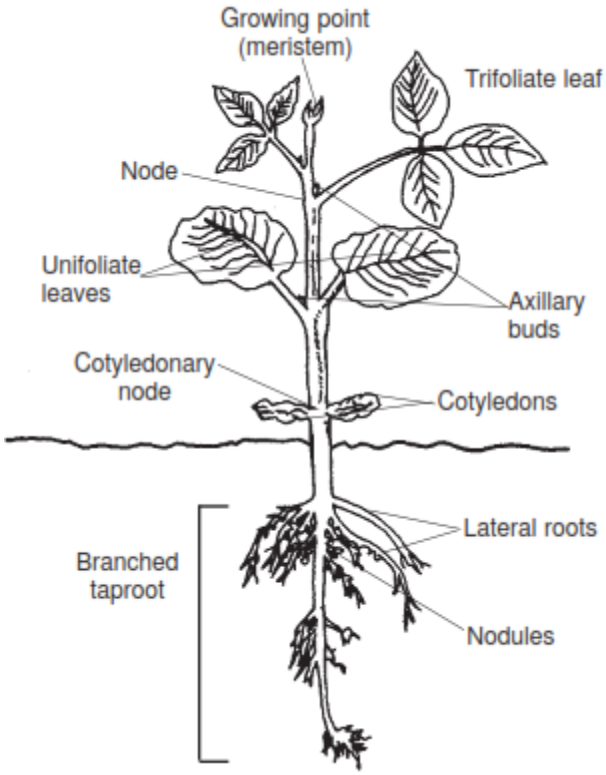
	R1	R2	R3	R4	R5	R6	R7	R8
	Beginning booming -Opening flower at any node -At 3-6 V stage -Flowering lasts for 3-4weeks -Flowering starts 6-8th WAE -Flowering peaks at R2-R3 ends at R5 -Root growth increase 1.3-3.2in/day	**Full bloom** -Open flowers at one of the two uppermost node -N fixation is at high rate -50% defoliation may cause 60% yield loss	**Beginning pod formation** -when 1st pod (3/16 in) at one of the 4 uppermost nodes -60-75% of flowers aborts and never contributes to the yield.	**Full pod formation** -1st pod 3/4in along the4uppermost Node. -This is a critical yield determining Period	**Beginning seed formation** -Seed is 1/8in large along the uppermost node -Large demand of water and nutrients -Maximum # of nodes Plant height Leaf area Root size and #	**Full seed formation** Pod containing a green seed that fills the seed cavity at one of the 4 uppermost node	**Beginning maturity** 1 pod anywhere with its mature color	**Full maturity** -95%of the pods have reached the mature color -Harvestable 7-10 days -Plant population can now be easily associated
Problems	-Weeds -moisture -Pests -diseases	-Weeds -moisture -Pests-**aphids are very active** -diseases	-Weeds -moisture -Pests **aphids are very active** -diseases	-Weeds -moisture -Pests -diseases	-Weeds -moisture -Pests -diseases			
Solutions								

Weekly Field Observation and Identification of Developing Morphological Structures in Soya bean at vegetative and reproductive stages

Participants perform field observation of the plant morphology and discuss the functions of plants parts. The objective is for participants to understand the parts and their importance/functions and management option to be considered for each growth stage. During discussions, the participants were equipped with management tips concerning pests and diseases management, weeds and moisture control, etc which are relevant to specific growth stage.

1. *Soybean morphology at vegetative to early reproductive phases.*

Figure I: Vegetative stage



Description of vegetative stages

Stage name	Description
Emergence	Cotyledons above the soil surface
Cotyledon	Unifoliate leaves unrolled sufficiently so the leaf edges are not touching
First-node (See Figure I.)	Fully developed leaves at unifoliate nodes
Second-node	Fully developed trifoliate leaf at node above the unifoliate nodes
Third-node	Three nodes on the main stem with fully developed leaves beginning with the unifoliate nodes
Successive -nodes	Number of successive nodes on the main stem with fully developed leaves beginning with the unifoliate nodes

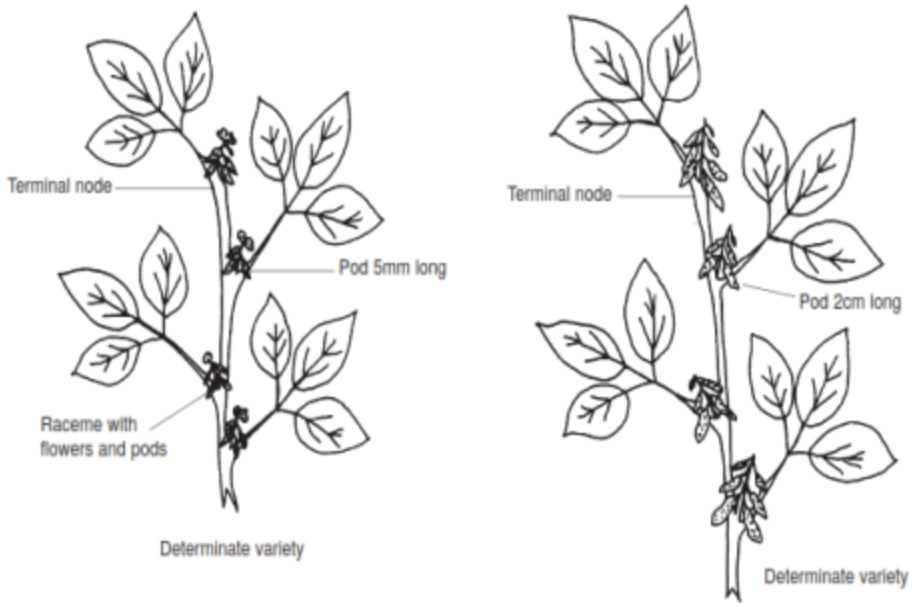
Management tips discussed by participants for Soya bean at vegetative stage:

- Both root and vegetative development depend on a good environment such as adequate soil moisture and nutrition (including adequate nodulation for nitrogen fixation) and the absence of high levels of disease and nematode infection.
- Under good environmental conditions, the root depth increases faster than shoot height during the vegetative development phase, but the dry weight of the above ground parts does exceed the root dry weight.
- At full growth, more than 80 percent of the roots are in the upper 4 inches of soil with a restrictive pan. This creates a situation in which deep cultivation (root pruning) or drought may reduce yields.

2. *Soybean morphology at reproductive stage*

The reproductive stage was categorized as being beginning pod and full pod.

Figure II: Reproductive stage (Left: Beginning pod and Right: Full pod)



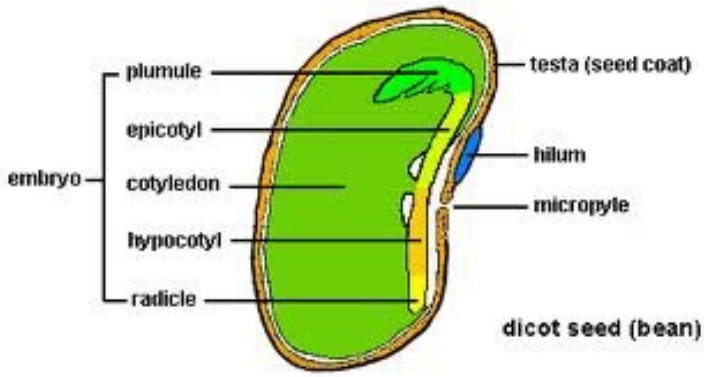
Description of Growth phases at Reproductive Stage

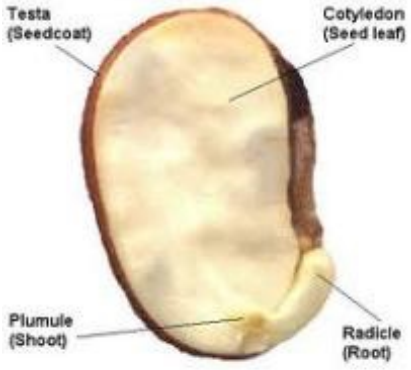
Stage name	Description
Beginning bloom	One open flower at any node on the main stem
Full bloom	Open flower at one of the two uppermost nodes on the main stem with a fully developed leaf
Beginning pod	Pod 3/16 inch long at one of the four uppermost nodes on the main stem with a fully developed leaf
Full pod	Pod 3/4 inch long at one of the four uppermost nodes on the main stem with a fully developed leaf

Beginning seed	Seed 1/8 inch long in a pod at one of the four uppermost nodes in the main stem with a fully developed leaf
Full seed	Pod containing a green seed that fills the pod cavity at one of the four uppermost nodes on the main stem with a fully developed leaf
Beginning maturity	One normal pod on the main stem that has reached its mature pod color
Full maturity	95 percent of the pods have reached their mature pod color; 5-10 days of drying weather are required after full maturity stage before the soybeans have less than 15 percent moisture

Seed morphology discussion

The discussions for morphology at reproductive stage, specificall at full-pod stage covered the bean structure as presented in the figures below.





Management tips to utilize at beginning and full pod growth stages

a) The failure to control weeds within 30 days can greatly affect yield.

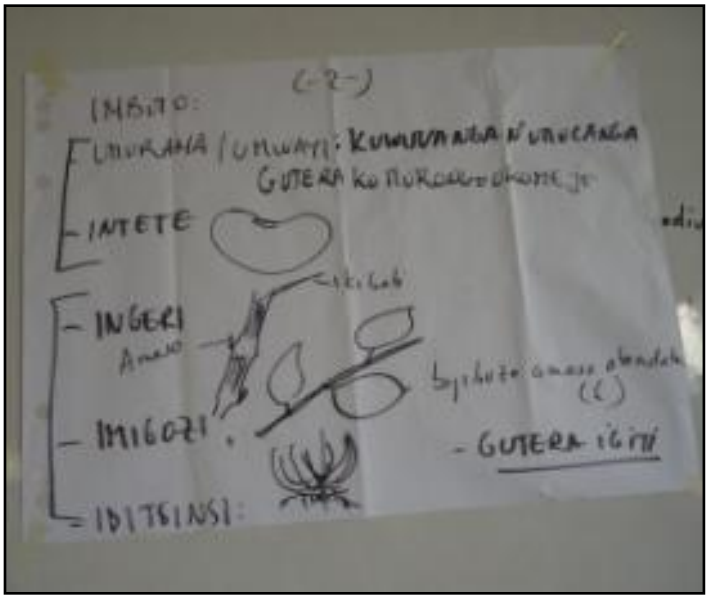
b) Prior to reproductive development (beginning and full bloom), plants can tolerate up to 40 percent defoliation (hail, insects, etc.) without significant yield loss, but 20 percent defoliation between beginning bloom and full seed can significantly affect yield.

c) Foliar diseases developing prior to full seed stage can significantly reduce yield.

d) At growth stage of beginning to maturity plants have reached physiological maturity and yield potential can be determined.

e) Stink bugs should be controlled up to full maturity stage.

f) Plants require good soil moisture through the full seed growth stage.



ACTIVITY 24

PESTS & DISEASES - INSECT CLASSIFICATION

About the session

Objectives

- To recognize that plants are attacked by Pest & Diseases
- To identify the Pest & Disease
- To identify the action to take
- To be able to classify insects
- To underderstand biological control

How was it facilitated?

- Through observation and analysis
- Discussion about possible solutions
- To learn from each other

Field collections, identification, classification of live specimens exercises with the training participants

Participants undertake field exercises, in small groups, to collect, identify, and classify common insect pests and their natural enemies as well as diseases and other crop abnormalities in adjoining fields. After collecting live specimen, the participants identify and classify their field collections based on their ecological functions. Using this method, the specimens were initially sorted out as either pests, natural enemies of pests, or diseases. The pests were then classified either as: defoliators, stem-borers, sap feeders, root feeders, grain/storage pests, or disease vectors. On the other hand, the natural enemies of pests were classified either as: predators, parasitoids, or insect diseases, while plant diseases were classified as: viral, fungal, or bacterial diseases and physiological disorders

During the process of identification and classification of field-collected specimens, there were heated discussions as to whether the insects collected were indeed pests or natural enemies of pests. There were also confusions as to whether the plant samples collected showing some abnormalities were caused by diseases or physiological disorders. It was at this juncture that the MT proposed that they (training participants) jointly develop *insect boxes.*

Classification of INSECT and other pests according to their function in crop ecosystem

Ecological Function	Specimens Collected	Destructive Stage
Defoliators	Skipper moth, butterfly Short-horn grasshopper Pumpkin beetle Lepidopterous larvae	Larva Nymph, Adult Larva, Adult Larva, Adult
Borers	Stalk borer	Larva
Sap feeders	Bugs Aphids	Nymph, Adult Young, Adult
Root feeders	Mole crickets White grubs	Nymph, Adult Larva
Storage/grain feeders	Grain weevil	Larva, Adults
Disease vectors	Whitefly Aphids	Adult Young, Adult

Classification of NATURAL ENEMIES of pests according to their function in crop ecosystem

Ecological Function	Specimens Collected	Kind and Stages of Pests Attacked
Predators (eat the whole insect or body parts of their prey)	Spiders	Moths, Butterflies, Green Leafhoppers, Larvae
	Ladybird Beetles	Eggs, Small Larvae, Aphids
	Dragonflies, Damselflies	Moths, Butterflies, Green Leafhoppers
	Long-horn Grasshopper	Lepidopterous eggs & larvae
	Ground Beetles	Soil-dwelling Pests
Parasitoids (lay eggs on eggs, larvae, pupae of	Parasitic Wasps	Parasitizes eggs, larvae, or pupae of lepidopterous pests

other insects and complete their life cycle inside the insect pests	Parasitic Flies (no specimen collected)	Parasitizes eggs, larvae, or pupae of lepidopterous pests & aphids
Insect diseases (microbes that cause disease of insects and attack larvae and adults of insect pests)	Fungal Diseases (no specimen collected)	Produce spores or mycelia on larvae and adults of host insect pests
	Bacterial Diseases (no specimen collected)	Attack the digestive systems of host insect pest larvae
	Viral Diseases (no specimen collected)	Attack/colonize insect body cells and causes body disintegration of host insect pests

Classification of CROP DISEASES according to their causal organisms

Causal Organism	Specimens Collected	Characteristic Symptoms
Viral Diseases	Common bean leaves with upward curling & maize leaves with streaking & yellowing (suspected viral diseases)	Yellowing, mottling, mild or severe stunting, curling of leaves, gall formation, ragged leaf edges
Fungal Diseases	Various leaves showing leaf spots/lesions & cottony or powder-like substances	Necrosis or discoloration, dry lesions or spots, presence of powdery substances (spores, mycelia) on the surface of lesions
Bacterial Diseases	Various leaves showing leaf spots/lesions	Necrosis or discoloration, water-soaked lesions, streaks, or stripes, presence of bacterial ooze, foul odor
Physiological Disorders	Bean leaves with deformities, maize leaves with streaks, yellowing & stunting	Aborted flowers, deformed fruits, general yellowing, streaking, uneven crop stand

Example of Control of Aphids by using Botanicals

Objectives

- To equip the participants on how to prepare and the use of botanicals.
- To control Aphids while conserving the ecosystem

How it was facilitated?

- By using short guide question and participatory discussions sharing the ideas to understand what normally farmers do, and to have a participatory way of controlling the aphid sp.

Preparation of botanical

- Ingredients
  - Crushed hot pepper
  - Crushed garlic
  - Soap
  - Water

How it was prepared

- Crushed hot pepper 0.25 kg was mixed in 3 lts of clean water, and steered the sieved , aiming to irritate the aphid as it comes into contact,
- The crushed garlic 0.1kg was then added to the mixture of water and hot pepper, the smell aiming to repel the aphids.
- The dissolved soap was the added to enable the pesticide to get attached to the plant.

Spraying regimes

The mixture was sprayed twice a week

Observation after the spray

- Few hours after the spray it rained and the pesticide get washed away.
- The percentage of attack was increasing to almost 70% of the plant, and the number per plant was also increasing,
- The ingredients used the pepper was not good from its smell, maybe it was harvested immature or the way it was preserved, likewise the Garlic

Further actions

It was agreed to spray *cypermethrin* to lower down the incidence of infestation. But, to continue using the botanical in case the condition resumes again.

Environment-Friendly Management Options for Viral, Fungal, and Bacterial Diseases

A number of available environment-friendly management options for viral, fungal, and bacterial diseases were discussed in small groups and later shared with all participants. These options considered their practicality as well as their applicability under Rwandan farmers' field conditions.

Suggested environment-friendly management options for different types of plant diseases

TYPES OF PLANT DISEASES	SUGGESTED MANAGEMENT OPTIONS
1. Viral diseases (bean mosaic virus, maize streak virus)	▪ Plant resistant varieties (select from the MTT variety adaptation study plot) ▪ Rogue (pull out) early symptom-showing infected plants and dispose them properly to eliminate source of inoculums ▪ Do not plant together with crops of the same family (soy bean for common bean, sorghum for maize) ▪ Avoid using pesticides to prevent pest resurgence and development of pesticide resistance of insect vectors
2. Fungal diseases (bean anthracnose, bean angular leaf spot, maize banded leaf and sheath blight, maize rust)	▪ Rogue (pull out) early symptom-showing infected plants and dispose them properly to eliminate source of inoculums ▪ De-leaf infected leaves or uproot infected plants and dispose of them properly ▪ Avoid using too much nitrogen fertilizers (e.g., urea or ammonium sulphate) ▪ Use higher levels of phosphorous and potassium fertilizers ▪ Do not use planting materials from harvest of fungus-infected varieties
3. Bacterial diseases (bacterial spot, bacterial grease spot)	▪ Rogue (pull out) early symptom-showing infected plants and dispose of them properly to eliminate source of inoculums ▪ De-leaf infected leaves and dispose of them properly ▪ Avoid using too much nitrogen fertilizers (e.g., urea or ammonium sulphate) ▪ Use higher levels of phosphorous and potassium fertilizers ▪ Do not use planting materials from harvest of bacteria-infected varieties

ACTIVITY 25

INSECT & DISEASE ZOO

About the session

Objectives

- To observe what insects and diseases do to plants
- To be able to classify insect and diseases
- To underderstand biological control

How was it facilitated?

- Insects and plants are collected kept in a small container (plastic bottle) and observed over a period of time.

During the process of identification and classification of field-collected specimens, there were heated discussions as to whether the insects collected were indeed pests or natural enemies of pests. There were also confusions as to whether the plant samples collected showing some abnormalities were caused by diseases or physiological disorders. Therefore, **insect and disease zoo exercises** were developed to better understand the ecological functions of their field-collected specimens (e.g., insect pests, natural enemies of pests, or diseases) in crop ecosystem.

- An ***insect zoo*** exercise involves the rearing of insects in small containers, such as used transparent plastic bottles or any similar vessels, which are wide enough for the insects to move freely inside and visible enough for farmers to observe insect behavior. If an insect is a suspected pest then it was reared together with a suspected host plant or plant part for keen observation. If, however, an insect was suspected as a natural enemy of a pest, then it was introduced into a container together with a suspected host pest for verification. Among others, the insect zoo exercise can be used to study:

  a. Ecological functions of insects (e.g., pest or natural enemy);
  b. Life cycles of insects (e.g., complete or incomplete metamorphosis);

c. Pest damage (e.g., insect pests);
d. Prey consumption and preferences (e.g., natural enemies)

- A ***disease zoo***, however, involves the rearing of a suspected fungal or bacterial diseased plant or plant part in a suitable container that will allow farmers to observe the development of a suspected abnormality. After providing the necessary conditions (e.g., moisture, temperature, oxygen) and the suspected abnormality developed further (e.g., lesions grew bigger) then it was probably a disease. If, however, it did not develop at all, then it was most likely a physiological disorder (e.g., nutrient deficiency or toxicity, damaged caused by low or high temperatures or pest or herbicide injury). A disease zoo exercise can be used to demonstrate:

  a. Causal organism of diseases (e.g., bacteria, fungus, or physiological disorders);
  b. Factors for disease development (e.g., room [low] or outside [high] temperature and humidity);
  c. Disease symptoms development (e.g., size, shape, and color of lesions, leaf spots, or streaks)

In their succeeding field activities, the training participants together with IMT established disease zoo exercises immediately after field collection to ensure the use of fresh specimens. The results of their disease zoo exercises are described below. Take note that based on the insect zoo studies they have set-up, the training participants have very little knowledge yet on other types of natural enemies of pests, such as parasitoids and insect pathogens. Similarly, their knowledge on predators is still limited, it being confined to common species, like ants, dragonfly, and spiders. In like manner, the training participants did not have enough practical skills in identifying crop diseases and physiological disorders. This means that future fine-tuning activities should focus more on such concerns.

It was observed that some insect zoo and disease zoo exercises were not properly conducted resulting to inconclusive results. In this regard, several recommendations were offered by the MTT participants and IMT to ensure more accurate results, namely:

a. Keep the insect and disease zoo set-ups within the training periphery to allow group observation and maintenance;
b. In the insect zoo for aphids, use more appropriate containers or similar vessels that can accommodate a live whole plant so that the effect of aphids can be well demonstrated;

c. For the insect zoo exercise, the suspected predator should be starved for at least 24 hours before introducing a suspected prey into an insect zoo container; and
d. Make sure that the sample to be used and the environmental conditions are appropriate for insect survival and disease development

Results of first insect zoo exercise

GROUP	STUDY UNDERTAKEN		RESULTS/CONCLUSIONS (RC)
	Pest Alone (PA)	**Pest vs. Natural Enemy (PN)**	
I (NAZDP)	Caterpillar vs. Maize leaf	Caterpillar vs. Spider	▪ PA: Caterpillar ate leaf margins of the maize leaf ▪ PN: Spider did not eat the caterpillar; ▪ RC: Caterpillar is a pest; Spider did not eat the caterpillar probably because it's not an appropriate prey (too big) or the spider is not yet hungry, hence the insect zoo must be repeated using different kinds of smaller preys
II (SAZD)	Weevil vs. Bean leaf	Frog vs. weevil	▪ PA: Weevil did not eat the bean leaf; ▪ PN: Frog did not eat the weevil; ▪ RC: Weevil did not eat the bean leaf because it was wilted; Frog did not eat the weevil probably because it's not yet hungry or the prey is not appropriate; Insect zoo will be repeated addressing the aforesaid issues.
III (EAZD)	Aphids vs. Bean leaf	Aphids vs. Ladybird beetle adults	▪ PA: Aphids remain on the leaf but the leaf was wilted; ▪ PN: Ladybird beetle adults ate all the aphids on the bean leaf ▪ RC: The bean leaf wilted due to sap feeding by the aphids, hence aphids are pests; Ladybird beetle is a predator
IV (WAZDP)	Weevil vs. Maize leaf	Aphids vs. Ladybird beetle adults	▪ PA: Weevil escaped; ▪ PN: Ladybird beetle adults ate all aphids on bean leaf in 1 hour. ▪ RC: The insect zoo on pest vs. maize leaf will be repeated using different kinds of pests; Ladybird beetle is predator

Results of different disease zoo exercises

GROUP	SPECIMEN	FINDINGS OF THE STUDY
I (NAZD)	Suspected fungal disease on maize leaf (initial size of lesion was 0.4 cm x 0.7 cm; no change on final size)	The lesions did not increase in size and no spores or mycelia produced; the lesion is probably an insect damage or caused by a physiological disorder
II (SAZD)	Suspected fungal disease on maize leaf (initial size of lesion was 4.0 cm x 1.0 cm; finally, the whole leaf was rotten)	Lesion increased rapidly to cover the whole leaf sample; there are blackish and whitish powdery substances on the surface of the lesion indicating that it is a fungal disease
III (EAZD)	Suspected rust disease on sorghum leaf sample (initial size of lesion was 0.4 cm x 0.8 cm; no change on final size)	Leaf sample dried before observation probably due to improper procedure; Exercise will be repeated following the recommendations on improved procedures
IV (WAZD)	Suspected fungal disease on bean leaf sample (initial size of lesion was 1.4 cm x 0.6 cm, final size was 2.0 cm x 1.6 cm) Suspected fungal disease on maize leaf sample (initial size of lesion was 1.5 cm x 0.4 cm, final size was 3.4 cm x 0.8 cm)	The lesions increased in size and produce blackish and whitish powdery substances (spores or mycelia) on the surface of the lesions indicating that they are fungal diseases

ACTIVITY 26

BALLOT BOX TEST

About the session

Objectives

- To test what participants know in a practical and fun way
- To encourage participants to observe

How was it facilitated?

- Set up 'ballot boxes as a moving exam
- Participants answer individually or in group.

What is a ballot box test?

'Ballot box' test is a field-based test administered to participants without using pens or pad papers. It uses specimens (e.g., materials, objects, plants, or animals) in actual crop ecosystem. Questions in a 'ballot box' evaluation dealt mainly on knowledge and skills in identification of plants, pests, pest damages, disease symptoms, arthropod pests and their natural enemies, fertilizers, chemicals, as well as soils, irrigation, and environmental stresses in crops.

For each question, there were three 'ballot boxes' representing possible correct answers to choose from and where participants put a replicate of their assigned numbers corresponding to a correct answer. A question referred for example to different insects in 3 containers or bags. In another instance, a question referred to a specimen indicated by a string attached to three plants in a crop ecosystem as possible answers.

Past experiences showed that for a 'ballot box' test to be effective, questionnaires should be framed to focus on functions of organisms or specimens rather than on their technical definitions.

Example of ballot box Pre- test used in the training of Master Trainers

This particular exercise was designed to develop functional 'ballot box' questionnaires for FFS on crops. This exercise is valuable for developing an evaluation instrument to assess pre- and post-training knowledge and skills gained by the FFS participants in crop production. The exercise consisted of two aspects, namely; (a) developing functional 'ballot box' questions, and (b) undertaking the 'ballot box' test using the functional questions. The individual scores of all participants is recorded. The highest score obtained was 79% while the lowest score was 35%. Overall, the average score was relatively low at 60% indicating that both their technical knowledge and field problem identification skills may still need further enhancement.

Functional 'Ballot Box' Pre-test 1 Questions and Correct Answers (underlined)

1. Which of these is not a predator? Specimens: (a) spider; (b) short-horn grasshopper; and (c) dragonfly
2. Which of these is a defoliator? Specimens: (a) silk beetle; (b) silk beetle; and (c) short-horn grasshopper
3. Which of these is a broadleaf? Specimens: (a) grass weed; (b) sedge weed; and (c) broadleaf weed
4. Which of this is a predator? Specimens: (a) long-nose short-horn grasshopper; (b) praying mantis; and (c) short-nose short-horn grasshopper
5. Which of these is a predator? Specimens: (a) plant weevil; (b) plant bug; and (c) predatory cricket
6. Which of these is an insect pest? Specimens: (a) predatory ladybird beetle; (b) plant weevil; and (c) predatory ladybird beetle
7. Which of these was caused by a defoliator? Specimens: (a) plant with a fungal disease; (b) plant with nutritional disorder; and (c) plant with leaves damaged by bean flies
8. Which of these is a sucking insect pest? Specimens: (a) plant bug; (b) lepidopterous larva; and (c) termite
9. Which of these does not help to improve soil fertility: Specimens: (a) termite queen; (b) honeybee; and (c) centipede

10. Which of these is a sedge weed? Specimen: (a) broadleaf weed; (b) sedge weed; and (c) grassy weed
11. Which of these is an insect damage? Specimens: (a) plant with fungal disease; (b) plant with nutritional disorder; and (c) plant damaged by a stalk borer
12. Which of these is an egg-predator? Specimens: (a) plant beetle; (b) aphids; and (c) lacewing adult
13. Which of these is an insect pest? Specimens: (a) predatory lady beetle; (b) planthopper; and (c) predatory ants
14. Which of these is an insect pest ladybird beetle? Specimens: (a) predatory ladybird beetle; (b) leaf-feeder ladybird beetle; and (c) predatory ladybird beetle
15. Which of these is not a predator? Specimens: (a) brown-winged dragonfly; (b) lepidopterous moth; and (c) blue-winged dragonfly
16. Which of these is a viral disease? Specimens: (a) sorghum plant damaged by insects; (b) cassava plant with mosaic virus disease; and (c) sorghum plant with nutritional disorder
17. Which of these is a fungal disease? Specimens: (a) leaf with sorghum rust disease; (b) leaf with maize streak virus disease; and (c) leaf with nutritional disorder
18. Which of these is a viral disease? Specimens: (a) leaf with sorghum rust disease; (b) leaf with maize streak virus disease; and (c) leaf with a nutritional disorder
19. Which of these is a grassy weed? Specimens: (a) broadleaf weed; (b) nut sedge; and (c) grassy weed
20. Which of these is a nutritional disorder? Specimens: (a) leaf with sorghum rust disease; (b) leaf with maize streak virus disease; and (c) maize leaf with nutritional disorder [phosphorous deficiency]
21. Which of these was damaged by a defoliator? Specimens: (a) sorghum leaf with early damage of earworm; (b) leaf with sorghum rust disease; and (c) maize stalk damaged by rodent
22. Which of these is an early damage of earworm? Specimens: (a) sorghum stalk damaged by stalk borer; (b) sorghum leaf with early damage of earworm; and (c) maize stalk damaged by stalk borer
23. Which of these leaves were damaged by defoliators? (a) bean leaves damaged by bean flies; (b) bean leaves with fungal disease; and (c) bean leaves without damage
24. Which of these is clearly at reproductive stage? Specimens: (a) bean plant at late vegetative stage; (b) bean plant at mid-vegetative stage; and (c) bean plant at flowering stage

2. *Familiarization Through Group Moving Exam Exercises*

A group 'moving exam' is a very practical tool used to progressively assess the participants' skills in identifying pests, their natural enemies, plant diseases, and other crop abnormalities from the field. It consists of allowing a group of farmers to move around, observe, discuss among themselves, and select the best answer from among specimens secured in flip charts, that will best describe the organisms' ecological function (e.g., whether the specimen is a predator, a parasitoid, a plant disease, or a physiological disorder). The 'moving exam' questions for the first and second exercises are as follow:

First Group 'Moving Exam' Questions (Correct answers are underlined)

1. Identify [specimen was a larva of a lepidopterous pest]: (a) larva or pupa? (b) defoliator or borer?

2. Identify [specimen was an adult of a bean leaf beetle]: (a) beetle or bug? (b) pest or natural enemy?
3. Identify [specimen was a predatory ant]: (a) wasp or ant? (b) predator or parasitoid?
4. Identify [specimen was an adult of a skipper]: (a) moth or butterfly? (b) adult of an insect pest or natural enemy?
5. Identify [specimen was a long-horn grasshopper]: (a) short-horn grasshopper or long-horn grasshopper? (b) predator or parasitoid?
6. Identify [specimen was a long-horn grasshopper adult]: (a) nymph or adult? (b) predator or parasitoid?
7. Identify [specimen was a wolf spider]: (a) spider or ant? (b) pest or natural enemy?
8. Identify [specimen was a predatory ladybird beetle]: (a) beetle or bug? (b) predator or defoliator?
9. Identify [specimen was a praying mantis]: (a) insect or spider? (b) predator or defoliator?
10. Identify [specimen was a predatory cricket]: (a) grasshopper or cricket? (b) predator or defoliator?
11. Identify [specimen was a long-horn grasshopper]: (a) short-horn grasshopper or long-horn grasshopper? (b) predator or parasitoid?
12. Identify [specimen was a wolf spider]: (a) spider or ant? (b) predator or defoliator?
13. Identify [specimen was a sorghum leaf with rust disease]: (a) maize or sorghum? (b) disease or physiological disorder?
14. Identify [specimen was a common bean leaf with mosaic virus disease]: (a) common bean or soybean? (b) disease or nutritional disorder?

Second Group 'Moving Exam' Questions (Correct answers are underlined)

1. Identify [specimen was a short-horn grasshopper]: (a) short-horn grasshopper or long-horn grasshopper? (b) defoliator or predator?
2. Identify [specimen was a long-horn grasshopper]: (a) long-horn grasshopper or short-horn grasshopper? (b) predator or defoliator?
3. Identify [specimen was a grub of a rhinoceros beetle]: (a) pupa or grub? (b) beetle or bug?
4. Identify [specimen was an adult of a rhinoceros beetle]: (a) natural enemy or pest? (b) beetle or bug?
5. Identify [specimen was a long-horn grasshopper]: (a) pest or natural enemy? (b) predator or defoliator?
6. Identify [specimen was a common bean plant with damping-off symptoms]: (a) soybean or common bean? (b) disease or nutritional disorder?
7. Identify [specimen was a sorghum leaf with rust disease symptoms]: (a) maize or sorghum? (b) physiological disease?
8. Identify [specimen was a maize leaf with symptoms of banded leaf and sheath blight disease]: (a) maize or sorghum? (b) disease or nutritional deficiency?
9. Identify [specimen was a predatory earwig]: (a) natural enemy or pest? (b) predator or defoliator?
10. Identify [specimen was a larva of a lepidopterous insect pest]: (a) pupa or larva? (b) defoliator or predator?
11. Identify [specimen was a black ant]: (a) wasp or ant? (b) predator or defoliator?
12. Identify [specimen was a mole cricket]: (a) mole cricket or field cricket? (b) root-feeder or plant-feeder?
13. Identify [specimen was a larva of a lepidopterous insect pest]: (a) pupa or larva? (b) Lepidoptera or Coleoptera?

14. Identify [specimen was a snail pest]: (a) pest or natural enemy? (b) snail or slug?
15. Identify [specimen was a butterfly]: (a) moth or butterfly? (b) adult of an insect pest or adult of a natural enemy?
16. Identify [specimen was a predatory cricket]: (a) cricket or grasshopper? (b) predator or defoliator?

After doing two (2) group 'moving exam' exercises, a quick analysis of the training participants' performance in the said activity revealed that their average skills were very satisfactory at 88% and 87% for the first and second group 'moving exams', respectively, which means that the participants can now correctly identify the ecological functions of almost 9 out of 10 animals or crop abnormalities that they commonly observed in the field. Nevertheless, the results imply that future fine-tuning of the training participants' identification skills for pests, their natural enemies, pest damages, and disease symptoms should be regularly undertaken. The percentage scores achieved by the training participants in the first and second group 'moving exams', respectively, for pests, their natural enemies, pest damages, and diseases symptom identification are shown.

Results of first and second group 'moving exams' obtained by the master trainers training (MTT) participants

ZONE	Sub-Group	1st Exam Score		2nd Exam Score	
		Point	%	Point	%
NAZD	1	25/28	89	26/32	81
	2	25/28	89	30/32	94
	AVERAGE	**25/28**	**89**	**28/32**	**88**
SAZD	1	23/28	82	27/32	84
	2	23/28	82	30/32	94
	AVERAGE	**23/28**	**82**	**28/32**	**89**
WAZD	1	26/28	93	32/32	100
	2	27/28	96	26/32	81
	AVERAGE	**27/28**	**95**	**29/32**	**91**
EAZD	1	24/28	86	27/32	84
	2	23/28	82	25/32	78
	AVERAGE	**24/28**	**86**	**26/32**	**81**
	OVERALL AVERAGE	**25/28**	**88**	**28/32**	**87**

Ballot box test used in training of Facilitators

1. Which of these is a defoliator? [Muri utu dusimba, ni akahe karya amababi y'igihingwa?] Specimens: (a) predatory ant; (b) lepidopterous larva; and (c) predatory cricket
2. Which of these is a fungal disease? [Muri izi ndwara, ni iyike iterwa n'uduhumyo?] Specimens: (a) maize leaf with fungal lesions; (b) maize with streak virus disease; and (c) maize leaf with insect damage
3. Which of these is not a predator? [Muri uki dusimba ni akahe katarya ibyonnyi?] Specimens: (a) dragonfly; (b) butterfly; and (c) ant[Which of these is a fungal disease? [Muri izi ndwara, ni iyike iterwa n'uduhumyo?] Specimens: (a) maize leaf with fungal lesions; (b) maize with streak virus disease; and (c) maize leaf with insect damage
4. [Muri uki dusimba ni akahe katarya ibyonnyi?] Specimens: (a) dragonfly; (b) butterfly; and (c) ant
5. [Muri utu dusimba ni akahe kona igihingwa?] Specimens: (a) predatory cricket; (b) short-horn grasshopper; and (c) predatory ladybird beetle
6. Which of these is an adult of an insect pest? [Muri utu dusimba ni akahe kageze ku kigero nyacyo cy'ubukure?] Specimens: (a) butterfly; (b) spider; and (c) long-horn grasshopper
7. Which of these is not a predator? [Muri utu dusimba, ni akahe katarya ibyonnyi?] Specimens: (a) predatory cricket; (b) short-horn grasshopper; and (c) chameleon lizard
8. Which of these weeds do not have nodes and internodes (sedge weed)? [Muri ibi byatsi, ni ikihe kidafite ingingo?] Specimens: (a) sedge weed; (b) broadleaf weed; and (c) grassy weed
9. Which of these is an insect pest? [Muri utu dusimba ni akahe kona imyaka?] Specimens: (a) short-horn grasshopper; (b) ant; and (c) spider
10. Which of these is a sucking insect pest? [Muri utu dusimba ni akahe kanyunyuza igihingwa?] Specimens: (a) bean beetle; (b) shield bug; and (c) ant
11. Which of these is caused by a defoliator? [Muri ibi bimenyeko, ni ibihe biterwa n'udukoko turya amababi y'ibihingwa?] Specimens: (a) leaf with small lesions of fungal disease; (b) leaf with large lesions of fungal disease; and (c) leaf damaged by short-horn grasshopper
12. Which of these weeds do you think belongs to the same group as maize (grassy weed)? [Muri ibi byatsi ni ikihe mu muryango umwe n'ibigori?] Specimens: (a) sedge weed; (b) broadleaf weed; and (c) grassy weed
13. Which of these is a predator? [Muri utu dusimba ni akahe karya ibyonnyi?] Specimens: short-horn grasshopper; (b) long-horn grasshopper; and (c) short-horn grasshopper
14. Which of these is a nutritional disorder? [Muri izi ndwara, ni iyihe iterwa n'ibura ry'intungagihingwa?] Specimens: (a) maize leaf with many lesions of fungal disease; (b) maize with few lesions of fungal disease; and (c) maize leaf with symptom of phosphorous deficiency
15. Which of these is not a predator? [Muri utu dusimba ni akahe katarya ibyonnyi?] Specimens: predatory cricket; (b) lepidopterous larva; and (c) short-horn grasshopper

16. Which of these is a viral disease? [Muri izi ndwara, ni iyihe iterwa na virusi?] Specimens: (a) maize with streak virus disease; (b) leaf with small lesions of fungal disease; and (c) leaf with large lesions of fungal disease
17. Which of these is an insect predator? [Muri utu dusimba ni akahe karya utundi?] Specimens: (a) bean beetle; (b) butterfly; and (c) praying mantis
18. Which of these is a fungal disease? [Muri izi ndwara, ni iyike iterwa n'uduhumyo?] Specimens: (a) plant with maize streak virus; (b) leaf with lesions of fungal disease; and (c) leaf with nutritional disorder
19. Which of these helps improve soil fertility? [Muri ibi ni ibihe, bifasha kongera uburumbuke bw'ubutaka?] Specimens: (a) bean beetle; (b) centipede; and (c) lepidopterous larva
20. Which of these weeds do you think belong to same group as soybean (broadleaf weed)? [Muri ibi byatsi ni ikihe kiri mu muryango umwe na soya?] Specimens: (a) grassy weed; (b) grassy weed; and (c) broadleaf weed (Amaranthus)
21. Which of these is an egg-predator? [Muri utu dusimba, ni akahe karya amagi y'uyundi dusumba?] Specimens: (a) butterfly; (b) green lacewing adult; and (c) short-horn grasshopper

Familiarization Through Moving Exam Exercises

As a complement to the 'ballot box' pre-test exercise, the MT administered to the training participants additional field-based activities that they should undertake as well during FFS so that the enthusiasm and interest of farmer-participants can be further sustained. Thus, the TOT participants were requested to collect insect pests, their natural enemies, plant diseases, and other crop abnormalities for identification, classification, and insect identification. After these exercises were through, another exercise was set-up, known as a group 'moving exam'.

A group 'moving exam' is a very practical tool used to progressively assess the participants' skills in identifying pests, their natural enemies, plant diseases, and other crop abnormalities from the field. It consists of allowing a group of farmers to move around, observe, discuss among themselves, and select the best answer from among specimens secured in flip charts, that will best describe the organisms' ecological function (e.g., whether the specimen is a predator, a parasitoid, a plant disease, or a physiological disorder). The first group 'moving exam' was administered to the TOT participants on 14th May using the following questions:

Group 'Moving Exam' Questions (Correct answers are underlined)

1. Identify: A. Pest or natural enemy? (Icyonnyi cyangwa Inshuti y'abahinzi?); B. Short-horn grass hopper or long-horn grass hopper? (Igihore/Igihara cyangwa Insenene?)
2. Identify: A. Pest or natural enemy [Predator]? (Icyonnyi cyangwa Inshuti y'abahinzi?); B. Short-horn grass hopper or long-horn grass hopper ? (Igihore/Igihara cyangwa Insenene?)
3. Identify: A. Pest or natural enemy? (Icyonnyi cyangwa Inshuti y'abahinzi?): B. Larva [Rhinocerus beetle] or adult? (Agakoko kagikura cyangwa agakoko gakuru/ gakuze?)
4. Identify: A. Pest or natural enemy? (Icyonnyi cyangwa Inshuti y'abahinzi?); B. Larva or adult [Rhinocerus beetle]? (Agakoko kagikura cyangwa agakoko gakuru/gakuze?)

5. Identify: A. Pest or natural enemy? (Icyonnyi cyangwa inshuti y'abahinzi?); B. Short-horn grass hopper or long-horn grasshopper? (Igihore/Igihara cyangwa Insenene?)
6. Identify: A. Common bean or Soybean? (Igishyimbo cyangwa soya?); B. Defoliator or Sucking insect pest [Aphids]? (Utu ni udukoko dupfumura amababi,cyangwa ni udukoko utunyunyuza igihingwa?)
7. Identify: A. Sorghum or maize? **(**Isaka cyangwa ikigori?); B. Disease (Sorghum rust) or nutritional deficiency? (Indwara cyangwa kubura intunga gihingwa?)
8. Identify: A. Sorghum or maize? **(**Isaka cyangwa ikigori?);m B. Virus Disease [streak virus disease] or fungal disease? (Indwara iterwa na virus cyangwa indwara iterwa n'uduhumyo?)
9. Identify: A. Pest or natural enemy? (Icyonnyi cyangwa Inshuti y'abahinzi?); B. Predator or defoliator? (Agakoko karya utundi dukoko/ibyonnyi cyangwa udukoko dupfumura amababi?)
10. Identify: A. Pest or natural enemy? (Icyonnyi cyangwa Inshuti y'abahinzi?); B. Predator or defoliator [larva of a moth]? (Agakoko karya utundi dukoko/ibyonnyi cyangwa udukoko dupfumura amababi?)
11. Identify: A. Pest or natural enemy [black ants]? (Icyonnyi cyangwa Inshuti y'abahinzi?); B. Predator or defoliator? (Agakoko karya utundi dukoko/ibyonnyi cyangwa udukoko dupfumura amababi?)
12. Identify: A. Pest [mole cricket] or natural enemy? (Icyonnyi cyangwa Inshuti y'abahinzi?); B. Defoliator or root feeder? (Agakoko gapfumura amababi cyangwa agakoko karya imizi?)
13. Identify: A. Pest [larva of a moth] or natural enemy? (Icyonnyi cyangwa Inshuti y'abahinzi?); B. Plant feeder or insect feeder? (Agakoko karya igihingwa cyangwa agakoko karya utundi dusimba/dukoko?)
14. Identify: A. Pest [leaf-feeder] or natural enemy? (Icyonnyi cyangwa inshuti y'abahinzi?); B. Slug or Leach = (Ikinyamujonjo cyangwa Umusundwe)
15. Identify: A. Butterfly or beetle? (Ikinyugunyugu cyangwa akagurube?); B. Adult of a pest or adult of a natural enemy? (Aka gakoko ni icyonnyi gikuze cyangwa ni inshuti y'abahinzi ikuze?)
16. Identify: A. Pest or natural enemy [Predator cricket]? (Icyonnyi cyangwa Inshuti y'abahinzi?); B. Cricket or grasshopper? (Ijeri cyangwa insenene?)

An analysis of the group 'moving exam' exercises revealed that the training participants' performance in the said activity were very satisfactory at an average of 86%, which means that the participants can correctly identify the ecological functions of almost 9 out of 10 insect pest or crop abnormalities that they commonly observed in the field. The results suggest that future fine-tuning of the training participants' identification skills for pests, their natural enemies, pest damages, and disease symptoms should be more regularly undertaken. The percentage scores achieved by the training participants in group 'moving exams' for pests, their natural enemies, pest damages, and diseases symptom identification are shown in the table below.

GROUP NUMBER	SCORE	%
1A	27/32	84

1B	28/32	88
2A	28/32	88
2B	31/32	97
3A	28/32	88
3B	30/32	94
4A	28/32	88
4B	28/32	88
5A	30/32	94
5B	26/32	81
6A	23/32	72
6B	26/32	81
7A	28/32	88
7B	24/32	75
8A	29/32	91
8B	27/32	84
AVERAGE (%)		86

ACTIVITY 27

PARTICIPATORY MONITORING & EVALUATION

About the session

Objectives

- To equip the participants with the framework and tools for monitoring the quality of FFS activities
- To keep on improving progressively the farmer learning activities.

How was it facilitated?

- Question and Answers
- Data collection and discussion
- Analyzing the way forward

FFS monitoring and evaluation for quality assurance.

Monitoring and evaluation of FFS activities were presented to be focusing on three main aspects which are

a) monitoring of the learning, technology generation and dissemination process
b) monitoring of results of applied technologies and management practices
c) monitoring of impact

FFS Monitoring and Evaluation aspects

Monitoring aspects	Specific issues to be monitored	M&E Tools
Process	1. selection of participants (literacy level, gender, age, wealth etc) 2. attendance and participation 3. selection of crop enterprise, field studies and trials, objectives, activities and indicators 4. regular field observation	Weekly/monthly reports, FFS curriculum, AESA, attendance register,

Results (field technical results)	1. increase in yield (or decrease), 2. response of crops to different fertilizers applications, 3. pests and diseases emergence as a response to various management practices, 4. varieties performance, etc	End of season report, AESA
Impact	Impact focuses on long term results, however indicators of impact can be explained as the number of facilitators trained to go and work with community as indicators of expected impact	Quarterly and final reports

Monitoring and evaluating the achievements

Observing the calf (LESA)

Measure with a scale

Facilitator visits a group member

Monitoring & Evaluating is an integral part of FFS!

AESA and LESA

- Weekly "monitoring" of the plants and animals

Ballot box

- Monitoring knowledge before, during and after producing

Measuring harvest

- Measuring the harvest
- Comparing the harvest of different treatments and ranking them

Evaluating profitability

- Calculating the revenue: Value of output - Cost of input

Assessing farmer's progress

- Facilitator visits group members to assist them and to assess how they are doing
- Measure harvest & calculate profitability

ACTIVITY 28

DEVELOPING A RECORDING BOOK FOR FFS FACILITATORS

About the session

Objectives

- To critically think about what FFS facilitators should record
- To provide facilitators with an easy to use and practical recording book
- To be able to collect data from the field at any time
- To be able to evaluate the work of the FFS facilitators

How it was facilitated?

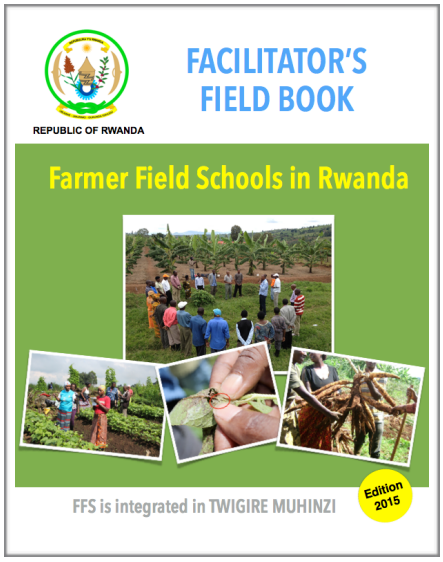
- A selected group of FFS Master Trainers developed the book
- A draft book was tested with facilitators for validation

The final version of the FFS Facilitator's field book included a review of all important aspects of FFS implementation, a reminder of all functions of an FFS Facilitator, recording pages for 6 different groups as well as example of a soya bean groups (all tables completed), FFS success stories, contact details of all Rwanda Master Trainers and a description of the integration of FFS in Twigire Muhinzi. This field book should not be considered a training manual but as a practical book to guide graduated facilitators in their implementation of FFS activities.

Facilitator's Field Book

Chapters

1. *What is FFS?*
2. *My Role as FFS Facilitator*
3. *FFS in Twigire Muhinzi*
4. *My records*
5. *Success stories*
6. *Contact details of all Master Trainers*



Recording Tables in the FFS Facilitator's Field Book

1

Basic Information of the FFS group

Facilitator's name .....

Contact .....

Crop/livestock .....

FFS group's name .....

Date of creation .....

District ..... Sector .....

Cell ..... Village .....

Number of members

Women ..... Men ..... Total .....

Crop/livestock of the group .....

Income generating activity (If any) .....

Other info: .....

.....

.....

.....

.....

Group Committee

No	Position	Name	Phone number
1	President		
2	Vice President		
3	Accountant		
4	Moral		
5	Discipline		
6	Welfare		
7	Internal auditor		
8	Internal auditor		

GROUP ANALYSIS

1

Group's name .....

Expectations

No	Expectations
1	

GAP analysis

No	Identified Problems	Posible solutions
1		

Yield of previous season (s)

No	Variety	Kg/m2	Ton/Ha
1			

No	Variety	Kg/m2	Ton/Ha
1			

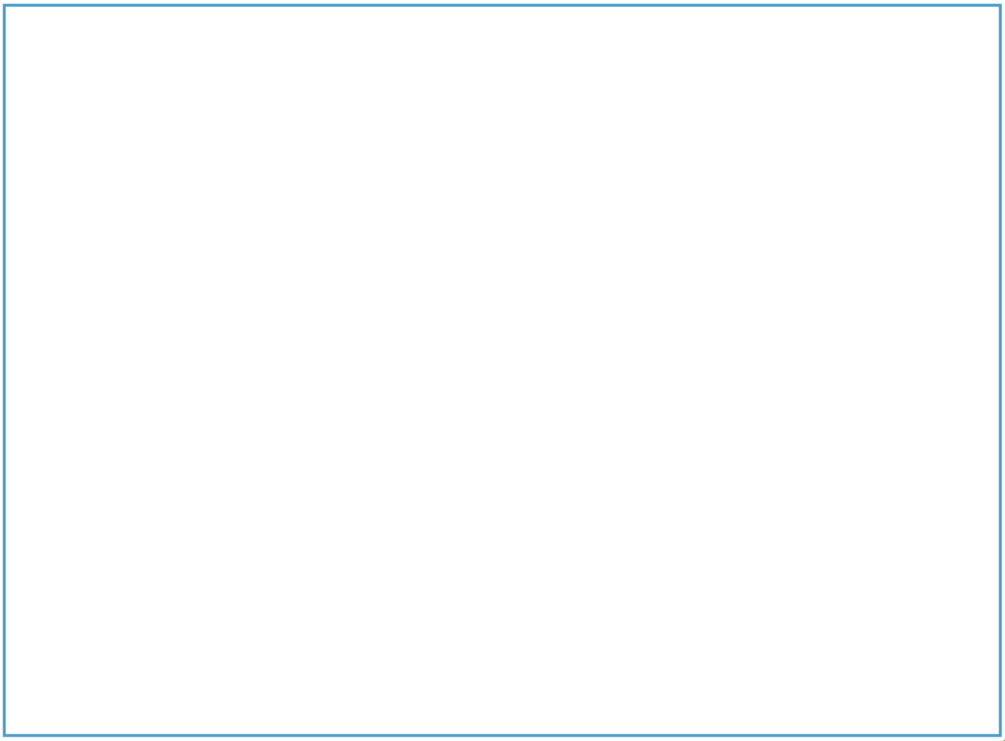
1

Group's name .....

Group Members - Attendance List

No	Name/Date (d/m)														
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															

Drawing (layout) of the FFS PLOT



Group's name .....

1

Information about different treatments in the FFS Field plot

No	Treatment	Description	Input costs
1			

Group's name .....

1

1

Group's name .....

Crop Calendar

No	Activities/Rainfall	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													

GROUP'S CURRICULUM

1

Group's name .....

No	Timing	Proposed Activity
1		

FFS Main Activity Report

1

Group's name .....

No	Date	Activity	Comment
1			

Income Generating Activities & Savings

1

Group's name .....

Date	Description of Activity or Saving	Amount IN	Amount OUT	Balance

PRODUCTIVITY REPORT

1

Group's name .....

No	Treatment	m2	Description	Kg	Yield per m2 (kg/m2)	Yield per Ha (Ton/Ha)	Rank
1							

REVENUE REPORT

1

Group's name .....

No	Treatment	m2	Description	Input cost (DAP, FYM &Seed)	Production (Kg)	Unit price (Frw/kg)	Revenue (Frw)	Balance (Frw)	Ranking
1									

ACTIVITY 29

SEED MULTIPLICATION & IMPORTANCE OF CLEAN SEED

About the session

Objectives

- To ensure that quality seed is available for group members
- To encourage groups to start a business by selling seed or planting material
- On farm multiplication of wanted varieties

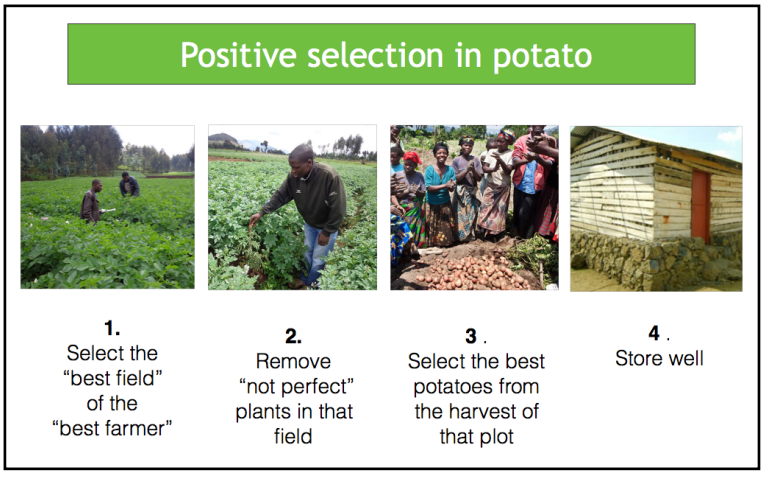
How was it facilitated?

- Question and Answers and group discussions about seed and genetic diversity
- Practical Implementation

Improvement of the informal seed for various commodities

Participants are sensitized about the importance of clean planting materials as well as about the value of genetic diversity in the production areas. They are trained on how to operate their own selection/production of their own seeds by taking into consideration the health status as well as the genetic identity (variety). This process has contributed to improve the quality and to increase the quantities of seeds produced, handled and marketed by farmers. This is what is known as the informal seed system.

In cassava, the technique of rapid multiplication allowed the farmers to have sufficient planting material.



Importance of clean planting material

Problem → Solution

- Poor planting material leads to **poor yields**
- Planting material can carry **diseases** which can have devastating effect in productivity

- FFS farmers understand the **importance of clean planting** materials and if they are trained to really become the main actors in **selecting** these materials.
- In some crops, FFS members learn how to **produce their own high quality planting materia**l. This is especially important for crops where there is a shortage of good planting material (potato, cassava, …)


Potato seed for next season


Heat treatment to kill germs


Seed selection starts in the field


Rapid multiplication

ACTIVITY 30

FIELD DAY & GRADUATION

About the session

Objectives

- To allow other farmers and opinion makers to see the results of FFS
- To draw more support for the FFS approach
- To introduce best practices to other farmers
- To recognize the effort of all group members
- To stimulate FFS groups members to continue to do their best until the end of the season.

How was it facilitated?

- FFS MT, Facilitators or farmers organize a day for other people to visit their fields
- Official certificates are provided to the trainees on graduation day

What is a field day?

A field day is an 'open day' when visitors are invited to visit the study plot. Field days can be organized at any level, meaning in the TOT study plots of Master Trainers or FFS Facilitators and in the field plot of any FFS group.

Why organizing a field day?

A field day in the TOT plot of master trainers or FFS facilitators course can draw the attention of high decision makers. It should be noted that the FFS methodology is not always well understood by persons who are not directly involved in its implementation. The best way to introduce the approach is by showing how it works in the field.

At FFS group level, field days are also excellent opportunity to introduce the FFS approach and the results to all farmers in the village as well as to local leaders. The members of an FFS group meet every week in the FFS field plot and know very well what is going on in the different experiments. It is very likely that the other farmers in the village are curious about what is going on what are the results. By inviting other farmers to have a look at the results, they will

understand more about the FFS approach and learn about which technologies gave the best results in their own area.

Practical organization of a field day

It is very important that field days are well organized and it needs to be planned well in advance. Trainees need to ensure that the field is in an excellent condition to receive the visitors. For a TOT field day, the program leaders need to discuss with key guests to ensure that they will participate in the field day. At village level, the group leaders will discuss with the village leaders to introduce the idea of organizing the field day and to select an appropriate day. Once the day is fixed, the guests can be invited.

Who should be invited?

The people to be invited depends on the situation, but the following can be considered:

- Decision makers: Minister, Permanent Secretary, DG, DDG, Head of departments, head of crop programs, head of zone, Governors, Mayors, Executive secretaries, etc.
- Representatives of NGOs and other programs working with farmers
- Farmers living nearby the field plot
- Representative of other FFS groups

What should be shown/presented?

It should be assumed that visitors do not know much about the FFS approach. Therefore it is important to present briefly how the FFS approach works and how it is different from demonstrations. Important elements to be covered are:

- Voluntary group of farmers meet every week in the field plot
- Various experiments are undertaken which try to find solutions for local challenges.
- Discovery based learning (AESA, Ballot box, etc.)
- FFS is based on Integrated Pest Management
- Learning process is facilitated by Facilitators and Master Trainers

Don't just talk but show!

The best way to introduce the approach to the visitors is by showing the real thing. Therefore, after a brief introduction, visitor should visit the experimental field. Here are a few ideas to make your field day successful:

- Perform an AESA assessment while the visitors are there. Let one farmers explain to the visitors what AESA is while other farmers are doing it

- Draw the field layout on a large piece of paper and explain which experiments are undertaken and why these experiments where chosen

- Set up a few ballot boxes and insect zoos to introduce these exciting tools

- Organize a mini exposition which can demonstrate the impact of FFS: Show the biggest banana bunches, most beautiful tomatoes or best seed potatoes! Show a normal small banana bunches as comparison. Small and big bunch next to each other!

- Split the large group of visitors in smaller groups. Each host team can take care of a smaller group. Consider a rotation for the visitors: One group starts with visiting the field (introducing layout & AESA), the second group with the mini expo and the third group with the tools (Ballot box, insect zoo, etc)

- Don't forget to introduce the additional activities such as savings, income generating activities of the group, gender, etc.

- Invite the media to report about the field day!

Graduation : A starting point

At the end of each training (Masters Trainer course, Facilitator Training course or Farmers training course) participants should get a certificate. This can be done at the same day as the field day or at another day.

Graduation should not be seen as the end point but as a starting point. For Master trainers, it means that they are now fully qualified to train Facilitators; For Facilitators it means that they are now fully qualified to train farmers using the FFS approach; For farmers it means that they successfully completed the first season as FFS group, yet the group should continue to experiment and to expand their activities!

ACTIVITY 31

MEASURING THE FFS RESULTS AT HARVEST TIME

About the session

Objectives

- To measure the results of various trials
- To learn participants to take their own decisions based on real data
- To be able to compare internally in the group as well as externally

How was it facilitated?

- Participants measure harvest results in their teams
- The findings are presented to the group
- Participatory interpretation of the findings (e.g. variety assessment)

Results of various trials in various MT, Facilitator and FFS groups are presented below:

1. Results of a Fertilizer trial in a TOT training on soya beans

Treatment	Average yield/1 m2					FINAL RANKING
	No of plants	No of pods	Total Bean seeds	Yield (gr/m2)	Yield (Ton/ha)	
DAP + Manure	32	882	2116	246	2.46	
	4	3	1	1	1	1
DAP + 0 Manure	41	993	1959	190	1.90	
	1	1	3	3	3	3
0 DAP + Manure	34	866	2029	211	2.11	
	3	4	2	2	2	2
1/2 DAP + 1/2 Manure	20	947	1832	186	1.86	
	5	2	4	4	4	4
0 DAP + 0 Manure	39	636	1241	117	1.17	
	2	5	5	5	5	

2. Results of a broadcasting vs. planting in line trial					
Practise	Average yield/1 m2				
	No of plants	No of pods	Total Bean seeds	Yield (gr/m2)	Yield (Ton/ha)
Broadcasting	32	890	1481	170	1.70
	2	2	2	2	2
On line	42	1355	2775	318	3.18
	1	1	1	1	1

3a. Example of harvest data from a variety trial for Climbing beans										
Variety	**Germination rate (%)**	**Vigour**	**No of harvested plants/ 3 m2**	**No of plants climbed on 9 stakes**	**No of pods on 9 stakes**	**No of pods/ plant**	**No of grains on 9 stakes**	**No of grains /pod**	**Yield gr/ 3 m2**	**Yield T/Ha**
RWV 1129	96	Very good	86	38	244	6	738	3	1060.7	3536
MAC 49	88	Very good	79	38	149	4	491	3	500.1	1667
DECELAYA	63	Very poor	57	26	111	4	276	2	225.4	751
RWV 2070	98	Good	90	39	209	5	500	2	722.9	2410
GASILDA	83	Good	75	32	153	5	533	3	762.5	2541
LOCAL	82	Good	74	37	383	10	1135	3	898.2	2994

3b.Variety Trial: Assessment of results - Ranking of varieties		
Ranking (best performance)	**Variety**	**Criteria for superiority**
1st	RWV 1129	✓ Rain tolerant ✓ High germination rate ✓ Vigorous (strong stem, large and very green leaves) ✓ Flowering from the lower part of stem ✓ Big grain and good yield ✓ Disease tolerant
2nd	MAC 49	✓ Rain tolerant ✓ Vigorous ✓ Many pods ✓ Flowering from the middle of stem (- ve) ✓ Poor bean filling (-ve)
3rd	RWV 2070	✓ Rain tolerant ✓ Good yield ✓ Poor bean filling (-ve) ✓ Vigour was not good (-ve) ✓ Flowering from the middle of stem (-ve) ✓ Short in height (-ve)
4th	Local	✓ Good yield ✓ Vigour was not good (-ve) ✓ Susceptible to rain (-ve) ✓ Small gain and few/pod (-ve) ✓ Mixture of many variety (-ve) ✓ Very high (-ve)
5th	Gassilda	✓ Poor vigour (-ve) ✓ Susceptible to rain (-ve) ✓ Susceptible to disease (-ve)
6th	LOCAL	✓ Long crop cycle (-ve) ✓ Poor vigour (-ve) ✓ Poor bean filling (-ve) Small grain very susceptible to disease (-ve)

ACTIVITY 32

SAVINGS, INCOME GENERATION & GROUPS SUSTAINABILITY

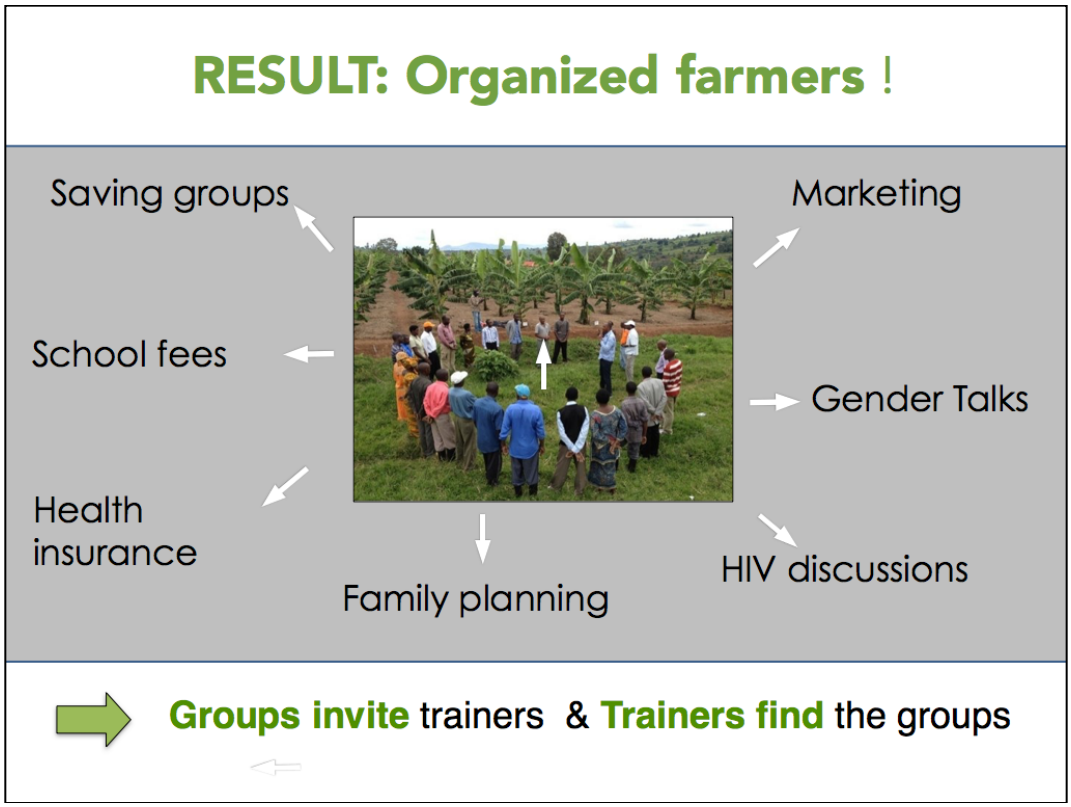
About the session

Objectives

- To stimulate activities that make FFS groups stronger
- To create local social protection networks
- To encourage FFS groups to look beyond production
- To increase the sustainability of FFS groups

How was it facilitated?

- Open discussions about the benefits of saving & social protection
- Brainstorm exercise about possible 'enterprises' for income generation
- Discussion about basic business planning
- Invite special trainers for specific topics



Why is it important to build strong groups?

Building strong groups is clearly also a wish of the farmers themselves. In the mid season assessment in 2015B, almost 3000 farmers were asked about the most important reason for them to join a FFS group. They could only choose one of the 3 options mentioned below.

The reason which was selected by most farmers was to be member of a strong group in which members can help each other. For 38% of the farmers this was the most important reason. 33% of the farmers was mainly concerned about food security at household level. They selected "having more food on the table" as the most important reason. The most economic reason "being able to sell more produce on the market" was 'only' selected by 29% of the farmers.

How to create strong groups ?

Strong FFS groups are the result of many efforts:

- First of all, when FFS farmers join a FFS groups they do so on a voluntary basis. They all commit to be an active member of the group. All members have a common interest.
- A FFS group has internal rules. Each group has a constitution and by-laws. For example, if one member does not participate in group activities, he/she can be expelled from the group.
- Each group has an elected committee with clear functions.
- To set up strong groups, you need a strong facilitator. The training curriculum for facilitators includes many activities that build the up skills of facilitators to build strong groups.
- The facilitators ensure that all group members are actively involved in the learning activities as well as in other group activities. The larger group is often divided in smaller mini groups to ensure that everyone is involved.
- The FFS sessions include group dynamic exercises which ensure that farmers keep on having fun and which strengthens the bound between the members.
- The groups meet very regularly, usually one time each week.

- A typical FFS session includes a **special topic.** This can be anything from an in depth discussion about a specific disease to family planning, health insurance, gender topics, nutrition, marketing, another crop.

Activities that make groups stronger

Savings

FFS is clearly more than learning alone*. The most popular additional activity for FFS groups are internal savings. More than 70% of the groups has such kind of savings. All group members give their* ***monthly contribution*** *during one of the FFS sessions. Everything is clearly recorded in the books. The group members can decide by themselves how the money can be used. In many groups,* ***members can borrow from the group*** *at a low interest rate. When the group has saved a reasonable amount, they can decide together what to do with the money. Often it is used in an activity that benefit the group members. Examples include groups that decided to purchase mattresses for all their members.*

School fees and medical insurance

Group members also encourage each other to ***pay school fees and medical insurance.*** *Sometimes groups savings are used for this purpose.*

Income generating activities

Groups that have saved a larger amount of money can invest it in ***an income generating activity.*** *Often they hire a large piece of land and grow a commercial crop or produce seed (formal or informal). In other occasions, they invest in another activity such as a road side shop, aquaculture, livestock, forestry etc. More than 20% of the FFS groups venture into an economic group activity.*

*The **Abishyizehamwe FFS group** in Mutenderi sector in Ngoma district was created to work with soybean. One year later, they started to **plant and manage a forest** to generate more income for the group. They received the land from the district because it helps against land degradation and they received a loan from the bank to purchase the inputs. A few years later they will harvest the fruits from their entrepreneurial spirit!*

*The **Ngelimbuhinzi group** in Muko sector started to work on potato in 2012 and later also learned about tomato. As such, they change between both crops according to the season. With the income from the tomato production, **they bought 3 pigs**. They produced **piglets which were distributed to all members** of the group. Now they all have organic fertilizer and they even **started a business of selling piglets to other farmers**. So thanks to FFS, they were able to develop a business and earn a lot from that. For the future, they hope that all group members can have a cow as well to start the same business. They said: "We are now smart in our way of thinking, we see business opportunities!'*

*The **Tuzamuranebahinzi group** in Busasamana sector started as a FFS group in 2009. Before FFS they were also growing potatoes, but they were using a lot of seed and energy, while the production was low. Thanks to FFS the productivity and total production increased a lot. The group spirit was strong and in 2010 they received an official cooperative certificate. The facilitator trained the members on how to **produce potato seed** by applying positive selection and how to store it in a good way. T**he members worked hard to contribute money to buy land for seed production & to build a store**. Potato seed has a good price on the market and so their income increased a lot. Some of the members of our group are affected by HIV. **They are proud that as a group they could buy cows for them**. The daily fresh milk helps them to fight malnutrition. They said:" We are really committed on helping & supporting each other. Every week we visit a member of the group to see if we can do something to improve the family's life."*

ACTIVITY 33

THE MEN ENGAGE GENDER APPROACH

About the session

Objectives

- To improve gender equality in FFS families
- To build up the skills of FFS Master Trainers and FFS Facilitators to implement gender activities based on the "Men Engage approach".
- To utilize the position of Facilitators as peer trainers to address important development issues that go beyond agriculture

How it was facilitated?

- A special 5 day training was organized with the Master Trainers from the Rwanda Men Resources Centre (RWAMREC)
- Facilitators organized 10 gender training sessions with their FFS groups
- Master Trained coached the facilitators during the process by observation of group sessions followed by constructive feedback

The FFS program achieved a good gender balance among the final beneficiaries: 53% of FFS farmers are female. Among the FFS facilitators, the percentage of women is 28%. But the intervention did not stop with gender balance as it introduced a training program to address gender inequality at its roots. The program collaborated with the Rwanda Men's Resource Centre (RWAMREC) to introduce the "Men engage gender approach". This approach is fully in line with the HeForShe Campaign from the United Nations, which receives full support of the HE President Paul Kagame

Methodology:

A total of 300 FFS facilitators were trained as peer trainer on gender equality. The overall objective of the training was to equip the FFS Facilitators with practical knowledge and skills in gender equality and prevention of gender-based violence and discrimination.

After completing a 5-day training course, the FFS facilitators organized 10 working sessions with 2 FFS groups each, involving 15,000 farmers. During this time they received 3 coaching sessions from RWAMREC in the their district. The follow up revealed that the majority of FFS Facilitators were able to engage participants in deep reflections about their own lives/ gender experiences, and how they intended to apply these gender messages to real life back home.

The training includes the following topics:

- Social construction of gender norms and roles
- Gender boxes
- Source of Gender Powers
- Discovering positive masculinity and positive femininities
- Gender Based Violence & gender discrimination
- Women's Rights
- Gender responsive laws and policies
- Gender mainstreaming in the Value Chain
- Family dialogue
- The Journey of Change and transformation in gender power
- Training techniques and facilitation skills

Is gender Training needed?

The participants in the 5 day training course were asked to agree or disagree with 7 statements at the start of the training. The results show that there is indeed a clear need for such training:

PERCENTAGE (%) OF TRAINEES (FFS FACILITATORS) THAT AGREES WITH THE STATEMENTS, BEFORE AND AFTER 5-DAY TRAINING)

	Statement	*BEFORE*	*AFTER*
1	***Men should have the last word*** *on the household decisions*	*85*	*3*
2	*The main role in the life of a man is to provide for the family, otherwise* ***he will be considered as less-of-a-man*** *in the eyes of the community*	*72*	*2*
3	***Women should respect and implement their husbands' rules*** *and decisions regarding the management of the household because men are the heads of the families*	*75*	*1*
4	***Sometimes women need to be beaten*** *especially when they did not fulfill women's duties.*	*38*	*0*
5	*A man or a woman who did not play a role in economic development of the household* ***should not have a word*** *on its management*	*49*	*5*
6	***Women contribute to their insufficient access*** *to agricultural resource they are facing*	*90*	*37*
7	*The division of labor between men and women is based on the* ***biological differences and God's will.***	*99*	*14*

Results of "Men engage" trainings sessions with FFS farmers

The sessions were highly appreciated by the participants and by local leaders. The majority of FFS Facilitators were able to engage participants in deep reflections about their own lives/gender experiences. Participants showed their intentions to apply these gender messages to real life back home.

<u>Important Note:</u> While in our case the Gender Training for Master Trainers and Facilitators was provided in a separated training after they graduated, it should be possible to integrated it in the training curriculum. However, integrating 10 gender sessions in the work with the FFS groups will not be possible in one season. Therefore, it is recommended to hold some sessions in the first season and some in the second season.

ACTIVITY 34

HIV PREVENTION & AWARENESS RAISING

About the session

Objectives

- To raise awareness about HIV/AIDS and prevent new infections
- To build up the skills of FFS Master Trainers and FFS Facilitators to implement HIV awareness and prevention activities
- To utilize the position of Facilitators as peer trainers to address important development issues that go beyond agriculture

How was it facilitated?

- A special 5 day training was organized with the Master Trainers from the Rwanda Biomedical Centre (RBC)
- Facilitators organized half day awareness raising sessions with several FFS groups
- A coaching session was organized after 2 sessions with farmer groups

HIV Prevention and Awareness

The program applied a similar training methodology as for Gender (Activity 34) for HIV/AIDS prevention and awareness raising. A total of 60 FFS facilitators received a 5-day training course to become a peer trainer. The training was provided by the Rwanda Biomedical Centre (RBC). Each of the 60 FFS Facilitators then organized information sessions with 22 FFS groups (33,000 Farmers in total).

The goal of the Rwandan Government is that everyone knows if he or she is HIV positive or not. All people who are HIV positive receive free medications. Based on the knowledge that HIV positive people who take their medication are much less likely to infect other people, this strategy makes a lot of sense. The indicator to assess the effectiveness of the information sessions provided by the trained FFS Facilitators was therefore the number of people who did a voluntary testing in the weeks following the meeting. The results are quite encouraging as 57% of the participants did the test.

It is worth noting that according the RBC, this was the first time that they trained non medical staff to conduct such kind of information sessions.

ACTIVITY 35

EVALUATING THE PERFORMANCE OF THE FACILITATORS (IN THE 3 PARTY CONTRACT)

About the session

Objectives

- To ensure that FFS Facilitators continue to implement the FFS approach correctly
- To have a transparent tool to decide how much the facilitators should be paid

How was it facilitated?

- Facilitator cooperatives sign a contract as service provide
- A standard evaluation form was developed and is used throughout the country
- Evaluators get clear instruction on how to use the tool
- Facilitators are paid based on the results of the assessment

Background

After graduating, the FFS Facilitators of each districts have **created FFS Facilitator's cooperatives** who work as professional service providers. These FFS Facilitator cooperatives **signed a performance contract** with RAB and the District (3 party contract). They commit to create new FFS groups and to implement all essential FFS activities with that group. The payment for the facilitators is linked to the performance which is verified in a field assessment.

Field assessment

The field assessment is organized in second half of the season. Currently, it is performed by the sector agronomists. A standard evaluation is form is used throughout the country. In order the keep the assessment fairly easy to implement, the number of criteria to be assessed has over time be reduced to a minimum. Still, it is believed that this is sufficient to ensure the quality of the FFS implementation.

The evaluation form

The evaluation form is presented below. The form is completed by the evaluator in a carbon book with three copies: One copy for the facilitator, one for the district and one copy for RAB. It

is very important that the facilitator keeps one copy for verification in case there are problems when it comes to payment.

The essential part of the evaluation contains a technical assessment and an assessment of the frequency that the facilitator meets with the group. Both have an impact on the payment. The technical assessment is based on 7 statements/questions with a Yes/No answer. For each statement, the evaluators has clear instructions to decide if the answer should be Yes or No.

Example

Statement: *The Farmers can explain the various experiments*

Explanation: *Ask randomly chosen farmers to explain a specific experiment in the FFS study plot. Ask what they are doing and why. If at least 80% of the farmers can give a satisfactory answer, the results is YES. If less than 80% can explain the experiment, the result is NO.*

The facilitators needs to score at least 4 times 'Yes' to be eligible for payment.

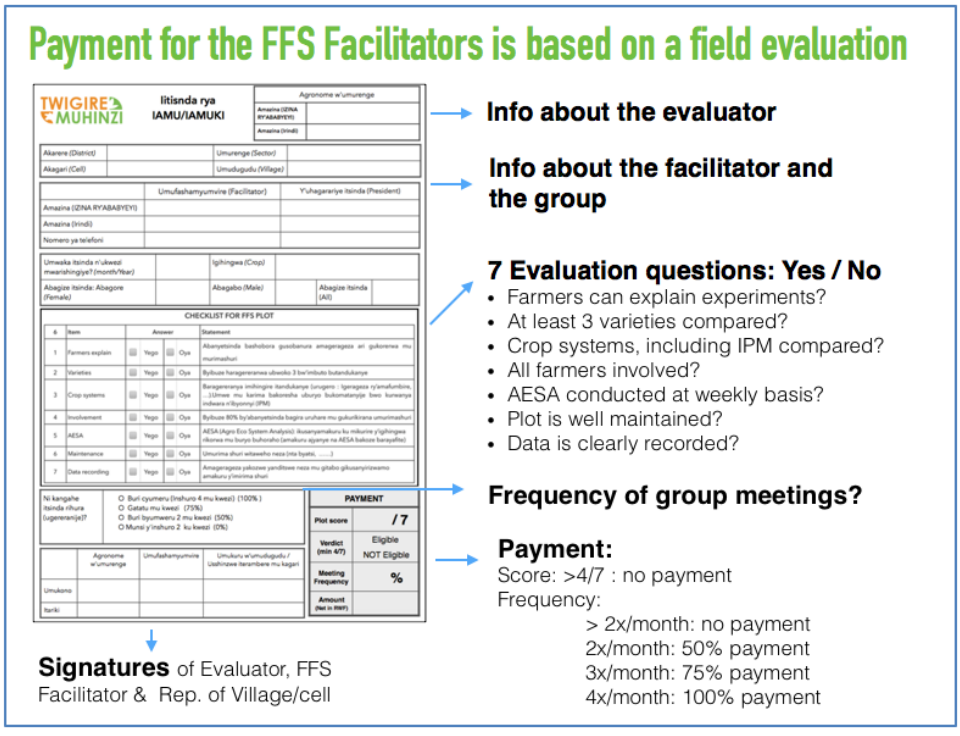
The second criteria is the frequency of meeting. The evaluator will check the recording to determine how many times the group has met. This should be crosschecked with group members and possibly with local leaders. Meeting 4x/months leads to 100% payment, 3x/month to 75% payment, 2x/month to 50% payment while less than 2x/month results in no payment.

The reasoning behind the payment decision is that FFS should be done correctly. If a group meets less than twice a month, an essential element of FFS is not respected.

Note: Meeting frequency depends on the kind of crop!

Mrs. Clementine is evaluated by the Sector Agronomist.

He visit every new FFS group to make a field assessment



TWIGIRE MUHINZI

Iitisnda rya IAMU/IAMUKI

Agronome w'umurenge	
Amazina (IZINA RY'ABABYEYI)	
Amazina (Irindi)	

Akarere *(District)*		Umurenge *(Sector)*	
Akagari *(Cell)*		Umudugudu *(Village)*	

	Umufashamyumvire (Facilitator)	Y'uhagarariye itsinda (President)
Amazina (IZINA RY'ABABYEYI)		
Amazina (Irindi)		
Nomero ya telefoni		

Umwaka itsinda n'ukwezi mwarishingiye? *(month/Year)*		Igihingwa *(Crop)*			
Abagize itsinda: Abagore *(Female)*		Abagabo *(Male)*		Abagize itsinda (All)	

CHECKLIST FOR FFS PLOT

6	Item	Answer		Statement
1	Farmers explain	☐ Yego	☐ Oya	Abanyetsinda bashobora gusobanura amagerageza ari gukorerwa mu murimashuri
2	Varieties	☐ Yego	☐ Oya	Byibuze haragereranwa ubwoko 3 bw'imbuto butandukanye
3	Crop systems	☐ Yego	☐ Oya	Baragereranya imihingire itandukanye (urugero : Igerageza ry'amafumbire, …).Umwe mu karima bakoresha uburyo bukomatanyije bwo kurwanya indwara n'ibyonnyi (IPM)
4	Involvement	☐ Yego	☐ Oya	Byibuze 80% by'abanyetsinda bagira uruhare mu gukurikirana umurimashuri
5	AESA	☐ Yego	☐ Oya	AESA (Agro Eco System Analysis): ikusanyamakuru ku mikurire y'igihingwa rikorwa mu buryo buhoraho (amakuru ajyanye na AESA bakoze barayafite)
6	Maintenance	☐ Yego	☐ Oya	Umurima shuri witaweho neza (nta byatsi, ……)
7	Data recording	☐ Yego	☐ Oya	Amagerageza yakozwe yanditswe neza mu gitabo gikusanyirizwamo amakuru y'imirima shuri

Ni kangahe itsinda rihura (ugereranije)?	O Buri cyumeru (Inshuro 4 mu kwezi) (100%) O Gatatu mu kwezi (75%) O Buri byumweru 2 mu kwezi (50%) O Munsi y'inshuro 2 ku kwezi (0%)

	Agronome w'umurenge	Umufashamyumvire	Umukuru w'umudugudu / Usshinzwe iterambere mu kagari
Umukono			
Itariki			

PAYMENT	
Plot score	**/ 7**
Verdict (min 4/7)	Eligible NOT Eligible
Meeting Frequency	**%**
Amount (Net in RWF)	

Evaluation form

CHECKLIST FOR FFS PLOT

Q	Item	Statement	Explanation
1	Farmers explain	Abanyetsinda bashobora gusobanura amagerageza ari gukorerwa mu murimashuri	Kubaza abanyetsinda kugusobanurira amagerageza ari gukorerwa mu murimashuri . Baza abenshi mubagize itsinda **niba byibuze 4** mu banyetsinda bashobora kubisobanura. Igisubizo ni **YEGO**
2	Varieties	Byibuze haragereranwa ubwoko 3 bw'imbuto butandukanye	Ugendeye ku busobanuro butangwa n'abanyetsinda,ushobora kumenya imbuto zitandakunye zageranyijwe. Mu gihe udasobanukiwe, ushobora kubabaza. Niba bari kugereranya byibuze amoko 3 y'imbuto. Igisubizo ni YEGO
3	Crop systems	Baragereranya imihingire itandukanye (urugero : Igerageza ry'amafumbire, …).Umwe mu karima bakoresha uburyo bukomatanyije bwo kurwanya indwara n'ibyonnyi (IPM)	Niba bari kugereranya imihingire itandukanye (amafumbire, kubagara, kuhira cg kuvomerera, gutera ku mirongo,..) kandi bakaba bafite akarima kahinzwe mu buryo bwa IPM. Igisubizo ni **YEGO**
4	Involvement	Byibuze 80% by'abanyetsinda bagira uruhare mu gukurikirana umurimashuri	Kubaza ni bande bakurikirana umurimashuri (guhinga, kubagara, kuhira, ….). Reba niba 80% by'abanyetsinda bitabira iyo mirimo. Ushobora gusaba abitabira iyo mirimo kuzamura ikiganza. Niba 80 % cg hejuru yabo bazamura ikiganza babyemeza. Igisubizo ni **YEGO**
5	AESA	AESA (Agro Eco System Analysis): ikusanyamakuru ku mikurire y'igihingwa rikorwa mu buryo buhoraho (amakuru ajyanye na AESA bakoze barayafite)	Baza abahinzi niba bazi AESA icyo aricyo, niba badasobanukiwe ijambo AESA icyo aricyo, uraribasobanurira (reba ibisobanuro byaryo ku rupapuro rukurikira) hanyuma ubabaze igihe bayikorera. Nyuma ubabaze niba hari ibishushanyo bya AESA bafite. Nusanga babikora igisubizo kiraba **Yego**
6	Maintenance	Umurima shuri witaweho neza (nta byatsi, nta ndwara, ……)	Umurima witaweho neza uba ugaragara neza nukuvuga: ➢ Udafite ibyatsi keretse ari igerageza ryo kutabagara ➢ Uteye k'umurongo keretse ari igerageza ryo kudatera k'umurongo ➢ Udafite uburwayi kereka biri mu magerageza yakozwe Nyuma yo kuganira kuribi byose n'abagize itsinda, ugendeye kandi kubyo ubona mu murima shuri, reba niba umurima witaweho cyangwa utitaweho.
7	Data recording	Amagerageza yakozwe yanditswe neza mu gitabo gikusanyirizwamo amakuru y'imirima shuri	Saba guhabwa igitabo gikusanyirizwamo amakuru y'imirima shuri (igitabo gifitwe n'umufashamyumvire ntabwo ari icy'itsinda). Reba niba umufashamyumvire agikoresha by'umwihariko urebe niba harimo amakuru agendanye n'amagerageza yakozwe mu turima duto tugize umurima shuri.

CHAPTER 5

OVERVIEW OF A COMPLETE TRAINING SCHEDULE FOR PART 1 OF THE TRAINING OF **MASTER TRAINERS**

(Part 2 is the coaching while the new Master Trainers organize the training of Facilitators)

SEASON-LONG MASTER TRAINERS TRAINING ON INTEGRATED PEST AND PRODUCTION MANAGEMENT (MTT-IPPM) FOR MAIZE-BEANS BASED PRODUCTION SYSTEM

TRAINING SCHEDULE

PART I: TEN-DAY INTENSIVE TRAINING ON NON-FORMAL EDUCATION (NFE) TECHNIQUES AND SELECTED SPECIAL TOPICS

WEEK 1: ONE WEEK BEFORE PLANTING (1WBP)

DATE	DAY	AM	PM
	MON	ARRIVAL AND REGISTRATION OF PARTICIPANTS AND FACILITATORS	
	TUE	Opening & Overview of SPATII/MINAGRI Program Participatory Norm Setting, Leveling of Expectations & Groupings Self Awareness/Getting to Know Each Other	Overview of Maize-based Production System in Rwanda Participatory discussions; ▪ Non-Formal Education Techniques ▪ Qualities of a Good Facilitator
	WED	'Ballot Box' Pre-test Soil Sampling & Participatory Discussions on Concept of Integrated Nutrient Management (INM) Role Play (Community Organizing)	Participatory Discussions on Participatory Rapid Appraisal (PRA) & Baseline Survey Form (BSF) Preparation Group Dynamics (Team Building) Concept of Village Immersion (VI)
	THU	VI (Courtesy Call to Village Officials, Briefing on IPPM & FFS, Validating BSF, PRA, & Getting Data for FFS Activities Feedbacks on Village Immersion (VI) Activities	Relating Ground Working & VI Activities to FFS (Gap Analysis) Group Dynamics (Leadership Qualities) Features of the FFS/ How to Manage an FFS
	FRI	Fieldwork on Land Preparation & Soil Test Kit (STK) Analysis Participatory Discussions on Best Practices in Land Preparations	Participatory Discussions: ▪ Compost & Other Organic Fertilizers ▪ Lime and Liming Practices Designing Participatory Technology Development (PTD) Activities
	SAT	FREE DAY	
	SUN	FREE DAY	

WEEK 2: ZERO WEEK BEFORE PLANTING (0 WBP)

DATE	DAY	AM	PM
	MON	Exercises on Seeding Rate, Fertilizer Computation, & Sowing of Seeds Fieldwork on Basal Inorganic & Organic Fertilizer Application	Participatory Discussions on Farm Record Keeping Workshop to Finalize Baseline Survey Form (BSF) Evaluation & Planning for Next Week's Activities
	TUE	Field Observations on Growth Stages in Relation to Crop's Cultural Management (Maize & Bean) Concept of 'What Is This?' & AESA (Agro-ecosystem Analysis) Participatory Discussions on Growth Stages in Relation to Crop's Cultural Management (Maize & Bean)	Group Dynamics (Leadership Qualities) Participatory Discussions on Methods & Steps in Conducting PTD Activities Preparations for MTT Trials (Designing Crop Protection Trials [CPT]) & Cultural Management Trials [CMT]) based on PRA & BSF results
	WED	Collection of Insect Pests (IPs and Natural Enemies (NEs) Workshop on IPs & NEs Ecology & Identification Insect Zoo Preparation & Moving Exam	Workshop in Designing Discovery-based Exercises & NFE Methods for IPs & NEs Food Chain & Food Web (Biological Magnification) Name Game (IPs & NEs)
	THU	Organizing a TOT: ▪ Overview/ Orientation of the IPPM Programs ▪ Getting to Know Each Other ▪ Gather Data (Using the BSF/PRA) Collection of Disease Infected Maize & Bean Plants Feed-backing & Critiquing Disease Zoo Preparation & Moving Exam Workshop on Disease Ecology & Identification	Continue Preparations for MTT Trials (Designing Crop Protection Trials [CPT]) & Cultural Management Trials [CMT]) based on PRA & BSF results Reporting of Insect Zoo Results Workshop in Designing Discovery-based Exercises & NFE Methods for Maize & Bean Diseases Continue Preparations for PTD Trials [Designing Other PTD Trials]
	FRI	Reporting of Disease Zoo Results Incorporating Changes to the Season-long Maize-based TOT IPM Curriculum	Wrap-up Sessions on the Season-long Maize-based TOT Curriculum & FFS Activity Guide Evaluation & Planning for Next Week's Activities

PART II: WEEKLY TWO-DAY SESSIONS FOR TOT PARTICIPANTS WITH A THREE-DAY BREAK TO MANAGE TOT, TCF, FFS ACTIVITIES IN THEIR RESPECTIVE ZONES

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WEEK 3: EMERGENCE STAGE (1WAP)

DATE	DAY	AM	PM
	WED	ARRIVAL OF PARTICIPANTS	
Apr 17	THU	AESA on CPT, Field Observations, Collection of Diseases, Insect Pathogens and Other Beneficial on Emergence Stage Processing of AESA	Participatory Discussions on the Use of Bio-fertilizers (Bio-N, *Trichoderma* sp, *Mycorrhiza* sp, Vermi-compost, etc) Concept of Integrated Nutrient Management (INM) Election of TOT Class Officers
Apr 18	FRI	Field Observation of Seedlings, Collection, and Identification of Seedling Pests and Beneficials at Emergence Stage Morphology at Emergence Stage (Draw and Label) Concept of Ecosystem Preparation and Setting up of Insect Zoos for Parasitoids (*Cotesisia*, *Trichogramma*, others) and Predators (Spider, Coccinilid, Lacewing, Earwig, and Syrphid Fly)	Concept of Village Follow-up (Participatory Discussions) QUIZ NO. 1 Evaluation and Planning for Next Week's Activities Ballot Box Preparation for FFS Pre-test
Apr 19	SAT	TRAVEL BACK TO RESPECTIVE ZONES	

WEEK 4: SINGLE LEAF STAGE (2 WAP)

DATE	DAY	AM	PM
Apr 24	WED	ARRIVAL OF PARTICIPANTS	
Apr 25	THU	AESA on CPT, Field Observations, Collection of Diseases, Insect Pathogens and Other Beneficial on Single Leaf Stage Seedlings Processing of AESA	Feedback & Critiquing on last week's 'Training Breaks' Activities Reporting Results of Last Week's Insect Zoos Participatory Discussions on Biological Control of Insect Pests at Early Stages
Apr 26	FRI	AESA on CMT, Field Observations, Collection of Early Stages Pests, Parasitoids, and Predators Seedling Morphology at Single Leaf Stage (drawing and labeling of important plant parts) Prepare and Set-up Diseases and Insect Pathogen Cultures Prepare and Set-up Diseases and Insect Pathogen Cultures	Participatory Discussions on Insect Pathogens QUIZ NO. 2 First Monthly Course Evaluation Planning for Next Week's Activities
Apr 27	SAT	TRAVEL BACK TO RESPECTIVE ZONES	

WEEK 5: SEEDLING (3-4 LEAVES) STAGE (3 WAP)

DATE	DAY	AM	PM
May 01	WED	ARRIVAL OF PARTICIPANTS	
May 02	THU	AESA on CPT at Seedling (3-4 leaves) Stage Collection/Identification of IPs (corn borers and egg masses) and Their NEs (spiders, ladybird beetles, *Trichogramma*) Processing of AESA and other field activities	Set-up Insect Zoo for Reporting Results of Last Week's Diseases and Insect Pathogen Cultures Feedbacks on last week's 'Training Breaks' Activities Role Play (Communication Skills Development) Stalk Borer and *Trichogramma* Parasitism
May 03	FRI	AESA on CMT, Collection, and Identification of Seedling Diseases (Downy Mildew, Leaf Blight, Stalk Rot and Mosaic) Morphology at Seedling (3-4 leaves) Stage (drawing and labeling of important plant parts) Participatory Discussions and Exercises on Pre-Disposing Factors in Seedling Disease Development (Downy Mildew, Leaf Blight, Stalk Rot and Mosaic)	Setting-up of Disease Culture (Fungal and Virus Diseases) Participatory Discussions on Fertilizer and Fertilizer Management in the Context of INM QUIZ NO. 3 Evaluation and Planning for Next Week's Activities
May 04	SAT	TRAVEL BACK TO RESPECTIVE ZONES	

WEEK 6: EARLY WHORL STAGE (4 WAP)

DATE	DAY	AM	PM
May 08	WED	ARRIVAL OF PARTICIPANTS	
May 09	THU	AESA on CPT and Collection of Diseases (Downy Mildew, Leaf Blight, Stalk Rot and Mosaic) at Early Whorl Stage Processing of AESA Setting-up of Disease Culture (Fungal and Bacterial)	Feedbacks on last week's 'Training Breaks' Activities Reporting Results of Last Week's Insect Zoos and Diseases Cultures Participatory Discussions on Cultural Management Practices in Relation to Growth Stages of Maize & Common Bean
May 10	FRI	AESA on CMT, Collection, and Identification of IPs (Stalk Borers, Earworms, and Their Natural Enemies (spiders, *Trichogramma*, ladybird beetles) at Early Whorl Stage Morphology at Early Whorl Stage (drawing and labeling of important plant parts) Setting-up of Insect Zoo (Stalk Borer, Plant hoppers and Their NEs)	Participatory Discussions on Stalk Borer and Earworm Biology, Planthoppers Management and on Stalk Borer Parasitation by *Trichogramma* Group Dynamics (Conflict Management) QUIZ NO. 4 Evaluation and Planning for Next Week's Activities
May 11	SAT	TRAVEL BACK TO RESPECTIVE ZONES	

WEEK 7: MID WHORL STAGE (5 WAP)

DATE	DAY	AM	PM
May 15	WED	ARRIVAL OF PARTICIPANTS	
May 16	THU	AESA on CPT, Collection, and Identification of Predators and Insect Pathogens (*Nuclear Polyhedrosis Virus* [NVV], *Metharrhizium* sp.[GMF], and *Beauveria* sp. [WMF]) at Mid Whorl Stage Processing of AESA Setting-up of Insect Pathogen's Disease Culture (NPV, GMF, WMF)	Feedbacks on last week's 'Training Breaks' Activities Reporting Results of Last Week's Insect Zoos and Diseases Cultures Set-up Insect Zoos for Spiders, Other Predators and Insect Pathogen's Diseases Culture Role Play ('Being a Natural Enemy') Participatory Discussions on the Following : ▪ Spiders and Other Predators ▪ Insect Pathogens (NVV, GMF WMF) ▪ Folk Media Presentation
May 17	FRI	AESA on CMT and Collection of Weeds Representing Different Broad Classifications Morphology at Mid Whorl Stage (drawing and labeling of important plant parts) Identification and Preservation of Weeds	Participatory Discussions on Critical Stage in Crop-Weed Competition and Losses Due to Weeds Participatory Discussions on Integrated Weed Management QUIZ NO. 5 Evaluation and Planning for Next Week's Activities
May 18	SAT	TRAVEL BACK TO RESPECTIVE ZONES	

WEEK 8: LATE WHORL STAGE (6 WAP)

DATE	DAY	AM	PM
May 22	WED	ARRIVAL OF PARTICIPANTS	
May 23	THU	AESA on CPT, Field Collection, and Identification of Weeds, Diseases, Other Pests, and Natural Enemies at Late Whorl Stage Processing of AESA Set-up Insect Zoos for Predators and Parasitoids	Feedbacks on last week's 'Training Breaks' Activities Reporting Results of Last Week's Insect Zoos and Insect Pathogen's Disease Cultures Preparation of CMT Summary Results
May 24	FRI	AESA on CMT and Collection of Weeds Representing Different Broad Classification Field Observations on Maize-based Cropping Systems and Corn-Weed Competition Morphology at Late Whorl Stage (drawing and labeling of important plant parts)	Participatory Discussions on Maize-based Cropping Systems and Corn-Weed Competition Second Monthly TOT Course Evaluation QUIZ NO. 6 Evaluation and Planning for Next Week's Activities
May 25	SAT	TRAVEL BACK TO RESPECTIVE ZONES	

WEEK 9: TASSELING STAGE (7 WAP)

DATE	DAY	AM	PM
May 29	WED	ARRIVAL OF PARTICIPANTS	
May 30	THU	AESA on CPT, Field Collection, and Identification of Pests (Aphids), Predators (Syrphid Fly Maggots, Lady Beetle Larvae) at Tasseling Stage Processing of AESA Setting-up Insect Zoos on Syrphid Fly Maggots and Lady Beetle Larvae Predation on Aphids	Feedbacks on last week's 'Training Breaks' Activities Participatory Discussions on *Trichogramma* Parasitation and Syrphid Fly Maggot Predation on Aphids and Aphids Management Role Play (Insect Pests and Natural Enemies Population Dynamics) Participatory Discussions on Estimating Aphid Population, Fungal Infection and Aphid Management
May 31	FRI	AESA on CMT, Field Collection, and Identification Insect Pathogens at Tasseling Stage Morphology at Tasseling Stage (drawing and labeling of important plant parts)	Participatory Discussions on Field Day Preparations Group Dynamics on Leadership Styles (Experiences on Leadership Styles and Processes) QUIZ NO. 7 Evaluation and Planning for Next Week's Activities
Jun 01	SAT	TRAVEL BACK TO RESPECTIVE ZONES	

WEEK 10: SILKING STAGE (8 WAP)

DATE	DAY	AM	PM
Jun 05	WED	ARRIVAL OF PARTICIPANTS	
Jun 06	THU	AESA CPT, Field Collection and Identification of Pests, Parasitized and Insect Pathogen Infected IPs (Stalk Borer, Aphids, Earworms, Armyworm, Cutworm, Planthoppers, Others) Field Observation on Crop Growth at Five Weeks After Planting and on Soil Erosion and Soil Conservation Practices Processing of AESA	Feedbacks on last week's 'Training Breaks' Activities Reporting Results of Last Week's Insect Zoos on Syrphid Fly Maggots and Lady Beetle Larvae Predation on Aphids FOLK MEDIA Participatory Discussions on Ground Working Activities in Participants' Respective Areas of Assignments Planning Workshop on Ground Working Activities in Participants' Respective Areas of Assignments
Jun 07	FRI	AESA on CMT, Field Collection, and Identification Insect Pathogens at Silking Stage Morphology at Silking Stage (drawing and labeling of important plant parts) Setting-up Insect Zoos on Parasitized and Insect Pathogen Infected IPs	Role Play (Folk Media Presentation) Participatory Discussions on Soil Erosion and Soil Conservation Practices Finalization of Plans for Ground Working Activities in Participants' Respective Areas of Assignments QUIZ NO. 8 Evaluation and Planning for Next Week's Activities
Jun 08	SAT	TRAVEL BACK TO RESPECTIVE ZONES	

WEEK 11: MATURITY [BLISTER] STAGE (9 WAP)

DATE	DAY	AM	PM
Jun 12	WED	ARRIVAL OF PARTICIPANTS	
Jun 13	THU	AESA on CPT, Rodent Loss Assessment, Selecting Varieties With Ideal Plant Types at Maturity [Blister] Stage), and Cleaning of Surroundings in Preparation for Field Day Processing of AESA Reporting Results of Last Week's Insect Zoos on Parasitized and Insect Pathogen Infected IPs	Feedbacks on last week's 'Training Breaks' Activities Problem Solving: Training Proposal Development as a Process of Creative Problem Solving (Participants to Identify 3 Priority Problems Faced During the Course and Draw-up Strategies and Actions as Solutions) Preparation and Planning for Field Day
Jun 14	FRI	Morphology at Blister Stage (drawing and labeling of important plant parts) Role Play (Selecting A Mate) Participatory Discussions on Selecting Maize Varieties with Different Plant Types Participatory Farmer Breeding and Plant Selection for Seed Production at Farmers' Fields	Participatory Discussion on Report Writing Participatory Discussion and Role Play (Communication Skills Development and Public Speaking) Third Monthly Course Evaluation QUIZ NO. 9 Planning for Next Week's Activities
Jun 15	SAT	TRAVEL BACK TO RESPECTIVE ZONES	
Jun 17	MON	GROUND-WORKING ACTIVITIES IN THE PARTICIPANTS' RESPECTIVE AREAS OF ASSIGNMENTS	
Jun 18	TUE	GROUND-WORKING ACTIVITIES IN THE PARTICIPANTS' RESPECTIVE AREAS OF ASSIGNMENTS	

WEEK 12: MATURITY [SOFT DOUGH] STAGE (10 WAP)

DATE	DAY	AM	PM
Jun 19	WED	ARRIVAL OF PARTICIPANTS	
Jun 20	THU	AESA on CPT and Other PTD Trials (Include Observations on Ways of Determining Proper Time of Harvest) Cleaning of Surroundings in Preparation for the Field Day Processing of AESA Final Observation and Presentation of Insect Zoo and Disease Culture Exercises	Sharing of Experiences on the Ground Working Activities Participatory Discussions on Initial Preparations for Field Day and Graduation
Jun 21	FRI	Morphology at Soft Dough Stage (drawing and labeling of important plant parts) Participatory Discussions on Ways of Determining Proper Time of Harvest Participatory Discussions on Some Concepts in Decision Making Preparation for Field Day and Graduation (How to Present Data)	Problem Analysis and Solving: Assessment of Strengths and Weaknesses of the Group and Things to Do to Overcome Weaknesses QUIZ NO. 10 Evaluation and Planning for Next Week's Activities
Jun 22	SAT	TRAVEL BACK TO RESPECTIVE ZONES	

WEEK 13: MATURITY [HARD DOUGH] STAGE (11WAP)

DATE	DAY	AM	PM
Jun 26	WED	ARRIVAL OF PARTICIPANTS	
Jun 27	THU	AESA	PREPARATION FOR THE FIELD DAY IN THE FFS SITE
Jun 28	FRI	PREPARATION FOR THE FIELD DAY IN THE TOT SITE	PREPARATION FOR THE FIELD DAY IN THE TOT SITE AND GRADUATION
Jun 29	SAT	TRAVEL BACK TO RESPECTIVE ZONES	

WEEK 14: MATURITY [HARVEST] STAGE (12 WAP)

DATE	DAY	AM	PM
Jul 03	WED	ARRIVAL OF PARTICIPANTS	
Jul 04	THU	FINAL PREPARATION FOR FIELD DAY AND GRADUATION	FINAL EXHIBIT PREPARATION
Jul 05	FRI	FIELD DAY	MASS GRADUATION
Jul 06	SAT	TRAVEL BACK TO RESPECTIVE ZONES	

WEEK 15: POST HARVEST ACTIVITIES (1WAH)

DATE	DAY	AM	PM
Jul 10	WED	ARRIVAL OF PARTICIPANTS	
Jul 11	THU	Presentation CPT and Other PTD Trial Results Conducted in the TOT Site Generating Participants Commitments (Five Things I'd Like to Do to Promote Local IPPM Program)	Participatory Discussions on the Economics of Maize-based Production Exercises : Computation and Analysis of Return on Investment [ROI] in TOT-IPM PTD Trials REPORT WRITING
Jul 12	FRI	POST TEST for TOT-IPM Participants (Theoretical and Practical [Ballot Box] Evaluations) POST TRAINING COURSE EVALUATION (By the TOT Participants)	Field Visit to Study Marketing and Products Utilization in Maize-based Production System REPORT WRITING
Jul 13	SAT	TRAVEL BACK TO RESPECTIVE ZONES	

WEEK 16: ACTION PLANNING (2WAH)

DATE	DAY	AM	PM
Jul 17	WED	ARRIVAL OF PARTICIPANTS	
Jul 18	THU	ACTION PLANNING (Local IPM Program)	ACTION PLANNING (Local IPM Program)
Jul 19	FRI	FINALIZATION OF ACTION PLANS PRESENTATION OF LOCAL IPM PROGRAM	SUBMISSION OF REPORTS CLOSING PROGRAM
Jul 20	SAT	TRAVEL BACK TO RESPECTIVE ZONES	

CHAPTER 6

OVERVIEW OF A COMPLETE TRAINING SCHEDULE FOR THE TRAINING OF **FFS FACILITATORS**

TOT Training	Time	Activity/Topic/Sub-topic	Objective/Expected Output	Tools/Methods	Materials Required
1st Training week	5 WBP	**Norm Setting & leveling expectation**	To set rules and regulation & to ensure that training is adapted to expectations	Main & small group discussion; Short questions;	Stationeries
1st Training week	5 WBP	**Host Team**	To Facilitate good information sharing	As above	Stationeries
1st Training week	5 WBP	Development of Daily, Weekly and Season long **Activity Schedules**	To make sure that training schedule is well adapted and to make everyone is well aware of it	As above	Stationeries
1st Training week	5 WBP	Knowledge **gap analysis** & Training **Needs Assessment**	To know what participants know on soybeans	Short questions, discussion in small groups & then presented to main group	Stationeries
1st Training week	5 WBP	Soya beans **problem** identification & possible **solutions**	To know soybeans production constraints & possible solutions	As above	Stationeries
1st Training week	5 WBP	Soybean **crop calendar**	To know exactly the period of a certain production activity when growing soybeans	As above	Stationeries
1st Training week	5 WBP	**Introduction to FFS , including the fundamental elements of FFS**	Participants understand how and where FFS started and will understand the fundamental elements of quality FFS	Short questions	Stationeries

TOT Training	Time	Activity/Topic/Sub-topic	Objective/Expected Output	Tools/Methods	Materials Required
2 nd Training week	3 WBP	**FFS facilitation skills** (What is facilitation; Difference between facilitation & teaching; Who is a facilitator; Qualities of a good facilitator; Golden rules of a facilitator; Characteristics of effective facilitator; How can a facilitator improve good relationship with participants; Undesirable behavior of a facilitator; Facilitation techniques)	Participants to become conversant & strong enough in facilitating FFS groups	Main & small group discussion; Short questions; Group Dynamics	Stationeries (individual & group)
2 nd Training week	3 WBP	**Formation of Farmer Field School (FFS) groups (**Group of 25-30 people; Gender balance; Different age groups; Group leadership; Constitution; Daily meeting schedule; Meeting day & time; Study field [contract]; Group norms; Gap analysis; Crop calendar; Baseline information)	Participants to be able to facilitate real FFS group formation	Short questions; discussion	Stationeries
2 nd Training week	3 WBP	**Why FFS?**	Participant to learn importance & be able to implement a real FFS	Short questions, discussions in small groups	Stationeries
2 nd Training week	3 WBP	**Basic concept of FFS**	Participants to know FFS methodology	As above	Stationeries
2 nd Training week	3 WBP	**Concept of IPM**	Participants to be able to apply IPM techniques & to arrive to proper decision-making	Group discussion; **Practical** (visit various sites with impact of IPM techniques); Group Dynamics	Group/ individual stationeries

TOT Training	Time	Activity/Topic/Sub-topic	Objective/Expected Output	Tools/Methods	Materials Required
3rd Training Week	**1WBP**	**Groups Dynamics (**Group dynamics; What is Group dynamic; energizers; brain teasers; body exercises; Why GD; When GD; From where/ by whom; When/where to be conducted) **FFS Leadership (**What is leadership; Why have leadership: How to select leaders; When to select leaders; Who are responsible to select leaders; Responsibilities of leader) **Sitting arrangement in FFS (**What is meant by sitting arrangement; How & why)	Participants to become conversant & strong enough in facilitating FFS groups (Energizers made in Rwanda in place)	Main and small group; discussion; Short questions; Group dynamics; Role plays	Stationeries both individual & group
3rd Training Week	**1WBP**	**Land preparation** (What is land preparation, why, when & how)	Proper land preparation (consider former crops, weeds, erosion)	Group discussion; **Practical (**To clear & prepare TOT plots)	Group/ individual stationary; Hoes; As above
3rd Training Week	**1WBP**	**Experimentation in FFS** (what is a TOT plot, size/ area, where to be sited, design & layout)	To have proper study plot design addressing farmers problems	Group discussion; Group Dynamics	As above
3rd Training Week	**1WBP**	**Soybean varieties & their characteristics**	Group members to be able to identify & select proper variety	Short questions; Group discussion; **Practical** (To identify & differentiate seeds & plant morphology in the field	Individual & group stationeries; sample of different available soybean varieties

TOT Training	Time	Activity/Topic/Sub-topic	Objective/ Expected Output	Tools/Methods	Materials Required
4th Training week	**P**	**Field design & layout**	To be able to have a study plot design with various options to farmers	Group discussion; short questions; **Practical** (To design & layout plots within main TOT plot; Group Dynamics	Group/ individual stationary; Tape measure; Pegs
4th Training week	**P**	**Spacing with mono-cropping;** Spacing with mixed/intercropping; Planting density; Seed estimation; Germination test	To have recommended plant population & enable convenient environment for root growth	As above; farmer practice holing	Individual/ group stationary
4th Training week	**P**	**Sowing of soybeans (**Planting techniques/ methods; Spacing/Plant population; Planting depth; Seed germination)	To have the plots planted on time; planting with clean, high quality soybeans	Main group discussion; Group dynamics; **Practical (**Planting of TOT plots; To determine desirable spacing; Calculate PP; Test for germination)	Germination tested seeds, Rope, Hand hoes, fertilizer, note books, labels
4th Training week	**P**	**Soil fertility management (**Manure & fertilizer use [discuss different types of manures & fertilizers, their uses & preservation])	Participants to be able to identify & obtain a good manure to be used in the TOT plots	As above; **Practical** (Visit & make observations to various site with different levels of fertility; Identification of different types of organic & inorganic fertilizers; Determining needed amount of fertilizer; Group Dynamics	Different fertilizer samples & materials needed when making organic manure

TOT Training	Time	Activity/Topic/Sub-topic	Objective/ Expected Output	Tools/Methods	Materials Required
5th Training week	**1WAP**	TOT study **plot follow-up &** data collection - germination	To observe % germination	Short questions & general discussions	Stationary
5th Training week	**1WAP**	**Ecosystem and Agro-ecosystem** (discuss interaction of living & no-living things within a certain environment, insect pests natural enemies & neutral insects)	Participants to be able to identify prevailing relationship within agro-ecosystem & find best to conserve beneficial ones & reduce enemies	Discussion in small & main group **Practical (**Visit & make observations on different sites with different ecosystem); Group Dynamics	Group/ individual stationary; paper bags for collection of samples
5th Training week	**1WAP**	**AESA introduction**	Group members to be able to conduct AESA for proper decision-making	Group discussion; **Practical** (small groups); Group Dynamics	As above
5th Training week	**1WAP**	**FFS objectives** (grow healthy crop, visit field regularly, conserve natural enemies, the farmer became an expert)	Participants to be able to know the focus of FFS	Small/main group discussion; visit different soybean fields under different management; Group Dynamics	As above

TOT Training	Time	Activity/Topic/Sub-topic	Objective/Expected Output	Tools/Methods	Materials Required
6th Training week	2 WAP	**AESA-1 (**selecting AESA plants, labeling, determine parameters)	To observe plant performance in relation to treatment & derive proper decision-making & implementation	To conduct AESA in small groups & present to main group for discussion & taking action	Group & individual stationary
6th Training week	2 WAP	**Facilitation skills (**What is record keeping; Types of records; Why record keeping; When record keeping; Who to keep the record)	Participants to become conversant & strong enough in facilitating FFS groups; Journals, attendance register, AESA sheets, visitors booklets	Main & small group discussion; Short questions Group dynamics	Stationeries (individual & group)
6th Training week	2 WAP	**NFE for adult learning (**What is adult learning; How adult learning; Non-formal education & Formal (classical) learning	Participants to become conversant & strong enough in facilitating FFS groups; Journals, attendance register, AESA sheets, visitors booklets	Main & small group discussion; Short questions Group dynamics	Stationeries (individual & group)
7th Training week	**3 WAP**	**AESA-2**	To observe plant performance in relation to treatment & derive to proper decision-making & implementation	To conduct AESA in small groups & present to main group for discussion & taking action	Group/ individual stationary
7th Training week	**3 WAP**	**Weeding** (what is a weed, advantages, disadvantages and weeding methods); Weed album & insect box	To be able to control weeds	Main/small group discussion; **Practical** (visit weedy plantations to identify & classification of weed types);	As above
7th Training week	**3 WAP**	Gender - part 1	Introduce the "Men Engage" approach. Build the capacity to organize gender sessions in FFS groups	Main & small group discussion; Short questions Group dynamics	Stationeries (individual & group)

TOT Training	Time	Activity/Topic/Sub-topic	Objective/Expected Output	Tools/Methods	Materials Required
8th Training week	**4 WAP**	**AESA-3**	To observe plant performance in relation to treatment & derive proper decision-making & implementation	To conduct AESA in small groups & present to main group for discussion taking actions	Group/ individual stationary
8th Training week	**4 WAP**	**Morphology of Soybean plant & their functions**	Participants to be able to take proper decision when a part of the plant is affected	Short questions; Discussion in small groups; **Practical** (Soybean plant showing all morphological parts)	Individual & group stationary
8th Training week	**4 WAP**	Gender - part 1	Introduce the "Men Engage" approach. Build the capacity to organize gender sessions in FFS groups	Main & small group discussion; Short questions Group dynamics	Stationeries (individual & group)
9th Training week	**6 WAP**	**AESA-4**	To observe plant performance in relation to treatment & derive to proper decision-making & implementation	To conduct AESA in small groups & to main group for discussion & taking action	Group/ individual stationary
9th Training week	**6 WAP**	**Soybean pests & diseases** (Identification, mode of attack, how they spread, how they affect plants, how they can be controlled); Pests (Foliage, Flower, Pod, Seed & Storage pests); Diseases (Fungal diseases of roots & stem, foliage & pods; Bacterial; Viral; Parasitic nematodes); Plant growth stages & related pests, diseases, disorders & expected natural enemies	To identify IPM techniques on how to control pests & diseases	Main/small group discussion; Short questions; **Practical** (Visit soybean fields); To identify various pests & disease symptoms, mode of attack & % infestation; Group Dynamics	Stationary; Pictures/ photos of pests & disease symptoms

TOT Training	Time	Activity/Topic/Sub-topic	Objective/Expected Output	Tools/Methods	Materials Required
10th Training week	**8 WAP**	**AESA-5**	To observe plant performance in relation to treatment & derive proper decision-making & implementation	To conduct AESA in small groups & present to main group for discussion & taking actions	Group/ individual stationary
10th Training week	**8 WAP**	**Ballot Box test**	Participants to be able to know processing techniques & how to process soybeans so as to improve shelf-life & to sell at reasonable price	Main group discussion; **Practical** (visit processing plants)	Stationary
11th Training week	**9 WAP**	**AESA-6**	To observe plant performance in relation to treatment & derive proper decision-making & implementation	To conduct AESA in small groups & present to main group for discussion & taking actions	Group/ individual stationary
11th Training week	**9 WAP**	**Processing and Marketing** **[a] Processing** (What is processing, why, when, how, and what to process)	Participants to be able to know processing techniques & how to process soybeans so as to improve shelf-life & to sell at reasonable price	Main group discussion; **Practical** (visit processing plants)	Stationary
11th Training week	**9 WAP**	**[b] Marketing** (What is marketing; what to market; when, how & why)	The participants to acquire knowledge about marketing so as to find reliable market which pays high price	Main/small group discussion; short questions; **Practical** (visiting nearby marketing bodies)	Stationary

TOT Training	Time	Activity/Topic/Sub-topic	Objective/Expected Output	Tools/Methods	Materials Required
12th Training week	**10 WAP**	**AESA -7**	To observe plant performance in relation to treatment & derive proper decision-making & implementation	To conduct AESA in small groups & present to main group for discussion & taking actions	Group/ individual stationary
12th Training week	**10 WAP**	**Crop Rotation** (What is crop rotation; Why crop rotation; How crop rotation)	Participant to get knowledge on crop rotation & plan to apply it in their fields	Main/ small group discussion; short questions; **Practical** (small groups to discuss & plan rotation)	Stationary
12th Training week	**10 WAP**	**Exchange visit** (what is exchange visit, why, how, when, who are involved)	Participants be able to arrange the exchange	As on Field day	As on field day
12th Training week	**10 WAP**	**PM&E** (what is PM&E, why, how, when, who are involved, what to evaluate: IPM project & the groups); Post test evaluation of participants: Ballot box; Individual & group start-up report; Final report	Participants to be able to monitor & evaluate group activities & plan for the future	As on evaluation in FFS	Stationary

TOT Training	Time	Activity/Topic/Sub-topic	Objective/Expected Output	Tools/Methods	Materials Required
13th Training week	**12 WAP**	**AESA-8**	To observe plant performance in relation to treatment & derive proper decision-making & implementation	To conduct AESA in small groups & present to main group for discussion & taking action	Group/ individual stationary
13th Training week	**12 WAP**	**Seed multiplication** (What is seed multiplication; Why seed multiplication; Techniques & procedures of seed multiplication)	Participants to be knowledgeable about seed multiplication techniques; Participants to be able to produce good quality seeds	Main/ small group discussion; Short questions; Study tour	Stationary; Transport; Snacks
13th Training week	**12 WAP**	**Farmer field day** (what is farmer field day? why, when, who are involved? how, what time is it conducted?)	Participants to know all about farmer field days & be able to conduct it	Main/small group discussion; short questions	Stationary; Transport & Snacks
13th Training week	**12 WAP**	**Facilitation skills: Income generating activities** (What is meant by income generating activities; Why income generating activities; How to develop income generating activities; Possible income generating activities)	Participants to become conversant & strong enough in facilitating FFS groups; Income generating activities in place	Main & small group discussion; Short questions; Group dynamics	Stationeries (individual & group)

TOT Training	Time	Activity/Topic/Sub-topic	Objective/Expected Output	Tools/Methods	Materials Required
14th Training week	**14 WAP**	**AESA-9**	To observe plant performance in relation to treatment & derive proper decision-making & implementation	To conduct AESA in small groups & present to main group for discussion & taking actions	Group/ individual stationary
14th Training week	**14 WAP**	**Facilitation skills** [a] **FFS group sustainability** (What is sustainability; Kinds of sustainability [group, technology]); Why sustainability; How sustainability) **[b] Short & long-term plans** **(**What is planning; When planning; How planning; Who makes the plan)	Participants to become conversant & strong enough in facilitating FFS groups; Plans for sustainability in place	Main and small group discussion; Short questions; Group dynamics	Stationeries (individual & group)
14th Training week	**14 WAP**	**Planning for next session** (what is planning, why, when, how, by whom)	From the observations/ results, group members be able to plan for the future (short/ long plan)	Main/ small group discussion; Short questions	Stationary

TOT Training	Time	Activity/Topic/Sub-topic	Objective/Expected Output	Tools/Methods	Materials Required
15th Training week	**15-17 WAP**	**AESA-10**	To observe plant performance in relation to treatment & derive proper decision-making & implementation	To conduct AESA in small groups & present to main group for discussion & taking actions	Group/ individual stationary
15th Training week	**15-17 WAP**	**Evaluation in FFS** (evaluation on results, impact & methodology: what is it about, when, how, why, by whom)	Participants to be able to evaluate FFS activities	Main/ small group discussion; Short questions; Designed questionnaire; Ballot box	Stationary
15th Training week	**15-17 WAP**	**Harvest**	Collect and Analyse harvest data	Field exercise. Small groups. Results presented to large groups	Stationary
16th Training week	**16 -18W AP**	**FFS-Farmer networks/ cooperatives** (what is farmer network, why farmer network, how can it be formed, running farmer networks)	To have strong sustainable FFS groups; To have farmers unite together for better decision-making	Main/ small group discussion; visit other cooperatives/ farmer networks	Stationary
16th Training week	**16 -18W AP**	**Graduation** (why when, how, who are involved)	Appreciation of participation; Group strengthening	Main group discussion; short questions	T-shirts/cap; Certificates; Foods/ drinks; Transport

CHAPTER 7

OVERVIEW OF A COMPLETE TRAINING SCHEDULE FOR **FFS FARMERS**

SEASON-LONG FFS CURRICULUM FOR MAIZE-BASED INTEGRATED PRODUCTION AND PEST MANAGEMENT (MAIZE FFS-IPPM)

The Farmer Field School (FFS) for Maize IPPM brings farmers together to carry out an intensive training on IPPM methods and issues over the life cycle of the crop. The FFS trains farmers to become IPPM experts in their own fields. The IPPM Training Team is assisted by the agricultural technician assigned in the area where the FFS is located.

The principles that guide the FFS learning process are:

- *The field is the primary learning resource.* All learning activities take place in the field and are based on what is happening in the field.
- *Experience forms the basis for learning.* The activities that take place in the field and their farms form the basis for discussions and analyses by farmers who arrive at concepts which they test and improve through further field activities.
- *Decision-making guides the learning process.* Training focuses on the analysis of the agro-ecosystem of the crop. The combination of analytical methods, ecological principles, and basic IPPM methods helps farmers gain insights into the ecological interactions in the field and provide them with greater confidence in making crop management decisions.
- *The training curriculum is based on local conditions of the FFS.* The FFS curriculum and materials are based on their appropriateness, the local conditions, and the problems and needs of the farmers in the FFS.
- *Training last the entire cropping season.* Farmers acquire a firm understanding of the relevant IPPM concepts for each growth stage of the crop as well as the factors that influence crop management decision-making at all stages of the plant's growth.

The FFS consists of 25 farmers meeting for one day each week, from 14-16 weeks. The Field School has at least 1,000 sq. meter 'learning field' containing a farmer-run comparative study of IPPM and other relevant field experiments.

A typical schedule of a Farmer Field School for any give day is:

7:00 - 8:30	Field monitoring in small groups
8:30 - 9:45	Agro-ecosystem analysis and discussion in small and big groups
9:45 - 10:15	Break
10:15 -10:45	Group dynamics activity in small or large groups
10:45 -11:45	Special topics : activity and discussions in small and large groups
11:45 -12:00	Evaluation and Planning

SEASON-LONG FARMER FIELD SCHOOL ACTIVITY GUIDE

MAIZE-BASED CROP PRODUCTION FFS-IPPM ACTIVITIES		
TIME	**WEEK 1: VILLAGE IMMERSION (1WBP)**	**WEEK 2: LAND PREPARATION AND PLANTING (0 WBP)**
7:00 - 7:30	❑ Arrival of Participants, Registration and Baseline Survey Form (BSF) Data Gathering	❑ Prayer/National Anthem ❑ Recapitulation ❑ Briefing the Day's Activities ❑ Ballot Box Pre-Test
7:30 - 10:00	❑ Opening Ceremonies ❑ Overview of the Training Program ❑ Introduction of Participants ❑ Setting of Training and Other Learning Norms ❑ Groupings	❑ Finalize Plans for CPT and Other PTD Activities in the FFS ❑ Land Preparation and Other Related Activities (e.g., continue BSF data gathering and define Farmers' Crop Protection [FCP] Practice, etc.)
10:00-10:15 B R E A K		
10:15 - 11:45	❑ Leveling of Expectations ❑ Lay-outing of Plots for CPT and Other PTD Trials	❑ Familiarization and Soil Test Kit (STK) Testing of the FFS Field Site ❑ Planting of the CPT and Other PTD Trials
11:45 - 12:00	❑ Discussion on Crop Protection Trials (CPT) and Other Participatory Technology Development (PTD) Activities in FFS ❑ Planning for Next Week's Activities/Prayer	❑ Processing of Field Activities ❑ Evaluation ❑ Planning for Next Week's Activities/Prayer

MAIZE-BASED CROP PRODUCTION FFS-IPPM ACTIVITIES		
TIME	**WEEK 3: EMERGENCE STAGE (1WAP)**	**WEEK 4: SINGLE LEAF STAGE (2 WAP)**
7:00 - 7:30	❑ Prayer/National Anthem ❑ Recapitulation ❑ Briefing for Field Activities	❑ Prayer/National Anthem ❑ Recapitulation ❑ Briefing for Field Activities
7:30 - 10:00	❑ Ecosystem Observation (Concept of Ecosystem) ❑ Seedling Morphology at Emergence Stage (drawing and labeling of important plant parts)	❑ Agro-Ecosystem Analysis (AESA) ❑ Seedling Morphology at Single Leaf Stage (drawing and labeling of important plant parts) ❑ Processing of Field Activities
10:00-10:15 B R E A K		
10:15 - 11:45	❑ Group Dynamics ❑ Continuation of Field and Other Related Activities ❑ Processing of Field and Other Related Activities	❑ Group Dynamics ❑ Participatory Discussions on the Use of Bio-fertilizers (Bio-N, *Trichoderma* sp, *Mycorrhiza* sp, Vermi-compost, etc) Concept of Integrated Nutrient Management (INM) ❑ Election of FFS Class Officers
11:45 - 12:00	❑ Evaluation ❑ Planning for Next Week's Activities/Prayer	❑ Evaluation ❑ Planning for Next Week's Activities/Prayer

MAIZE-BASED CROP PRODUCTION FFS-IPPM ACTIVITIES		
TIME	**WEEK 7: MID WHORL STAGE (5 WAP)**	**WEEK 8: LATE WHORL STAGE (6 WAP)**
7:00 - 7:30	❑ Prayer/National Anthem ❑ Recapitulation ❑ Briefing for Field Activities	❑ Prayer/National Anthem ❑ Recapitulation ❑ Briefing for Field Activities
7:30 - 10:00	❑ AESA ❑ Collection, Identification of Predators and Insect Pathogens (*Nuclear Polyhedrosis Virus* [NVV], *Metharrhizium* sp., and *Beauveria* sp.) at Mid Whorl Stage ❑ Processing of Field Activities and Insect Zoo Reporting ❑ Morphology at Mid Whorl Stage (drawing and labeling of important plant parts)	❑ AESA ❑ Field Collection and Identification of Weeds, Diseases, Other Pests and Natural Enemies ❑ Participatory Discussions on Integrated Disease Management (Leaf Rust, Bunded Leaf Sheath Blight, Stunts, and Mosaics) ❑ Processing of Field Activities and Insect Zoo Reporting ❑ Practice of Folk Media Presentation
10:00-10:15 B R E A K		
10:15 - 11:45	❑ Group Dynamics ❑ Participatory Discussions and Exercises on the Following : - Spiders and Other Beneficial - Insect Pathogens (*Nuclear Polyhedrosis Virus* [NVV], *Metharrhizium* sp., and *Beauveria* sp.) - Folk Media Presentation ❑ Introduction to Disease Culture	❑ Group Dynamics ❑ Morphology at Late Whorl Stage (drawing and labeling of important plant parts) ❑ Participatory Discussions on Integrated Weed Management (Critical Period of Weed Competition) ❑ Set-up Exercises on Pre-Disposing Factors in Disease Development (Disease Culture)
11:45 - 12:00	❑ Evaluation ❑ Planning for Next Week's Activities/ Prayer	❑ Evaluation ❑ Planning for Next Week's Activities/ Prayer

MAIZE-BASED CROP PRODUCTION FFS-IPPM ACTIVITIES		
TIME	**WEEK 9: TASSELING STAGE (7 WAP)**	**WEEK 10: SILKING STAGE (8 WAP)**
7:00 - 7:30	❑ Prayer/National Anthem ❑ Recapitulation ❑ Briefing for Field Activities	❑ Prayer/National Anthem ❑ Recapitulation ❑ Briefing for Field Activities
7:30 - 10:00	❑ AESA ❑ Field Collection and Identification of Pests (Aphids), Predators (Syrphid Fly) and Insect Pathogens ❑ Processing of Field Activities and Reporting on Disease Culture ❑ Morphology at Tasseling Stage (drawing and labeling of important plant parts) ❑ Participatory Discussions on *Trichogramma* Parasitation and Syrphid Fly Maggot Predation on Aphids and Aphids Management	❑ AESA ❑ Field Collection and Identification of Pests, Parasitized and Insect Pathogen Infected IPs (Stalk Borers, Earworms, Planthoppers, Aphids, Armyworms, Cutworms, Others) ❑ Processing of Field Activities ❑ Set-up Insect Zoo (Parasites and Insect Pathogens) ❑ Exercises on Effect of Pesticides to Humans and the Environment and Life Cycle and Food Webs
10:00-10:15 B R E A K		
10:15 - 11:45	❑ Group Dynamics ❑ Participatory Discussions on: - Detasseling as a Cultural Control for Corn Borer - Field Day Preparations ❑ Group Dynamics	❑ Morphology at Silking Stage (drawing and labeling of important plant parts) ❑ Reporting of Insect Zoo (by group) ❑ Participatory Discussions on Utilization of Field Insect Pathogens (*Nuclear polyhedrosis virus* or NPV and *Bacillus thuringensis* or *Bt*) ❑ Field Day Preparation
11:45 - 12:00	❑ Evaluation ❑ Planning for Next Week's Activities/ Prayer	❑ Evaluation ❑ Planning for Next Week's Activities/ Prayer

MAIZE-BASED CROP PRODUCTION FFS-IPPM ACTIVITIES		
TIME	**WEEK 11: MATURITY [BLISTER] STAGE (9 WAP)**	**WEEK 12: MATURITY [SOFT DOUGH] STAGE (10 WAP)**
7:00 - 7:30	❑ Prayer/National Anthem ❑ Recapitulation ❑ Briefing for Field Activities	❑ Prayer/National Anthem ❑ Recapitulation ❑ Briefing for Field Activities
7:30 - 10:00	❑ AESA ❑ Field Collection and Identification of Diseases, Insect Pests and Natural Enemies ❑ Fieldwork (Seed Selection [Tagging] from F_1 Hybrids for Seed Production Using F_2 Seeds, Rodent Loss Assessment at Maturity [Blister] Stage) ❑ Processing of Field Activities	❑ Last AESA ❑ Field Exercise on Rodent Damage Appraisal ❑ Processing of Field Activities ❑ Morphology at Soft Dough Stage (drawing and labeling of important plant parts)
10:00-10:15 B R E A K		
10:15 - 11:45	❑ Group Dynamics ❑ Morphology at Blister Stage (drawing and labeling of important plant parts) ❑ Participatory Discussions on Selecting Maize Varieties with Different Plant Types ❑ Participatory Farmer Breeding and Plant Selection for Seed Production at Farmers' Fields	❑ Group Dynamics ❑ Participatory Discussions on: - Rodent Damage Appraisal and Practical Control Strategies - Practical Strategies on Smut Control Strategies ❑ Continue Planning for Field Day and Selection of Appropriate Folk Media for Advocacy and Sending Across IPM Messages
11:45 - 12:00	❑ Evaluation ❑ Planning for Next Week's Activities/ Prayer	❑ Evaluation ❑ Planning for Next Week's Activities/ Prayer

MAIZE-BASED CROP PRODUCTION FFS-IPPM ACTIVITIES		
TIME	**WEEK 13: MATURITY [HARD DOUGH] STAGE (11WAP)**	**WEEK 14: MATURITY [HARVEST] STAGE (12 WAP)**
7:00 - 7:30	❑ Prayer/National Anthem ❑ Recapitulation ❑ Briefing for Field Activities	FIELD DAY* *The Field Day is ideally held two weeks before the expected date of harvesting
7:30 - 10:00	❑ Participatory Discussions on Ways of Determining Proper Time of Harvest ❑ Tabulation of AESA Results from CPT and Other PTD Trials ❑ Preparation and Summation of PTD Results	GRADUATION CEREMONIES* *The Graduation Ceremonies is usually held simultaneously with the Field Day
10:00-10:15 B R E A K		
10:15 - 11:45	❑ Final Folk Media Rehearsal and Other Preparations for the Field Day and Graduation Ceremonies	RESTORATION ACTIVITIES
11:45 - 12:00	❑ Evaluation ❑ Planning for Next Week's Activities/ Prayer	PREPARATION OF TERMINAL REPORT

CHAPTER 8

BUDGET
FOR TRAINING MASTER TRAINERS AND FACILITATORS

COST OF TRAINING FFS MASTER TRAINERS

Typical cost for 10 day initiation for 44 MT	Unit price	units	days	Rwf	Euro
Transport allowance Master Trainers	5,000	44	2	440,000	489
Mission allowance for Master Trainers	40,000	44	10	17,600,000	19,556
International Master Trainers	200,000	3	15	9,000,000	10,000
Conference room	100,000	1	10	1,000,000	1,111
Materials	500,000	1	1	500,000	556
Total				**28,540,000**	31,711

Typical cost for a 2 day training session for 44 M	Unit price	units	days	Rwf	Euro
Transport allowance Master Trainers	5,000	44	2	440,000	489
Mission allowance for Master Trainers	40,000	44	3	5,280,000	5,867
International Master Trainers	200,000	3	5	3,000,000	3,333
Conference room	100,000	1	2	200,000	222
Materials	200,000	1	1	200,000	222
Total				**9,120,000**	10,133

Total 10 days initiation				28,540,000	31,711
14 two-day sessions	9,120,000	14		127,680,000	141,867
Coaching sessions by Int. MT in 2nd season	200,000	3	48	28,800,000	32,000
Grand total				**185,020,000**	205,578
Per Master Trainer				**4,205,000**	**4672**

COST FOR TRAINING FFS FACILITATORS

Typical cost for a 3 day training session for 80 F	Unit price	units	days	Rwf	Euro
Transport allowance for facilitators	2,500	80	2	400,000	444
Compensation for facilitators	3,000	80	4	960,000	1,067
Accommodation and meals	20,000	80	4	6,400,000	7,111
Mission allowance for Master Trainers	40,000	4	4	640,000	711
Transport allowance Master Trainers	5,000	4	2	40,000	44
Conference room	100,000	1	3	300,000	333
Materials	200,000	1	1	200,000	222
Total				**8,940,000**	9,933

Total cost for 16 three-day sessions	8,940,000	16		143,040,000	158,933
Coaching mission Master Trainers	40,000	4	10	1,600,000	1,778
GRAND TOTAL				**144,640,000**	160,711
Cost per facilitators				**1,808,000**	**2,009**

CHAPTER 9

FFS Master Trainers
in Rwanda

Rwandan FFS Master Trainers

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CHAPTER 10

FARMER-FACILITATOR'S COOPERATIVES: PROFESSIONAL SERVICE PROVIDERS

Cooperative of FFS Facilitators in Rwanda

Hire us to train your farmers

Who we are

We are professionals and technically qualified team in conducting training to farmers by using the approach of Farmer Field School (FFS). We are ready to contract with any group of farmers, cooperative, company or NGOs that need agriculture related training.

What we do

We provide season long training for farmers on different crops. The approach is based on a practical skilling process that allows the trainees to deeply understand and adopt the techniques of modern and market oriented farming. This is done by conducting practical training sessions and regular follow up of the crop in the field which results in the increase of productivity.

What I hear, I forget. What I see, I remember. What I do, I understand.

Our Partners

We have established a partnership with different institutions:

- 3 Party contracts between all Districts of Rwanda, RAB and FFS Facilitator's cooperatives on the implementing Twigire Muhinzi activities; to create new FFS groups and to train famer promoters
- Kigali farms Ltd works with 30 FFS facilitators from Burera and Musanze Districts on mushroom production.
- One of our cooperative (COFAR) has contracted a French NGO know as AIMF through Rubavu District to form more FFS groups and to construct green houses.

Price

Our services cost as follow:

The FFS Facilitator is supposed to work with the group once a week and the training covers a minimum period of 6 months for seasonal crop. For perennial crops, the minimum period is one year but the frequency of meetings is less.

The total cost for the minimum period of 6 months for seasonal crops and 12 months for perennial crops is 125,000 Rwf net + transport allowance in case of long travel distances.

Our service fee per group/season

125,000 Rwf

For a group of 25 farmers, this is only 5,000 RWF per farmer!

List of Facilitators' Cooperatives

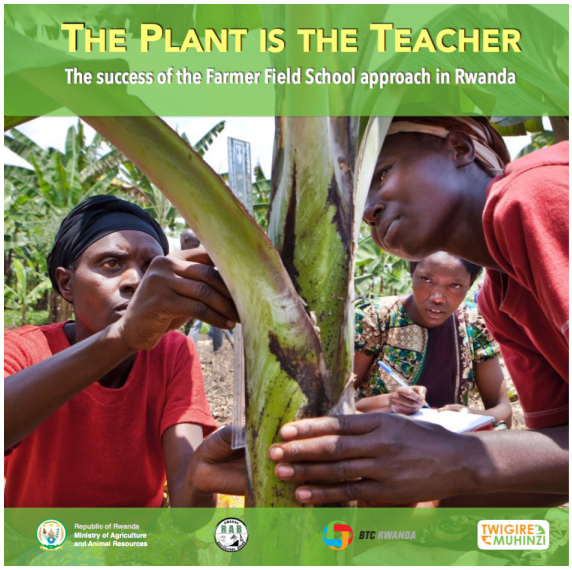
We work across the whole country and we have representatives in the 29 Districts. The table below illustrates different cooperatives of Facilitators as well as their contact address.

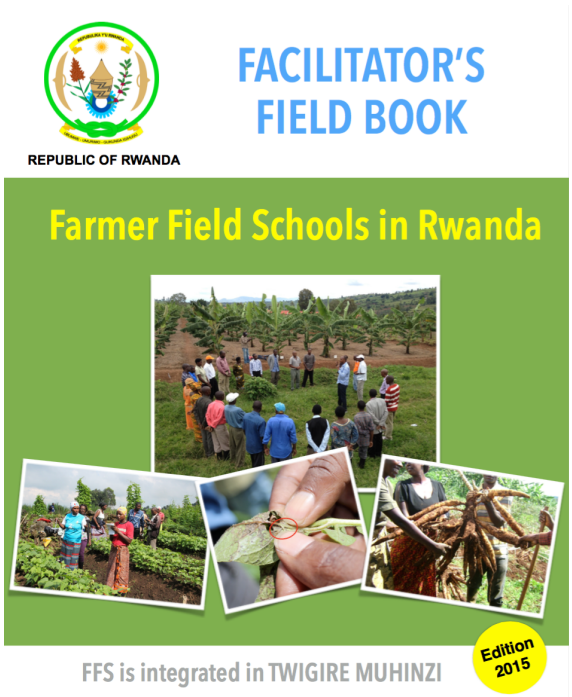
N°	Cooperative	District	Contact Person	Telephone
1	KOIBU	Burera	Tuyisenge Schadrack	078 847 8463
2	KOTTUBUM	Musanze	Ndereyabanzi Eliezel	078 567 8973
3	Koperative Umuhuza Gakenke	Gakenke	Nkurikiyumukiza Felicien	078 309 8181
4	COFEANYA	Nyarugenge	Kabayiza Jean Baptiste	078 627 1173
5	KOUIRU	Rurindo	Ndagijimana Thomas	078 348 8870
6	KOAUGI	Gisagara	Rugemintwaza Emmanuel	078 354 8007
7	SACH	Huye	Semwiza Jean Damascene	078 640 1697
8	TERIMBERE MUHINZI MWOROZI	Kamonyi	Shyaka Hassan	078 355 4449
9	Abadahigwa mu buhinzi	Muhanga	Sengoga Jean Claude	0788859798
10	KOABONYA	Nyamagabe	Nshimyumuremyi Valens	078 639 2903
11	Urugero rw'abahinzi Nyanza	Nyanza	Bisangabagabo Jean Paul	078 879 1776
12	KOAINYA	Nyaruguru	Nyiranzabamwita Vestine	078 887 6500
13	KOAPRORU	Ruhango	Mushimiyimana Rachel	0783263382
14	COFAR	Rubavu	Ntibitura Modeste	078 100 7218
15	ZAMURUMUSARURO NGORORERO	Ngororero	Habineza Yussufu	078 857 9097
16	TUBAFASHE KWIGIRA	Karongi	Ruziganyi Francois	078 855 370
17	KOPANYA-TWIGIRE	Nyabihu	Munyaneza Alexis	078 879 7757
18	DUHUZE UBUMENYI NYAMASHEKE	Nyamasheke	Nshimyumukiza Jean Baptiste	078 859 1201
19	KODUIRUHANGO	RUTSIRO	Hamenyimana Deo	078 879 3559
20	COPROSSARU	RUSIZI	Mukeshimana Richard	078 316 7398
21	VUDUKA Ngoma	Ngoma	Shema Jean Damascene	078 500 9508
22	KOAKA Twigire	Kayonza	Mvutseneza Jean Pierre	078 334 6818
23	CFAER	Rwamagana	Twagirayezu Daniel	078 531 8426
24	KODUAM	Kicukiro&Gasabo	Dusengimana Leostache	078 849 3238
25	KOTUBAKI	Kirehe	Kayizere Pascal	078 897 6405
26	KOTAMUGA	Gatsibo	Semana Evariste	078 445 2651
27	COFANYA	Nyagatare	Minani Jean Paul	078 507 7665
28	KOABUGE	Bugesera	Kabengera Sylvestre	078 876 5712
29	KONUGI	Gicumbi	Ntakirutimana Charlotte	078 862 8340

CHAPTER 11

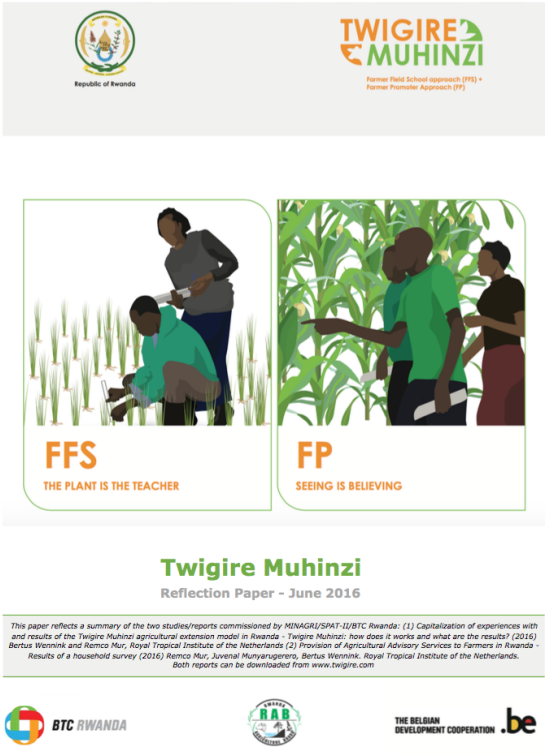
OTHER PUBLICATIONS
ABOUT FFS IN RWANDA

The following documents can be downloaded from the FAO Global FFS network site: (http://www.fao.org/farmer-field-schools/en) or contact the authors.

	*A colorful promotion booklet about the FFS approach in Rwanda. 64 pages*
	*A comprehensive report about all the achievements of the 'Support to SPATII' Program. 262p*



English and Kinyarwanda version of the notebook which is used by the FFS Facilitators while they work with their groups. It helps them to implement their activities and it make keeping records easier. 200 pages & Training presentation on how to use the recording book.



This illustrated document provides a summary of the two studies below. It explains how the model works, presents results and assess success factors as well as critical issues. It is based on the two reports below. 15 pages.

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