



OUT PUT OF TRAINING OF TRAINERS COURSES ON FARMER FIELD SCHOOL METHODOLOGY FOR FARMER FACILITATORS

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Compiled by

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Intensified Social Forestry Project in Semi-arid Areas of Kenya

2006

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PROJECT BACKGROUND

The Government of Japan (GOJ) through Japan International Cooperation Agency (JICA) has had a longstanding partnership with the Government of Kenya (GOK) in the area of dryland forestry development. Presently, JICA has provided five years of technical assistance under the *Intensified Social Forestry Project in Semi-arid Areas (ISFP)*. The focus under ISFP is to consolidate the past efforts in the development of social forestry in the semi arid lands of Kenya.

The involvement of Government of Japan (GOJ) in the forestry sector dates back to the middle 1980's: The initial assistance was through the Social Forestry Training Project (SFTP), which was implemented over the period 1985 to 1997. The main focus of this project was on dryland forestry technology development for tree nursery and tree establishment in the semi-arid areas and to provide training in social forestry. After the expiry of this cooperation, the GOJ provided further support under the Social Forestry Extension Model Development Project (SOFEM), which was implemented in Kitui for five years ending November 2002.

The prevailing conditions of low technology production systems in the semi-arid areas, coupled with the unreliable rainfall regimes, portends poor agricultural productivity and are a cause for high incidences of food insecurity and poverty. The threat to the livelihoods in these areas is real which calls for practical interventions so as to improve on the livelihood conditions of the people in these areas.

Tree-based production systems have more resilience to the vagaries of weather and in conditions of improved technology can improve the productivity of the semi-arid areas. Some of these challenges are development and dispersal of viable dryland forestry technologies for the wider application in the semi-arid environment; the harnessing of the untapped economic potential of the non-wood forestry products (NWFP); documentation, scientific improvement and application of local tree related technologies; scientific prediction of the productivity of dryland tree species; lack of detailed understanding of the socio-economic factors underlying the present state of the use of the forestry resources in the drylands.

To maximize production in dryland forestry and to contribute to socio-economic development, strengthening of the forest extension service delivery, intensification of tree growing, development of micro-enterprises, technology transfer, adaptive research, domestication of fast growing tree species, strengthening linkages, waste reduction, marketing information and channels are needed.

Economic opportunities outside agriculture are few in most of the semi arid areas. Increasing population pressure, depleted soils in agricultural fields, scarce water, and pest menace are issues that confront farmers regularly. All these negatively affect rural livelihoods and the farmers are struggling to find new sources of income. However, conditions of these negative factors vary according to areas. It is becoming increasingly important, therefore, for farmers to equip themselves with appropriate and site specific technologies that could be generated locally. In addition, the integration of scientific knowledge with local traditional farmers' knowledge is necessary in improving establishment of farm forests as well as the dissemination of such activities.

The ISFP backed with long experiences in semi-arid land forestry of Kenya has learned that forestry activities need to be incorporated with agricultural practices. Poverty and food insecurity issues require to be addressed in the development of forestry activities. With integrated production systems combining annual and perennial crops as the entry point, the ISFP

tries to offer an opportunity of intensifying and diversifying the use of farms through establishing farm forests.

The emphasis of the ISFP farm forestry extension activities is "learning processes" and "collective actions". It was under this background therefore that, the ISFP facilitated farmer facilitators "Training of Trainers (TOT)" course on Farmers Field School (FFS) facilitation skills.

ISFP Project Area



Location map of target districts for Intensified Social Forestry Project (ISFP)

PREFACE

This Manual/Report is an output of farmer TOT course for farmer facilitators from Tharaka, Mbeere and Kitui districts. The training was done in Rural Tavern for Tharaka, Embu Agricultural Staff Training (EAST) College for Mbeere and Kitui KEFRI Regional Centre for Kitui district. The course was held from 6th to 10th June 2005 for Tharaka, 13th - 17th June 2005 for Mbeere and first group of Kitui and 27th June – 1st July, 2005 for the second group of Kitui. Additional TOT for 10 farmers was held from 6th to 10th March 2006 at KEFRI Kitui. A total of 138 farmer facilitators were trained i.e. Tharaka (27), Mbeere (38) and Kitui (73) respectively.

The output will serve as a reference manual to be used by farmer facilitator TOT graduates when conducting FFS activities in their new groups as well as in their existing groups.

In all the trainings, the participants were put in sub-groups to enhance their participation. The methodology adopted in the course involved field exercises, small group and large group discussions and presentations, informal and structured discussions, plenary presentations and sessions, group dynamics and FFS field visits.

This manual is a summary of most of the topics covered during the training. It is good to note that the field visits and group presentations are not included in this manual but the summary of everything covered during the training has been captured.

It is hoped that, this manual will be of use to all the participants and other practitioners implementing or using the FFS Methodology.



P. M. Kariuki

Project Manager, ISFP

ACKNOWLEDGEMENT

This document is an output of the collaborative effort by several institutions and individuals in both conducting the training and capturing the proceedings of the TOT course.

The cooperation demonstrated by the participants in undertaking the activities of the course enabled us to cover the programmed activities within the scheduled time.

I would like to thank the Intensified Social Forestry Project in Semi arid areas (ISFP) for organizing and financing this TOT program. I sincerely thank the entire Project management officers at Project Headquarters for all the support. Thanks go to the Chief Advisor Yuichi Sato, Project Manager Patrick Kariuki, Project Coordinator Nawashiro Takanobu and the Project Extension Expert Shinji Ogawa. I would also like to thank the DAO Kitui (Mr. Muindi) for allowing his officers to facilitate the farmer TOT in the three districts

I wish to acknowledge the good and exemplary performance demonstrated by the facilitators; Victoria Nthenya, Danic Mutemi, Japheth Jaffari, Mr. Wambugu, Emily Kioko and Mr. Mutothya all of Ministry of Agriculture Kitui; and the good work done by Mr. Fondo (DFEO Siakago), Mr. Aloo (DFEO, Mwea), Mr. Maina (DFEO, Gachoka), Mr. Rewa (DFEO, Tharaka North), Mr. Mutea (DFEO, Tharaka South), Mr. Mainga (DFEO, Ikutha), Mr. Manoah (DFEO, Mwitika), Mr. Muiruri (DFEO, Mutomo), Mr. Ndaka (ADFO, Mbeere), Mr. Muthuri (ADFO, Kitui), all of Forest Department and the late Mr. Ali Atanas (KEFRI, Kitui) for assisting in facilitation of the TOT.

I appreciate the good work done by Lucy Wangeci (ISFP secretary) and Winnie Gichogo (FD HQs secretary) in capturing all the proceedings of the TOT activities.

Thanks to KEFRI Kitui Regional Research Centre (Kitui), the proprietor of the Rural Tavern Hotel (Tharaka) and Embu Agricultural Staff Training (EAST) College for hosting the workshops and availing a lot of their facilities for use during the training period.

TO ALL GOD BLESS YOU.

LIST OF ACRONYMS AND ABBREVIATIONS

AESA	Agro- Ecosystem Analysis
ASAL	Arid and Semi Arid Areas
DFO	District Forestry Officer
DFEO	Divisional Forestry Extension Officer
DANIDA	Danish International Development Agency
FAO	Food and Agriculture Organization of United Nations
FD	Forest Department
FFS	Farmer Field School
GOJ	Government of Japan
GOK	Government of Kenya
IFAD	International Fund for Agriculture Development
ILRI	International Livestock Research Institute
IPM	Integrated Pest Management
ISFP	Intensified Social Forestry Project
JICA	Japan International Cooperation Agency
KARI	Kenya Agricultural Research Institute
MOA	Ministry of Agriculture
NGO	Non Governmental Organization
PTD	Participatory Technology Development
SFTP	Social Forestry Training Project
SOFEM	Social Forestry Extension Model Development Project
UNDP	United Nations Development Programme

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PART I. CLIMATE SETTING AND TOT ORGANIZATION

1.1 Participatory Introduction of Participants

Participatory method was used where participants paired up and introduced each other in turns. Each participant was required to pick on a partner he had not known before. The objective was to encourage openness and start developing team spirit. The introductions were to capture the following details of each participant: name, home area, likes, dislikes and other comments e.g. marital status.

In this participatory introduction, the facilitator informed the participants that the purpose of introductions was to get participants know themselves and others. The illustration of the Johari Window was used as shown below. The participants were encouraged to remain in the open area. By doing so, it was possible to discover the talents, gifts and potentials hidden in people.

JOHARI WINDOW

Open area: What a person knows about him/herself and others know about us	Blind area: What other people know about a person which him/her does not know
Private area: What one knows about him/herself but others do not know	Unknown area: Attributes not known to both the possessor and even the other members.

1.2. GROUPING

This is the process of assembling different individuals into sets also known as sub groups for the sole purpose of carrying out certain targets at specific times.

A group should have its mandate (rules and regulations) to control and check against excess of members /friends

Why do we do grouping?

- ❖ Sharing of ideas/experiences
- ❖ Accomplish tasks fast by saving time
- ❖ Enhance participation – give each member a chance to participate adequately
- ❖ Bring together people with different abilities
- ❖ Empowerment/bargaining power
- ❖ Makes supervision easy

What do we note before grouping?

- ❖ Establish the number of members
- ❖ Gender balance
- ❖ Number of sub groups to be formed
- ❖ Check for availability of materials (e.g. during AESA taking farm tools and implements)
- ❖ Time allocation- e.g. FFS schedule presentation of AESA.
- ❖ Bring and balance people with different abilities

Each sub group should have

- i) Identity /name
- ii) Slogan/motto
- iii) Leader (s)

1.3. Functions of Host team

A sub group responsible for a given learning day's activities is known as the host team. Duty allocation is through balloting

Main functions of a Host team

- ❖ Keep the training hall or the training premises clean
- ❖ Arrange the hall and all the training materials
- ❖ Introduction of facilitators and guest facilitator
- ❖ Prepare the programme for the day
- ❖ Facilitates the whole day's activities- prayers, recap etc
- ❖ Serve as time keepers for the session
- ❖ Distributes all the training materials
- ❖ Assists the facilitator
- ❖ Do any other activities allocated by the facilitator
- ❖ Checks attendance / roll call
- ❖ Provide energizers/dynamics
- ❖ Takes the days proceedings for recap in the next day
- ❖ Planning for the next week
- ❖ Act as link between the facilitators and the participants
- ❖ Updating the participants on the current issues
- ❖ Organizing logistics on field activities
- ❖ Thanking facilitators and guests

PART II. OVERVIEW OF THE FFS APPROACH

2.1. Historical Background of The Farmer Field Schools (FFS)

- ❖ Started in South East Asia on Integrated Pest Management (IPM) in rice production.
- ❖ Due to increase use of pesticides there was a build up insect pests
- ❖ Redesignated to IPPM
- ❖ In a bid to solve this problem there was need to involve the farmers
- ❖ Embrace farmers' practices and experiences.
- ❖ Other methods
 - Biological
 - Cultural
 - Chemical
- ❖ Approach has been used to overcome other production constraints e.g. soil fertility, water harvesting
- ❖ Concept borrowed to African Countries.
- ❖ In Kenya, FFS started in 1996 through FAO in Western Kenya.
- ❖ Expanded in 1999 through IFAD.
- ❖ Taken by other Institutions in Kenya such as KARI, GOK ILRI, ISFP, DANIDA etc

Focus - The field is the focus of FFS

Curriculum - Influenced by the problem to be solved and by the field conditions.

Real problems - Are analyzed and solved in the field with the full participation of farmers.

2.2. Approach and Concept

2.2.1. What is a Farmers Field School?

A Farmers field school (FFS) is described as a Platform and "School Without Walls" for improving decision-making capacity of farming communities and stimulating local innovation for sustainable production.

It is a participatory approach to extension, whereby farmers are given opportunity to make a choice in the methods of production through discovery based approach.

A Field School is a Group Extension Method based on the principles and methods of adult education. It is a "school without walls" that teaches basic agro-ecology and management skills that make farmers experts in their own farms.

It is composed of groups of farmers who meet regularly during the course of the growing seasons to experiment as a group with new production options. Typically FFS groups have 25-30 farmers. After the training period, farmers continue to meet and share information, with less contact with extensionists.

FFS aims at increasing the capacity of groups of farmers to test new technologies in their own fields, assess results and their relevance to their particular circumstances, and interact on a more demand driven basis with the researchers and extensionists looking to these for help where they are unable to solve a specific problem amongst themselves.

In summary therefore a Farmer Field School (FFS) is a forum where farmers and trainers debate observations, apply their previous experiences and present new information from outside the

community. The results of the meetings are management decisions on what action to take. Thus FFS as an extension methodology is a dynamic process that is practiced and controlled by the farmers to transform their observations and to create a more scientific understanding of the crop / tree / livestock agro-ecosystem. A field school therefore is a process and not a goal.

2.2.2. Objectives

Broad objectives

- ❖ Bring farmers together to carry out collective and collaborative inquiry for the purpose of initiating community action plan to solving their problems.

Specific Objectives

- ❖ To empower farmers with knowledge and skills to make them experts in their own fields
- ❖ To sharpen farmers' ability to make critical and informed decisions that renders their farming profitable and sustainable.
- ❖ To sensitize farmers in new ways of thinking and solving problems.
- ❖ To help farmers to unite together as one community.

2.2.3. Principles of FFS

The 4 major principles within the FFS process are:

- a) Grow healthy crop/ livestock/ trees
- b) Observe field regularly
- c) Conserve natural enemies (friendly insects) of crop/ live stock/ trees
- d) Farmers understand ecology and become experts in their own field.

2.2.4. Characteristics of FFS

- ❖ Farmers as experts - farmers learn by doing. They have hands on experience on the various activities.
- ❖ The field is the learning place - sub groups collect, analyze data and make action decisions
- ❖ Extension workers are facilitators and no teachers - extension workers take back seat roles only offering help and guidance.
- ❖ Scientists/ Subject Matter Specialist work with rather than lecture farmers. They provide back stopping, advisors to their colleagues.
- ❖ FFS curriculum or programme is integrated and holistic
- ❖ Training follows the seasonal cycle.
- ❖ Regular group meetings dictated by type of enterprise(s).
- ❖ Learning materials are learner generated.
- ❖ Group dynamics/ team building.
- ❖ No basic education is required for a farmer to join.

2.2.5. Conditions for successful FFS

- ❖ Well trained facilitators
- ❖ Well defined priority problem
- ❖ Organized community that is dedicated/committed and willing
- ❖ Clear understanding of the concept and procedure by all stakeholders
- ❖ Support and goodwill of the authorities at various levels
- ❖ Availability of appropriate technology
- ❖ Adequate resources and logistical support
- ❖ Proper identification of site/area

- ❖ Proper identification and selection of participants
- ❖ Flexible and dynamic farmer group that is well organized and structured
- ❖ Farmers with common interest
- ❖ Proper and guaranteed supervision, monitoring and evaluation of the activities.

2.3. Ground Working

A collective term for all activities carried out in an area with a view of preparing/paving way for introduction of FFS activities.

Note: the activities should begin a season before or at least a month prior to a planned FFS.

Objectives

Broad:

- ❖ To determine the actual needs of the area which will be the basis for developing an FFS program

Specific:

- ❖ Determine level of technology- do not assume that the farmers know nothing. Investigate what they know and what they don't and you will know where to start.
- ❖ Collect information on the ecology of the area - Ecology is the relation between plants and living creatures to each other and to their surroundings. For information on the ecology, you therefore consider
 - The interaction between human activities and other animals
 - The natural vegetation of the area
 - The climate of the area
 - Existing water sources
 - Nature of soil etc
- ❖ Identify existing technology which is not yet fully utilized. What exists is easier for a farmer to adopt than what does not exist.
- ❖ Mobilize the community to volunteer to participate in the FFS:- you can use an ideal existing group of farmers or you can form a new group of farmers who are interested in learning through the FFS methodology

2.3.1. Guidelines/steps in ground working

a) General

Brief the local Extension officer

Purpose:

- Support to the programme
- Provide them with information about the programme
- Avail the assisting staff.

Brief the local government office

- ❖ Brief them about the programme
- ❖ Enlist their support
- ❖ Who is going to be involved in the programme
- ❖ Have dialogue with local leaders and leader of farmer's organization.

- ❖ Discuss with farmers e.g. through farmer meetings and locality
- ❖ Identify the site
- ❖ Request farmers to volunteer to be members of the FFS

B) Existing groups

When you are forming an FFS from an existing group;

- ❖ Have a list of all groups which you think can be suitable for FFS learning
- ❖ Short list them (Short List 1)
- ❖ Out of the short list 1, use a questionnaire so as to reduce the number. Form another list, short list 2
- ❖ From the shortlist 2 select the one(ones) you find appropriate
- ❖ Enter into an agreement with them on FFS learning
- ❖ The members enter in agreement with the host farmer

C) New groups

While forming new groups it is good to

- ❖ Involve all the stakeholders. These include the following;
 - Provincial administration
 - Agriculture, forestry, livestock or relevant ministries-culture and social services
 - Politicians
 - Group leaders
 - Church leaders
 - NGO working in the area
 - All collaborators
- ❖ Hold a baraza together with Provincial administration. The purpose is to;
 - Create awareness
 - Explain the objectives
 - Mobilize the community to volunteer to participate in FFS mainly from the same area
- ❖ Identify the community needs related to the project through focused participatory rural appraisal (PRA) by
 - Collecting the data of the area(soil, ecology, population, climate)
 - Identify the needs and the existing technology
 - Identify the land use system e.g. farming systems
- ❖ The community identify and understand their problems.
- ❖ Prioritize the problems and the possible solutions
- ❖ Transect walk - visit few farmers/farms to get to know the problems, needs and the area better.
- ❖ The following can also be done during the baraza;
 - Group formation (Criteria to join the group)
 - Enlist participants
 - Constitute the group officials through elections i.e. chairman, vice-chairman, secretary, vice-secretary and treasurer
 - Name of the group / FFS
 - Write the constitution – by laws
 - Selection of the host farmer and site

- Meeting days and time
- Meeting at the site with the facilitators
- Registration of the groups at the Department of Social Services
- Opening the bank account to enable the farmers to develop
- FFS schedules

The above is summarised by the 3Ps

- ❖ **Public** - baraza
- ❖ **Publicize** - announce
- ❖ **Picture** - taking

2.4. Selection of Participants

In forming a new group the facilitator has a chance to select the farmers who could be suitable for FFS learning unlike in an already existing group, the facilitator does not have all the chance to select. With time you will find some members of the group withdrawing from the FFS learning while others continue learning and even others from outside can be willing to join. Given a chance to select the facilitator could follow a certain criteria.

Selection criteria for participants:

- ❖ Willing farmer- the farmers should not be forced by anybody or by certain circumstances. After understanding what FFS is he/she should be left to decide.
- ❖ Progressive (innovative) farmer- the farmers should be people who can develop new ideas.
- ❖ Honest farmer- The farmer should be somebody who can be trusted in handling the property of the other farmers and to do as the others would require.
- ❖ Patient- he/she should be patient throughout FFS days scheduled. He /she should be patient to understand. He./she should be patient to wait for results of crops. He should be patient as regards tree growing etc.
- ❖ Available as required of FFS- he/she should be punctual when attending FFS. He /she should be attending all the FFS days during learning. He/she should be attending all the FFS days during facilitating if he /she is a farmer facilitator.
- ❖ Able to cooperate with others- the farmers should be ready to co-operate in the case of sharing tasks, participation, sharing of tools and equipments, contributions.
- ❖ Willing to avail his resources for use in FFS learning – a farmer could have a resource which others don't have and he therefore should be in a position to help the rest. Such resources include land, water resources, ploughing animals, fencing materials, manure etc.
- ❖ Ready to work in a group-in the farming communities there are farmers who are not ready to work in a group. This could be due to several reasons:
 - They would consider working in a group as time wasting
 - Others could be people who are not social
 - Others could be people who don't like sharing what they know or what they have with others etc.
- ❖ Socially acceptable- they should be people who are liked by the public. This is due to:
 - The FFS members should feel free while they are in his farm
 - The members of public who would want to learn from demonstration trial should be able to do so.
 - Occasions such as field day need to be hosted by socially accepted farmers.
 - Such farmer should be the role models to the rest of the community. People will tend to copy somebody whom they like etc

- ❖ Farmers must have a common interest- normally people with a common interest will have similar problems and they will tend to come together to solve them.
- ❖ Must come from the same locality (area) - same locality has similar problems and the people there know each other better
- ❖ Willing to follow the norms set by the group - norms are the roles set by the group. Groups cannot perform any activity without governing rules
- ❖ Must be willing to share experiences- the farmer should give any experience he has to the rest and also receive what others have.
- ❖ They must be ready to sign an agreement by both group (FFS) and ISFP or the body coordinating the FFS program

2.5. Criteria For Site Selection of an Enterprise

Different factors are to be considered when choosing / selecting an enterprise to be undertaken. Below are examples of the common enterprises practiced by most FFS and the criteria for site selection:

- ❖ Tree Nursery
 - Availability of water supply
 - Availability of land –well drained
 - Gentle slope (topography)
 - Accessibility
 - Security
 - Availability of fertile soil
- ❖ Woodlot / fruit orchard
 - Land availability
 - Accessibility
 - Security
 - Soil profile
 - Topography
 - Species to be planted

2.6. Field School Schedule / Guide

It is a programme schedule for all the activities with time allocation and who is responsible for the activities during the conduct of field school.

Objective of FFS schedule is:

- ❖ To help us carry out the activities smoothly and within time
- ❖ To put each activity in perspective
- ❖ To ensure that farmers understand the objective of each activity
- ❖ To ensure that every one knows their role
- ❖ So that the facilitator can prepare for the topics in advance
- ❖ To ensure that all the materials required are available

Field schools usually meet for half a day on the agreed day of the weeks. A typical day is divided into:

- ❖ Prayers
- ❖ Roll call
- ❖ Review of previous activities
- ❖ Briefing on days activities

- ❖ AESA taking, processing and presentation to larger groups by sub groups for decision making
- ❖ Group dynamic activity in small or large groups
- ❖ Special topic activity
- ❖ Review of day's activities
- ❖ Planning for next session
- ❖ Announcements
- ❖ Roll-call
- ❖ Closing prayers

Example of FFS Field Guide

Time	Activity	Objectives	Materials	Responsible persons
8:00–8:05am	Prayer	To commit the days activity to the Lord	Bible	Host team
8:05–8:10am	Roll call, brief & Recap	Know who is present. To remind ourselves of previous activities	Register Previous AESA	Host team
8:10–9:00am	Field monitoring AESA	To check the progress of our enterprise by collecting data	Books, pens, ruler pencils and weighing balance	All
9:00–10:00am	Processing of AESA and presentation	To synthesize, analyze the data and present it to the larger groups for collective decisions on what management action to take	Flip charts, books, felt pens, board crayons ruler and masking tape	Facilitator / Host team
10:00–10:30am	Group dynamics	To energize (revitalize) the group To enhance participation To educate on group activities		Host team / Facilitator
10:30–11:30am	Special topic	To input on a special topic which will widen their scope of knowledge/skills	Books, pens, pencils	Facilitator
11:30–11:40am	Review of the days activities	To evaluate our achievements	AESA materials	Facilitator
11:40–11:50am	Planning for next session	To prepare adequately	Flip charts, felt pens	Host team
11:50–11:55am	Roll call Announcements	To note the late comers, absentees	Register	Host team
11:55–12:00noon	Prayer	Thank God for the day	Bible	Host team

PART III. KEY NON-FORMAL EDUCATION METHODS

3.1. Principles of adult learning

One of the most important characteristics of good adult education is that it is based on problem-posing. The emphasis is on learning not teaching. It is learner centred, self discovery and action oriented. The learning methods that do not employ the traditional teaching techniques (formal) are known as non-formal education methods.

Differences between Formal and Non Formal Education

Formal Education	Non Formal Education
A teacher and student relationship	Facilitator and participant free to discuss and learn from each other
Formal rules and regulations followed	Participants guided by own set learning norms
Same age and education level	Age and education may differ
Learning involves mostly a pen and a book (writing)	Emphasis is on learning by doing
Learning is in a specified place (room)	Learning is not confined to a classroom, its in the field

Characteristics of adult learners

- ❖ Adults learn very slowly, they take time
- ❖ They have experience and knowledge
- ❖ They learn what they want
- ❖ They learn at their own pace
- ❖ They learn best when they do (perform) practically
- ❖ Adults are impatient, get bored quickly
- ❖ Their concentration span is short
- ❖ They learn by choice not by force
- ❖ It takes time to organize adults because they have numerous agenda
- ❖ They like being treated with respect
- ❖ They need diplomacy in the process of communication
- ❖ They have sense of personal dignity
- ❖ They have weaker memory but strong observation and reasoning powers
- ❖ They are critical of new messages – must ask why

When do adults learn best?

- ❖ If their ideas are respected and appreciated
- ❖ When they can decide on what they want to learn
- ❖ They learn best when treated with respect
- ❖ If training is practical
- ❖ If they compare with others

Remember

- ❖ Adults should not be treated as students
- ❖ Adults should not be forced to learn, instead they should be allowed to learn at their pace

Adult learning psychology (you should know that)

1. Adults have a wide experience and have learnt much from life. They learn most from their peers.
2. Adults learn quickly about those things that are relevant to their lives. So the facilitator needs to create a situation in which they can share in planning, choose the topics and participate in regular evaluation of what they are doing.
3. Adults have a sense of personal dignity. They must be treated with respect at all times and never feel humiliated or laughed at before others.
4. As adults grow older, their memories may get weaker but their powers of observation and reasoning often grow stronger
5. Adults are critical of new messages, they must ask why

How can a facilitator help adults to learn?

- ❖ By creating a conducive atmosphere i.e. 'participatory' introductions, sitting in circle
- ❖ Treat people with respect/ do not intimidate them
- ❖ Establish and build on what they already know
- ❖ Let them learn at their own pace/assess continually
- ❖ Identify their expectations/ be learner oriented
- ❖ Make sessions lively, use of dynamics
- ❖ Vary teaching methods- role play, demonstrations, group discussions, sharing of experiences use of visual aids
- ❖ Treat people as individuals, give each the chance to express their own opinion

3.2. Types of Non-Formal Education Approaches Used in FFS

i. Sharing of experiences, knowledge and opinions

This is good when one wants to induce or change attitude. Trainees are most likely to change attitudes after discussion. The method is suitable as a means of obtaining a feedback.

ii. Case study

This follows a history of some event or set of circumstances with relevant details examined by the trainees. It provides opportunities for exchange of ideas and consideration of possible solutions to problems the trainees will face in their work situation.

iii. Role play

Trainees enact, in the training situation, the role they will be called upon to play in their job. Use role-playing mainly for the practice of dealing with face-to-face situation

iv. Problem solving exercise

Participants undertake a particular task that should lead to a required result. This would assist them to learn something without being taught. Facilitator gives participants set of rules, instructions, tasks etc.

v. Small group/big group approach

Divide participants into small groups, giving each a particular task to accomplish and discuss. Give every member of the small group the chance to share his ideas about the assigned task. Leaders that each of the groups chooses lead the discussions. After a certain given time, ask all groups to convene and process their discussion with the bigger group.

vi. Brainstorming

Either in small groups or as a big group, give participants an issue or problem to be discussed about and deliberated on exhaustively. After a thorough deliberation on the issue or problem, the entire group comes up with a consensus as a final output.

vii. Folk media

It is informal / tradition methods of conveying messages. It is a creative medium for communicating ideas appropriately applicable in a participatory and discovery based teaching or learning environment. There are various types of folk media:

- | | |
|------------------|------------------|
| a) Songs | b) Story telling |
| c) Dances | d) Gossip |
| e) Legends | f) Parables |
| g) Announcements | h) Games |
| i) Rituals | j) Dramas |

Principles of Folk Media

- ❖ Community based (avoid sophistication)
- ❖ Involves peoples participation especially FFS
- ❖ Self reliance – use locally available materials
- ❖ Indigenous to put a clear message to the community (that is song/ dance combination)
- ❖ Should be with the programme perspective.

Characteristics of Folk Media

- ❖ Involves narration
- ❖ Involves application of human creativity and theatre art.
- ❖ Are not written
- ❖ Have special messages
- ❖ Subject to misinterpretation – kept in collective memory of elders
- ❖ Has a narrator (source) and a receiver (way)
- ❖ Passed over from generation to generation
- ❖ Informal

What are the Dimensions of Folk Media

1. Flexibility

- ❖ The ability to see with a fresh pair of eyes
- ❖ To shift from one perspective to another
- ❖ To move from a different stand point

2. Fluency

- ❖ A free and clear flow of words, images and ideas

3. Originality

- ❖ The capacity to produce fresh response arising out of each person's unique perspective, personal history and experiences.

4. Synthesis Elaboration

- ❖ Ability to develop an idea or image, make connections, to transform existing ideas or images into a new and integrated form or pattern.

TASK: Groups doing/ compose folk media of their choice and present.

PART IV. CONCEPTS AND TECHNIQUES USED IN FFS

4.1 Concept of Ecosystem

4.1.1 Definition:

An ecosystem refers to both the living and the non-living things coexisting and interacting in an area.

Learning objectives:

- ❖ Facilitate learning by discovery in the FFS
- ❖ To guide farmers to critically analyze and make better decisions on their field problems

Components of an ecosystem

- ❖ Living
- ❖ Non-living and the
- ❖ Physical environment

4.2 Concept of What Is This? What Is That?

(Learning to answer questions with questions)

4.2.1 Definition:

It is a discovery-based learning in which questions are used to answer questions. It leads the learner to the answer by asking questions.

4.2.2. Purpose

- ❖ It promotes learning by discovery and leads learners towards their own analysis
- ❖ It guides farmers to critically analyze and make better decisions in their own fields.

The goal of discovery-based learning is to provide a more enlightened educational opportunity for participants. This methodology of learning is very important for achieving the goal of education. One important method is to ask questions that allow the participants to develop their own analysis and understanding. You are stealing an opportunity for education if you reply directly with an answer. Ask questions. Lead the participant to the answer by asking questions.

There are many ways to answer the question: What is this? For most of us, the natural response is to give the name of the object, often in a foreign language. The question is often answered by saying: Oh that is or "This is? The result of this answer is that an education process has been stopped.

A better way to answer the question is to ask a question:

- ❖ Where did you find it?
- ❖ What was it doing?
- ❖ Were there many of them?
- ❖ Have you seen this before?

The idea is promote learning by discovery and to lead the person toward his or her own analysis.

NOTE: NEVER GIVE THE ANSWER WITH A NAME. THAT ONLY KILLS THE QUESTION. THE QUESTION IS A CHANCE TO LEARN.

4.3 Concept and Importance of AESA - Making A Group Management Decision

4.3.1. Definition

AESA means Agro-Eco-System Analysis.

- ❖ It is establishment by observation of the interaction between a crop/tree/livestock and other biotic and a biotic factors co-existing in the field
- ❖ This involves regular observations of the crop/tree/livestock
- ❖ It is a way of assembling what we are studying and placing into a process useful for decision making based on many factors.
- ❖ Promotes learning by discovery and leads learners towards their own analysis.
- ❖ It guides farmers to critically analyze and make better decisions on their own fields.

Why AESA?

- ❖ To improve decision-making skills, through a field situation analysis by observing, drawing and discussing
- ❖ To improve decision-making skills by presenting small group decisions for critique in the large group
- ❖ Makes farmers to have a close relationship with crops / trees / livestock.

How to conduct AESA

AESA is an approach, which can be gainfully employed by extension functionaries and farmers to analyse field situations with regards to pests, natural enemies, soil conditions, plant health, the influence of climatic factors and their interrelationship for growing healthy crop. Such a critical analysis of the field situations will help in taking appropriate decisions on management practices.

The basic components of AESA are:

- ❖ Plant health at different stages
- ❖ Built in compensation abilities of the plants
- ❖ Pest and natural populations dynamics
- ❖ Soil conditions
- ❖ Climatic factors
- ❖ Farmers past experience

The Methodology of AESA involves:

a) Field Observations (AESA taking)

Tools: Note book, pen, measuring tape / ruler, string

Enter the field at least 5ft away from the edge. Select a site with a dimension of 1 sq. metre randomly

Record the visual observation in the following sequence:

1. Flying insects (both pests & natural enemies of pests)
2. Close observation on pests and natural enemies of peststhat remain on the plants
3. Observe pests and natural enemies of pests by scrapping the soil surface around the plants
4. Record disease and its intensity
5. Record insect damage and disease incidence in percentage

6. Record parameters like number of leaves, plant height, reproductive parts of the selected plants and other agronomic parameters that are important for decision making for making observation in the following weeks.
7. Record the types of weeds, their size and population density in relation to crop plant
8. Record soil conditions
9. Record the climatic factors viz sunny, partially sunny, cloudy, rainy etc for the preceding week.

b) Drawing (AESA processing)

Tools: Crayons, news print, marker pen and ruler

In AESA processing in the news print indicate the:

- ❖ Name of the group (FFS) and Sub group
- ❖ AESA Number, week number, days and date
- ❖ Draw the plant at the Centre on a chart.
- ❖ Then draw pests on the left side and natural enemies (friendly insects) on the right side.
- ❖ Indicate the soil condition, weed population etc.
- ❖ Give natural colours to all the drawing; for instance, draw healthy plants with green colour, diseased plant/leaves with yellow colour. While drawing the pests and the natural enemies on the chart care should be taken to draw them at appropriate part of the plant, where they are seen at the time of observation. The common name of pest should also be indicated alongside the diagram.
- ❖ The weather factor should be reflected in the chart by drawing the diagram of sun just above the plant if the attribute is sunny. If cloudy, the clouds may be drawn in place of sun.

C) Group discussions and decision making (AESA presentation)

The observations recorded in the previous and current charts should be discussed among the farmers by raising questions relating to change in pest and natural enemies population in relation to crop stages, soil condition, weather factors such as rainy, cloudy or sunny etc. Based on these discussions the group takes judicious decision for specific post management practices.

AESA made simple

- ❖ Keep the design
 - Simple
 - Interesting
 - Convenient
 - Plot size small
- ❖ Sample size/ Number of plants to measure
 - Simple/ Managerble Number
 - Representative -5-10%
- ❖ Measurements calibration should be simple
- ❖ Choose parameters which are simple, interesting, direct implication on the issue or problem investigated.
- ❖ Involve all members in the group
- ❖ Keep all records for comparative analysis

AESA sheet should be kept safe in a permanent record. It will be used for the data analysis later.

AESA helps to prepare for tomorrow.

Name of FFS:		Group No (Sub group):	
AESA No:		Date:	
Plot No:		Week No:	
Problem addressed:			
General Information		Parameters	
Variety:		Length of weeks:	
Date planted:		Width of leaves:	
Age of crop:		No. of leaves:	
Spacing:		No. of diseased leaves:	
Fertilizer:		No. of dead leaves:	
Weather:		Length of leaves:	
Time of observation:		No. of pods:	
Plant population:			
Germination %:			
Insect Pests:	Plant Drawing		Natural enemies:
Pest observed			Natural enemies observed
e.g.			e.g.
Stalk borer			Honey bee
Maize rust			Black ant
Observations:		Recommendations:	
Soil moisture		<i>What management practices should be applied</i>	
Diseases		e.g. Application of pesticide	
Insect pests		e.g. Application of Fungicide	
Plant health			
Weeds		e.g. Weeding	

b) Example of tree AESA format

Tree AESA

Name of FFS _____ Sub-group _____
 AESA No. _____ Week No. _____ Date _____
 Enterprise _____

General Information

Species/Variety _____
 Spacing (m) _____
 Hole size (cm) _____
 Land Preparation (e.g. Ploughing) _____
 Other treatment (e.g. Manure) _____

 Date planting _____
 Initial planting size (cm) _____
 Age of Trees (weeks) _____
 Weather _____
 Time of Observation _____

Tree Data

Below 50 cm high

Tree height (Average) (cm) _____
 Height in last AESA (cm) _____

50 cm to 2m high

Tree height (Average) (cm) _____
 Height in last AESA (cm) _____
 No. of branches _____
 No. of branches in last AESA _____

For the fodder or firewood purpose

Length of branches (cm) _____

Over 2m high

Tree height (Average) (m) _____
 Height in last AESA (m) _____
 CBH (Average) (cm) _____
 CBH in last AESA (m) _____

Pest/Insects

Friendly Insects



Observations

Recommendations

- 1.
- 2.
- 3.

- 1.
- 2.
- 3.

Fruits Tree AESA

Name of FFS: _____ Sub-group: _____
 AESA No. _____ Week No. _____ Date: _____
 Enterprise _____

General Information

Species _____
 Variety _____
 Spacing (m) _____
 Hole size (cm) _____
 Land Preparation (e.g. Ploughing) _____
 Other treatment (e.g. Manure) _____
 Date planting _____
 Initial planting size (cm) _____
 Age of Trees (weeks) _____
 Weather _____
 Time of Observation _____

Tree Data

Below 50 cm high

Tree height (Average)(cm) _____
 Height in last AESA (cm) _____
 No. of branches _____
 No. of branches in last AESA _____

50 cm to 1.5 m high

Tree height (Average) (cm) _____
 Height in last AESA (cm) _____
 No. of branches _____
 No. of branches in last AESA _____
 Crown width (cm) _____
 Crown width in last AESA (cm) _____
 Number of flowering branches _____

Over 1.5 m high

Tree height (Average)(cm) _____
 Height in last AESA (cm) _____
 Crown width (cm) _____
 Crown width in last AESA (cm) _____
 No. of flowering branches _____
 No. of fruits _____
 No. of fruit in last AESA _____
 Size of fruit (cm) _____
 Size of fruit in last AESA _____

Pests/ Insects

Friendly Insects



Observations

Recommendations

- 1.
- 2.
- 3.

- 1.
- 2.
- 3.

4.4 Participatory Technology Development (PTD)

4.4.1 Definitions

Participatory Technology Development (PTD) or Participatory Action Research (PAR) is a process of collective and collaborative inquiry with the purpose of initiating community action on solving local problems. PTDs in farmers' field schools are implemented to empower participants (both farmers and facilitators) with analytical skills. These help in investigating into cause - effect relationship of problems in farming practices and thereby stimulate them to design a set of actions for participants learn from other farmers response at each stage of intervention and draw lessons for future field school programs implementation strategies. In addition, the participants develop analytical skills and attitudes in working within participatory framework in planning, organizing and evaluating development activities.

Participatory Technology Development (PTD) means all relevant stakeholders do what only researchers usually do. It can be seen primarily as a learning strategy for empowering participants and secondarily as producing research results in conventional sense. PTD as a learning process empower in three ways:

- It empowers because of the specific insight, new understandings and new possibilities that participants discover in creating better explanations about their social world
- Participants learn how to learn;
- It liberates when participants learn how to create new possibilities for action.

4.4.2. A GUIDE TO AGRICULTURAL ENTERPRISE SELECTION/ANALYSIS

Introduction

Farmers face a number of constraints, which affect the profitability of agriculture production. It is not possible to alleviate poverty and raise living standards unless these constraints are addressed.

Farmers can be facilitated to formulate strategies on how best to deal with the constraints.

How to facilitate

Farmers are led through a focus discussion, focusing on a number of agricultural enterprises versus resources; constraints are identified and analyzed on how they affect various enterprises.

To generate this information, the group considers a variety of farm enterprises and major constraints and use small stones (pebbles)/ various symbols to represent the intensity of the limitations to enterprise development, a maximum score of 10 is normally recommended in communities of fair literacy levels.

This exercise is more beneficial when done by various target groups, individually then comparisons done about their perceptions (the youth, men and women)

Application

The information gathered is tabulated (in a matrix) and discussion encouraged amongst the community members, entering on the least limiting resource to the most, the least to the most constrained enterprise; the enterprises with the highest potential for development, the most and least profitable enterprise.

The above information once gathered becomes more useful as decision making took if a cost-benefit analysis of the enterprises in question has been developed. Such information is finally used to enable farmers make the best decisions about enterprise selection as well as formulation of a way forward on how best to overcome the constraints.

The necessary extension interventions especially training support to selected community members on the technical and socio-economic aspects of various income generating activities are thus tailored to address the specific circumstances faced by the farmers.

Example: Agricultural constraints

Constraint or resource	Enterprise											
	Maize	Beans	Onions	Vegetables	Coffee	Bananas	Cattle	Sheep	Goats	Poultry	Farm trees	Total
Land	1	2	5	1	8	3	1	3	3	1	1	29
Capital	9	7	7	5	8	3	8	7	7	6	1	63
Labour	9	9	9	4	4	3	8	5	5	2	1	59
Technical knowledge	9	6	7	3	8	3	9	4	4	6	5	64
Low soil fertility	9	8	9	9	7	6	8	7	5	5	5	78
Weather	8	9	6	8	2	5	5	3	9	4	9	68
Pests and diseases	3	4	5	8	7	9	7	2	9	2	3	59
Marketing	1	1	2	5	3	1	1	1	1	1	2	16
Poor seed and inputs	9	2	4	4	6	7	3	2	8	1	8	54
Storage losses	3	3	8	8	1	2	2	2	2	2	1	34
TOTAL	61	51	62	55	54	42	52	36	53	30	36	

The matrix shows that the most limiting resource to agricultural production is low soil fertility whereas the least limiting resource to agricultural is marketing.

Onion production is the enterprise that is most limited by all constraints.

Poultry keeping has got the least significant limitation but it has not been exploited because of high initial capital requirement and the high risks involved.

Note: the most important thing is data interpretation, these calls for open discussion by all participants coupled with good facilitation skills

Resources

- Land
- Capital-finance
- Labour
- Equipment

Constraints

- Inadequate rainfall
- Lack of capital
- Poor planning
- Poor seeds and farm inputs
- Inadequate technical knowledge

- High incidences of livestock/crop pests and diseases
- Low soil fertility

Considerations

- Amount of rains
- Family food needs
- Profitable enterprises
- Agro-ecological suitability
- Marketing
- Tools for decision-making

Example of PTD set up in agriculture

Before deciding with the farmers the design of the PTD or enterprise what should be done? Come up with the prioritized enterprise e.g.

a) Maize enterprise

Core problem in maize production

- ❖ Poor soil fertility
- ❖ Inappropriate varieties
- ❖ Low and unreliable rainfall
- ❖ Pests / diseases
- ❖ Poor husbandry practices

Some recommendations

- ❖ Use of manure, fertilizer planting using stop dressing
- ❖ Suitable varieties for the area
- ❖ Water harvesting techniques
- ❖ Pest/ disease control -IPM
- ❖ Proper spacing and planting techniques

b) Cowpeas enterprise

Core problems

- ❖ Crop varieties
- ❖ Poor pest /disease control
- ❖ Poor husbandry practices e.g. spacing

Some recommendations

- ❖ Planting of the right variety
- ❖ Timely pest/disease control - flower onset through plodding
- ❖ Early land preparations and planting
- ❖ Timely agronomic practices e.g. early weeding

N. B: Factors to consider when identifying solutions to the identified problems:

- ❖ Possibility of adoption
- ❖ Cost of the technology
- ❖ Demand for the technology
- ❖ Historical perception

4.4.3. AGRICULTURAL CROPS

They are divided into:

- ❖ Cereals
- ❖ Legumes
- ❖ Root crops
- ❖ Oil crops
- ❖ Fibre
- ❖ Vegetable
- ❖ Fruits

4.4.3.1. Cereals

Cereals are the main food crops and the main group which depend on rain fed in most areas. The main food crops are maize, sorghum and millet.

1. Maize

It has two main types with each having many different varieties

a) Composite – It has several varieties such as:

- ❖ Katumani
- ❖ Makueni Dryland Land Composite (DCL)
- ❖ Pwani
- ❖ Local

b) Hybrids – Several varieties such as:

- ❖ D-8013 etc
- ❖ Series 500 e.g. 511,512,513
- ❖ Pioneer, DH01 or 02
- ❖ Pannar, 4141 Cargill
- ❖ Series 600 -eg 611,612 etc

NB:

- ❖ Composite can be planted twice only but hybrid should not be planted twice
- ❖ Composite requires small amount of rains 300-750mm, matures quickly
- ❖ Hybrids for dry area DH01, DH02, series 500, Cargill 4141.

i. Maize variety and characteristics

Variety	Potential Yield	Suited area of production
Katumani	30-40 bags/ha	AEZIII and IV
Composite B	12-16 bags/acre	Rainfall 200-300mm per season
Makueni (DLC)	10-16 bags/acre	AEZIII and IV Rainfall 150-200mm per season
Dryland hybrid 1(DH01)	12-20 bags/acre	Mid-altitude, hot semi-arid climates e.g. Kitui, Makueni, Taveta
Dryland Hybrid 2 (DH02)	12-20 bags per acre	As for DH01
H5 12 and H513	45-50 bags/ha 18-20 bags /acre	AEZ III (coffee zones) Rainfall 300-500mm per season

ii. Crop management

a. Land Preparation

Well prepared without clods. Hand, oxen plough or tractor can be used for ploughing.

b. Planting

- ❖ Time- early before onset of rains
- ❖ Seed Rate -25kg per Ha (10kg/acre two seeds per hole then to one after two weeks of emergence.

c. Spacing

Pure stand (maize alone):

- ❖ Between rows 90cm (3 feet)
- ❖ Between plants 30cm (one foot)
- ❖ If using oxen plant every third row

Intercropping:

- ❖ Recommended for higher rainfall areas (AEZIII) with legumes while in lower marginal area pure cropping is recommended. Plant one row of beans or cowpeas after every row of maize.
- ❖ Distance between maize and a bean is 60cm. Spacing within the row for maize is 30cm and for beans and cowpeas is 15cm (0.5ft).
- ❖ Distance between pigeon peas rows should be 75cm (2.5ft) for pigeon peas, distance from plant to plant is 50cm or early maturing varieties.

d. Fertilizer

- Inorganic 2 bags/ Ha or 1 bag/acre of 50kg 20:20:0 NPK
- Manure 7 tonnes (250 wheelbarrows) / ha well decomposed manure

e. Weeding

First weeding two weeks after emergence

Second weeding two weeks after first weeding

iii. Crop Protection

a) Pest	Chemical control	Cultural methods
Stalk borer	Bulldock at 8kg per hectare or a pinch into the funnel of the crop at knee height stage when there is adequate moisture	Field sanitation (removal of Stover)
Termites	Seed dressing with marshal Spray with ant killer	Destruction of anthill – removal and killing the queen
b) Diseases	Chemical control	Cultural control
Head smut	No chemical control	Use clean seeds Rogue and destroy affected plants Crop rotation Seed dressing with Fernasan D

iv. Harvesting

Time of harvesting

- ❖ When ears droop and turn brown
- ❖ When black layer is formed on the kernel

v. Storage

- ❖ If not dry enough, store as cobs in a well ventilated crib until they dry
- ❖ Shell grain and dust with acetylic super at 50g per 90kg bag.

2. Sorghum

i. Varieties and characteristics

Characteristics	Potential grain yield	Target area of production
Grain red in colour with soft endosperm	30 bags/ha	Wetter semi-arid area
Tolerant to striga weed and grain mould	12 bags/acre	1000-1300 metre above sea level
White and large grains	35-40 bags/ha 15/bags /acre	Semi arid lowlands and moist mid-altitude
Brown grain with a soft endosperm	30 bags/ha 12 bags/acre	As above

ii. Crop Management

- ❖ **Land preparation:** fine seed bed for better seed establishment
- ❖ **Planting:** drill and hill planting is recommended
- ❖ **Time:** plant at onset of rains at 2.5 to 4cm or 5 cm if dry planted.
- ❖ **Seed rate:** 5-8 kg/ha
- ❖ **Thinning:** should be done a first weeding when soil is moist (3 weeks after emergence). Leave only one seedling per hole/hill.
- ❖ **Spacing:** 75cm between rows and 20cm between plants.

iii. Crop Protection

Insect	Symptoms	Control
Shoot fly	Withering central shoot Tillering of the crop	Seed dressing with Marshal Spray with Thiodan 35%
Stalk borer	Holes on leaves and stem	use dammed
Sorghum midge and aphids	Heads without grain	Spray Karate or Sherpa etc.
Diseases	Symptoms	Control
Charcoal root	Lodging of plants, poor filling of grain	Seed dressing with Fernassan D Crop rotation
Head smut	Large whitish galls on heads rupture to expose a mass of black brown powder	Seed dressing with Fernassan D Uproot and burn or burry diseased plants

iv. Harvesting

- ❖ **Time:** when grain is hard and does not produce milk when crushed
- ❖ Thresh and store in cool dry containers
- ❖ Dust grain with Acetylic super

3. Millets

i. Variety and their characteristics

Variety	Potential Yield	Traits
KAT/PM -1	2 bags/Ha	80% of ears have bristles which discourage bird attack
KAT /PM 2	As above	
Finger millet KAT/FM 1	15 bags per ha 5 bags per acre	10% of ears have bristles
Pros Millet KAT/Pro 1	12 bags per ha 6 bags per acre	Tolerant to blast and resistant to lodging
Foxtail millet KAT/Fox 1	12 bags per ha 5 bags per acre	Recovers fast from drought stress

(ii) Areas of production

Millets grow well in agro-ecological zones IV and V with about 150mm of rain per season.

(iii) Crop management

Land preparation -Should be done to a fine tilth because of small size of seed for good crop establishment

Husbandry

Variety	Spacing	Seed rate	Planting method
Pear Millet	60x15cm	5kg/Ha 2kg/acre	Drill with oxen or hill planting with a panga or jembe
Finger Millet	30 x 10cm	4 kg per ha	Drill or hill planting
Proso Millet			
Foxtail Millet			

Thinning

Done during the first weeding, 2 or 3 weeks after emergence

Weeding

- ❖ First weeding – 2-3 weeks after emergence
- ❖ Second weeding – 2 weeks after first weeding

iv. Crop protection

Insect pest	Control
Stalk borer	Dress with Marshall at 3kg/Ha Apply Bulldock at plant funnel when there is adequate moisture
Shoot fly	Removal of crop residues after harvest

v. Harvesting

By cutting of the heads, sun drying and threshing to remove the grain

4.4.3.2. Grain legumes

1. Pigeon peas

i. Varieties and their characteristics

Variety	Flowering Period	Maturing Period	Potential yield	Remarks
KAT 60/8	95-120 days	136-150 days	<i>In one season</i> 13-17 bags/ha 95-7 bags/acre <i>In two seasons</i> 33 bags /ha 13 bag/acre	The grain is white with brown spots
KAT 81/3/3	130-140 days	170-185 days	15-28 bags/ha 6-11 bags/acre	Tolerant to wilt, pod sucking bugs and pod borers. Has cream white colour with large brown patches
KAT 777	105 -115 days	160-180 days	15-26 bags/ha 96-10bags/acres	It has a large oval white seed
ICPL 89091	60-70 days	120 days	<i>In one season</i> 11bags/ha <i>In two seasons</i> 22 bags/ha	

ii. Crop Management

a) **Land preparation:** require fine tilth

b) **Planting:** Plant before onset of the rains

Seed rate: 20-25 kg/ha (8-10kg/acre)

Method of planting: plant in furrow or hole at least 2 seeds per hole (this is wasteful and the germination is excellent)

Depth of planting: place seed 4-5 cm and cover properly with soil

Thinning: thin to 2 seedlings per hole, two weeks after emergence.

c) **Spacing**

Sole cropping/pure stand

KAT 60/8: plant 75cm between rows and 50cm between plants. When using oxen sow after every two other rows.

KAT 81/3/3 and KAT 777: plant at a distance of 75cm between rows and 50cm between plants.

ICPL 87091: sow at 50cm between rows and 10cm between plants. If using oxen skip one furrow.

Intercropping

KAT 60/8 and KAT 777 can be intercropped with maize, sorghum and millets during the first season (short rains). Sow one row of pigeon peas after one row of maize or one row of pigeon peas followed by two rows of maize at a distance of 90m between maize sorghum and pigeon peas rows. ICPL 87091 should always be planted as a pure stand.

d) Fertilizer

Fertilizer is normally not recommended. However in extremely poor soils a basal application of one bag of NPK fertilizer (20:20:0) could be applied.

e) Weeding

For short duration pigeon peas varieties such as ICPL 877091 weed twice and for medium and late types such as KAT 60/8, KAT 777 and KAT 81/3/3, weed three times in the first season.

First weeding should be done within the first 2-3 weeks whereas second weeding should be done two weeks after the first.

iii. Crop protection

Insect pests

- ❖ Before flowering – thrips and aphids
- ❖ After flowering – pod fly pod borers, pod sucking bugs
- ❖ Storage – bruchids

General recommendation- Spray once before flowering and twice after flowering.

The following is recommended at various stages of plant growth:

- ❖ Before flowering to control thrip and aphids, spray sherpa plus, karate or Thiodan when flowers are forming.
- ❖ During and after flowering to control thrips, pod fly, pod borers and pod sucking bugs, spray sherpa Plus, Thiodan, karate, or Decis.
- ❖ Storage: control bruchids through use of Super Actellic, ash, or neem leaves.

Diseases

Fusarium wilt

- ❖ Rogue and destroy infected plants
- ❖ Crop rotation- successive pigeon peas sole crop should not be planted in the same field after 3 years. Rotation should be with cereals.

iv. Harvesting

Green mature pods may be harvested for grain. Harvest dry grains when most of the pods are dry and more have turned brown.

Storage- dry seed in sun before storing and dust with super actellic at 50g/bag

v. Utilization

Pigeon peas can be consumed in form of whole grain or split pea (dehulled). There is market within and outside the country for green pods, whole grain and split pea.

2. Cowpeas

i. Varieties and their characteristics

Variety	Flowering Period	Maturing Period	Potential yield
Machakos 66 (M66)	66 days	85-95 days	13-20 bags/ha 5-7 bags/acre
Katamani 80 (K80)	45-58 days	75-85 days	17-20 bags/ha 6-7 bags/acre
KVU HB, 48E10	45-50 days	85-95 days	13-17 bags/ha 5-7bags/acres

ii. Crop management

a) **Land preparation:** well prepared field for good seedling establishment.

b) **Time of planting:** early planting at the onset of rains.

c) **Seed rate:** 25-35 kg per Ha. (10-14 Kg per acre)

Number of plants/hill: 3-4 then thin to 1

Depths of planting: 4-5 cm and seed covered properly.

Spacing: sole Cropping – M66, K80, KVU 27-1, space at 60cm x 20 cm.

KVU 419, KVU HB48E10 space at 50x20cm

Intercropping: distance between maize and cowpeas row is and one plant to another is 15cm.

d) **Fertilizer:** in highly eroded soils 10-15 Kg/Ha nitrogen and 20-25 kg/Ha SSP or TSP.

e) **Weeding:** first weeding done 2 weeks after emergence and second weeding just before flowering.

iii. Crop protection

- ❖ Aphids – apply Thiodan, Karate or Sherpa plus.
- ❖ Thrips- Sherpa Plus, karate
- ❖ Leafhoppers- thiodan
- ❖ Pod Borers- thiodan, sherpa plus, Decis, Thiodan Pod sucking bugs – Dimethoate, Sherpa Plus, Karate
- ❖ Apion beetle – Super Actellic.

3. Beans

i. Varieties and their characteristics

Variety	Flowering Period	Maturing Period	Potential yield	Remarks
Katamani Bean 1 (KB 1)	30-33 days	60-65 days	16-20 bags/ha 7 bags/acre	Grain is yellowish green Resistant to rust and common bean mosaic virus
Katamani Bean 2 (KB 2)	30-35 days	60-65 days	15-17 bags/ha 5-7 bags/acre	Maroon in colour

ii. Crop management

a) **Land preparation:** seedbed should have a fine tilth.

b) **Time of planting:** at the onset of rains when at least 30 mm of rainfall has been received.

c) **Seed rate:** 40 -50 kg/Ha (16-20kg per acre)

Number of seed/hill: sow at least 2 seeds per hill

Depth of planting: plant at 4-5 cm depth

d) **Spacing:**

Sole cropping:

Hand planting – 45 x 20cm

Oxen planting – 60 x 15cm

Intercropping

With maize intercrop one row of beans after every row of maize and the spacing is 60 x 15cm

With sorghum sow two rows of beans between two rows of sorghum

d) **Fertilizers:** DAP at the rate of 1 bag/Ha (50KG/Ha) during planting

e) **Weeding:** first weeding should be done two weeks after emergence and the second before flowering.

iii. Crop protection

Insect pests: bean fly, black bean aphid, bean leaf hopper

Control: use dimethoate and /or rogue affected plants to avoid further infestation, also plant early.

Main diseases: Anthracnose, angular leaf spot, charcoal rot, bean mosaic virus, haloright, rust.

Control: use Benomyl, copper oxychloride, rotate with cereals.

iv. **Storage:** dust with actellic super (50g per bag)

4. Green grams

i. Varieties and their characteristics

Variety	Flowering Period	Maturing Period	Potential yield	Remarks
KVR 22	55-60 days	80-90 days	11-14 bags/ha 5-7 bags/acre	Seed colour is golden yellow The variety is tolerant to aphids, yellow mosaic, and moderately resistant to powdery mildew
KVR 26	40-45 days	60-65 days	14-17 bags/ha 5-7 bags/acre	Grain is green in colour and less stony than local races

ii. Crop management

a) **Land preparation:** seed bed should be fine tilth

b) **Time of planting:** at the onset of rains when at least 30mm of rain has fallen.

- ❖ Method of planting:- when using oxen plough for planting, place seed at the side of the furrow.
- ❖ Seed rate: 10-15 kg /ha (4-6 bags /acre)
- ❖ Number of plants per hill: at least two.
- ❖ Depth of planting: should be kept at 4-5 cm

c) **Spacing:** sole cropping 45 x 15 cm

d) **Weeding:** first weeding at 2 weeks after emergence and second weeding before flowering.

f) **Fertilizer:** 10 -15kg/Ha of nitrogen and 20-25 kg of SSP or TSP in highly eroded soils which are deficient of these nutrients.

iii. Crop Protection

Insect pests

Thrips- thiodan, sherpa plus

Aphids- thiodan, sherpa plus, karate

Pod sucking bugs- Dimethoate, sherpa plus

Apion beetle – thiodan, karate

Bruchids – super Actellic

Diseases:

Powdery mildew and yellow mosaic virus - control using Benomyl and Copper oxychloride.

5. Soya beans

i. Varieties

- ❖ Duicker
- ❖ EAI=3600
- ❖ Nyala
- ❖ SCS 1
- ❖ Gazelle
- ❖ Sable

ii. Cultivation

Can grow under a wide range of climatic conditions though essentially it is a sub tropical crop.

Temperatures

Most varieties thrive on fairly warm temperatures

Rainfall

Requires about 600mm of well distributed rainfall

Rainfall is critical during vegetative phase and also at flowering and pod formation stage but requires a fairly dry weather during ripening.

Soils

Deep, fertile and well drained soils with P ++ range of 5.6 to 6.8. Heavy impermeable soils are not suitable.

iii. Crop Management

Planting:

Planting can be by hand or oxen. Preferably plant seeds from previous season harvest as the crop loses viability very fast.

Spacing:

Row spacing - 50cm

Plant to plant - 5cm

Seed rate 60-70 kg

Depth of planting - 2.5cm to 5cm

Fertilizer

100 kg of DAP ha especially when soil fertility is low. Direct fertilization from fertilizer used in a previous crop is more effective inoculation of the seed e.g. Biofix can help improve the fixing capacity of the seed.

6. Groundnuts

i. Varieties

Mani Pintar

- ❖ Runner variety
- ❖ Seeds are red and white
- ❖ High yielding
- ❖ Requires long growing season

Asiryen Mwitunde

- ❖ Spreading bunch varieties.
- ❖ Moderate tolerant to rosetta
- ❖ Seeds are too small for confectionary trade

Homabay

- ❖ Runner variety
- ❖ Large seeds suited for local and confectionery use.

Makulu red

- ❖ Red skinned seeds
- ❖ High oil content

Bukene

- ❖ Light brown seeds making it suited for confectionery trade

B I (Red beauty)

- ❖ Red seeded
- ❖ It's a multiline variety
- ❖ Suited for confectionery

ii. Climate

- ❖ Requires well distributed 400-80mm of rainfall
- ❖ Does well in a warm climate.

iii. Crop management

a) **Planting:** Sow at a depth of 5-10cm (2-4 Inches)

b) **Spacing:**

- ❖ Row spacing (row to row) - 60cm
- ❖ Plant to plant – 10cm

c) **Seed rate:** 40-50 kg/ha

d) **Fertilizer requirement:**

- ❖ Not very necessary but requires adequate supply of calcium
- ❖ Can apply 2 bags (50kg each) of DAP per ha.

e) **Weed control:**

One or two weeding before the canopy develops

4.4.4. FORESTRY TECHNICAL ENTERPRISES

There are several enterprises, which can be used in forestry PTDs. They include and not limited to,

- a) Tree Nursery
- b) Woodlots for timber and poles
- c) Fruit orchard
- d) Fodder bank
- e) Trees intercropped in agricultural crop land

4.4.4.1. Nursery establishment and management

What is a tree nursery?

A tree nursery is a place where young trees seedlings are raised with special care and protection until they are strong enough to be able to be transplanted out in the field.

The size of nursery depends on the number of seedlings to be raised. The size may be influenced by availability of space, labour, water, tools, materials, seeds and market. A group intending to raise 1000 seedlings for example will require a space of 5mx4m.

The success of seedlings production in small-scale nurseries doesn't only depend on efficient management of resources but also availability of resources in good time quantities and qualities in time. The nurseries are encouraged to use locally available materials e.g. tin containers, milk tetra packs, ash, and chicken droplets for termite control. These are meant to facilitate or lead to long-term sustainability.

Nursery operations

When selecting a tree nursery site, two main factors have to be considered.

a) Factors Important to tree growth.

- ❖ Water availability
- ❖ Good soil availability next to the nursery site
- ❖ Topography to be good as to be allowing for proper drainage and keep off strong winds damage on the seedlings. Not in valley bottoms but flat areas. Water logged site should also be avoided
- ❖ Nursery materials to be available in time so as not delay the work.

b) Factors importance for nursery management:

- ❖ Nursery to be located to facilitate sharing of seedlings close to planting site to reduce transport cost.
- ❖ Accessibility - the nursery should be located where it is reach on foot and by vehicles.
- ❖ Ownership - it is necessary that the nursery be on public land owned by the government may be free to make any decision.
- ❖ Security - The nursery should be located in a secured place as to minimize loss of seedlings and tools.

Setting up a Tree Nursery

A nursery should be laid out in such a way that the following are used:

- ❖ Should be in east - West direction for better illumination
- ❖ Access road and paths so as to minimize the need for transport of materials and seedlings

- ❖ Fencing - protection is needed against browsing and trampling by animals.
- ❖ A shelter for tools, material and workers
- ❖ A soil dump. The production of potted seedlings requires large amount soil, sand and manure.
- ❖ Windbreaks - Where strong and /or desiccating wind prevail, a wind break consisting of at least two rows of shrubs and one row of trees should be planted along the nursery facing the main weed direction. The trees should be fast growing and strong stemmed so as to overcome wind effects.

Time to start nursery work

The time to start nursery operations depends on the time the seedlings are to be planted in the field. There must always be enough time for the seedlings to grow and attain the recommended plantable sizes. It is generally important that the work starts in the February or March for the slow growing species to reach the size o 30-50cm height with the onset of the rains in November.

Nursery Tools

The simple nursery tools required in the case of small-scale nursery are:

- ❖ Water jerry cans for watering the seedlings
- ❖ Jembes for preparing the nursery site and constructing sunken beds
- ❖ Rakes for clearing off rubbish from the nursery
- ❖ Shovel for sieving of soil and manure before potting
- ❖ Panga for cutting fencing materials
- ❖ Slasher for slashing around the nursery site

NURSERY TECHNIQUES

a) Nursery soil

Where possible should have nearby sources that are nearby the enterprise establishment so that the organic matter can mature and the seeds of weeds germinate and can easily be removed

b) Soil Sieving

Soil must be sieved to remove stones branches, roots and unnecessary matters before mixing

c) Soil Mixing

Since the soils of arid areas are infertile and of poor physical properties, it is necessary to mix the soils with the well composed manure to improve both fertility and structure.

A ratio of 4:1 is recommended. If the soil is clay, sand should be added to mix in potting. The potting mixtures should be moist but not wet when potting is carried out.

d) Potting Containers

As the emphasis is mainly on the use of locally available materials, farmers are encouraged to use the locally available materials. The following materials can be used for potting:

- a) Cooking fat containers
- b) Plastic oil containers
- c) Milk tetra packs
- d) Polythene tubes

Note that it is very important to wash cooking containers and milk tetra packs with detergent solution to remove fat and milk stains that attract termites.

e) Potting Operation

This is the filling of the container with the soil mixture. The polythene type pot size is 4"x7" clear or black in colour. It is important that the pots are open on both end for ensuring proper root development and drainage.

When potting, ensure that the half of the lower bottom of the pot is compacted to ensure that the pot does not bend and spill the contents when it is being carried. The top half should be slightly compacted so as to make seed sowing easier.

f) Seedling Bed Preparation

Sunken bed is used in semi-arid areas to retain moisture. The depth is usually 10cm. It is advisable to place a later of ash about 3cm thick on the floor of the bed to reduce termite effects.

A bed measuring 70cmx70cm is recommended for 100 pots.

g) Seed sowing

The time for seed sowing of any species depends on the duration it takes to attain plantable size. It is important that the seeds are sown in time so as to attain plantable size of 30cm to 50cm by every year.

Slow growing species such as *Tamarindus indica* (Muthumula), *Delbergia melanoxyton* (*Muvingo*), *Azadirachta indica* etc should be sown early preferable January – February.

Fast growing species such as *Leucaena leucocephala* (*Lukena*), *Eucalyptus* species (*Musanduku*), *Carrida papaya* (*Muvavai*) etc. may be sown later preferably June –July.

i. Direct Sowing

The direct sowing is suitable for medium to large size seeds like *Croton megalocarpus* (*Muthulu*), *Delonix regia*, *Tamarindus indica* (*Muthumula*) etc. This method is more economical and simple and good for those species with good germination capacity.

Sowing depth is an important factor to consider because if seeds are sown too deep in the soil, they may germinate too deep and exhaust food reserves stored in the cotyledon before emerging above the soil. The seedling cannot manufacture its own food before appearing above the soil so it dies and are. Sowing depth is approximately equivalent to the diameter of the seed.

When sowing, the following should be observed:

- ❖ The pots should be watered properly prior to sowing
- ❖ Use dibbler to make 2-3 holes in each pot
- ❖ Put one seed in each hole and cover gently with soil.
- ❖ Water the pots after sowing
- ❖ Make shade preferably with local materials e.g. grasses above the pots.
- ❖ Continue watering the pots twice a day: early morning and late afternoon

In case all the seeds germinate, they are pricked out into un-germinated pots or new pots. The one to be left in the original container should be the healthier seedling.

ii. Indirect sowing (seed bed)

Indirect sowing is suitable for fine seeds e.g. *Eucalyptus* species (Musanduku) and also those seeds with low or difficult germination capacity e.g. *Melia volkensii* (Mukau).

When sowing in seedbed, the following should be observed:

- ❖ Make the soil/ sand mixture surface is evenly flat
- ❖ Sow the seeds evenly and broadcasting on the bed. The seeds should not be overcrowded to avoid fungal attack
- ❖ For fine seeds like *Eucalyptus* species, the seeds are mixed with sand before sowing
- ❖ Cover the seeds with thin layer of soil
- ❖ Water the bed gently with watering can with fine holes. Empty can with fine holes is also recommended
- ❖ Make light shade using local material e.g. grasses.
- ❖ Continue watering the bed twice a day: early morning and late afternoon until germination is complete.

h) Pricking Out

Once seeds are sown in the seedbed germinate, they have to be transferred into pots a process known as pricking out. Seedlings will normally suffer less shock if pricked out when having three leaflets

Before pricking out observe the following:

- ❖ The exercise should be done early morning or late in the afternoon
- ❖ The bed should be watered properly before pricking
- ❖ The leaflet and not the stem should be held while pricking to avoid injuries
- ❖ The pricked seedlings should be placed in a can filled $\frac{3}{4}$ with water.
- ❖ The pots to be pricked in should be watered and holes made using a dibbler
- ❖ If the roots are too long, they may be ripped off
- ❖ The pricked seedlings are placed in pot holes using a dibbler, the soil is pushed towards the seedling to hold it tight
- ❖ The pots should be watered properly after pricking
- ❖ The pricked seedlings should be shaded immediately.

SEEDLING CARE AND MAINTENANCE

a) Shading

After sowing the seeds and pricking out from the seedbed, there should be partial shading to protect the seedling from direct sunrays, which may cause high evapo-transpiration. The seedlings should be kept under shade for about 2-3 weeks. The material used for shading should be locally available such as grass millet stalks etc.

b) Watering

Seedlings should be watered twice daily i.e. early in the morning and late in the afternoon when the sun is not hot. The quantity of water or watering intensity should be 30 litres per 1000 seedlings. During the rainy season, never water twice. You can water once or not at all depending on the amount of rainfall. Note however that over watering or under watering may be encourage proliferation of damping off fungi while under watering may lead to poor root development since the water will only moisten the surface layer of the soil.

c) Weeding

Weeds are threat to health growth of seedlings and must therefore be controlled. This is because weeds compete for water and nutrients and can reduce seedlings vigour if not controlled. Do not wait until the weeds are too big. Hand weeding or use of dibbler is usually an appropriate method. Watering before weeding usually makes it easier.

d) Cultivation

Cultivation aims at controlling the weeds, improving aeration and percolation. Roots can penetrate easier into the soil, which facilitates absorption of nutrients. Experience has shown that repeated watering of seedlings compact the soil and deteriorates the physical properties of the soil. This therefore makes cultivation an indispensable exercise. Convenient tools for the exercise include spatulas, dibbler etc.

e) Root Pruning

When seedlings have reached a certain size, their roots become longer than the depth of strong root system. It is important that strong roots are not allowed to develop because once they are cut: the seedlings are likely to be weakened. Therefore periodic is required before the root system establishes itself into the ground. This is done once 2 weeks. It is advisable the nursery stock is watered before and after root pruning to enable the seedlings to recover from the shock.

f) Nursery Cleaning

The nursery site should be kept tidy at all times. All weeds around the nursery site should be removed. These weeds harbour crickets, caterpillars and other harmful insects, which feed on around seedlings, and also give them a place to hide. It is therefore advisable to remove all the weeds around the beds and clear the rubbish as well.

g) Hardening Up

Seedlings must be prepared for the harsher conditions that they will meet in the field. To prepare the seedlings to those conditions, seedlings are removed from the shade, watering frequently and intensity reduced and root pruned frequently. Hardening up is recommended to start 1-2 months before planting during which seedlings should also spread out to imitate out planting espacement in the field.

TREE IMPROVEMENT

Plant improvement involves genetic improvement of plants of high productivity potential from ordinary plants species.

i. GRAFTING

Is one of the propagation methods whereby an improved variety of fruit part (scion) is detached from the mother plat and transferred to a young root where it is attached to improve the productivity of the local stock.

Reasons for grafting

- ❖ To reduce maturity period – 3 years
- ❖ To improve quality of the fruits
- ❖ To reduce susceptibility to diseases and pest.
- ❖ Producing high quality seedlings for sale

Types of grafting

- ❖ Top grafting
- ❖ Side grafting
- ❖ Wedge or cleft grafting
- ❖ Whip and tongue grafting
- ❖ Splice grafting
- ❖ Veneer grafting
- ❖ Saddle grafting
- ❖ Bottle grafting

The simplest and the most successful techniques are as discussed below

a) Wedge or Cleft Grafting

- ❖ Select a healthy vigorously growing undiseased seedling (root stock) about 30cm high
- ❖ Remove leaves from the bottom of the plant to a height of about 15cm
- ❖ Select a small piece of branch (scion) from a healthy, mature vigorously growing parent tree and remove (cut its) leaves.
- ❖ Cut off the leafy part of the root using a sharp knife (see no.2) a secateur can also be used
- ❖ Using a sharp knife, split the top centre of the root stock about 1cm long
- ❖ Using a sharp knife cut (shape) the scion within leaves to form a V-shape (wedge) at the bottom. The V shape tip should also be 1cm long
- ❖ Put the V shaped scion into the splitted part of the rootstock and tightly tie them together using a polythene band. Tie at the joint only and cover immediately with transparent polythene tube with a close top.
- ❖ The cover just below the joint.
- ❖ Water your plant daily and observe after 14 days for leaf production from the scion.

NB: Remove only suckers that may appear from the rootstock.

b) Splice Grafting:

All steps from No. 1 to No. 4 are similar to wedge grafting also no.8

- ❖ Using sharp knife cut an oblique shape on the root stock about 1cm long
- ❖ Using a sharp knife cut an oblique shape on the scion about 1cm long
- ❖ Put the scion and the rootstock oblique together in such a manner that there is no wound left uncovered and tie immediately with a polythene tape.

Apparatus needed during grafting

- ❖ A very sharp knife
- ❖ Dettol, spirit or acid (to sterilize germs)
- ❖ Scion
- ❖ Root stock
- ❖ Grafting tapes / binding tapes
- ❖ Gazette for creating shade

Choosing scions

- ❖ Scions must be obtained from a clean farm
- ❖ Select the tree for scion production
- ❖ Check the growth of the tree (good form and size of fruits)
- ❖ Do not get the scions from flashing, shooting or flowering shoot
- ❖ Scions should be got from dormant buds (shoot) n
- ❖ An example of dormant scion
- ❖ The months of November to January are the best periods for selecting
- ❖ Check the age of the mother tree. It should be older than the rootstock approximately 8 years.

Factors to be considered while grafting

- ❖ A sharp knife or razor blade without soap stains and salt (must be clean)
- ❖ Scion must be inserted inside the root stock (make sure the side of the scion doesn't overlap)
- ❖ Scion must be of the same size (diameter)
- ❖ Wash your hands and knife properly
- ❖ You should make sure that water doesn't reach the cut part when typing.
- ❖ After 14-21 days check whether the grafting has succeeded.
- ❖ You should be careful when watering

ii. Budding

- ❖ T budding
- ❖ Inverted T budding
- ❖ Patch or shield budding
- ❖ Slash budding

a) T - Budding

- ❖ Select a vigorous healthy growing seedling
- ❖ Reduce the leaves from the rootstock to only a few at the top
- ❖ Select a bud stick from a vigorously growing parent tree
- ❖ Use a sharp knife to cut the 'T' to look like fig
- ❖ Open the bark from where you cut the 'T' to like fig
- ❖ Using a sharp knife cut from a bud stick about 1cm long and inserts it in the 'T' cut on the rootstock. Close the root bud and tie with a polythene band. Note that the bud should not be completely covered with the polythene but the top half should be left showing.

b) Patch Budding

In this approach all the steps apply except that instead of a 'T' cut, the cut is as shown in the illustration.

Tending

(Consist watering, weeding, sheltering (shading))

Hardening off or up - e.g. uncovering the seedlings

EXAMPLE OF NURSERY PTD

Mango - Kwirutira group

They have 300 mango seedlings

Germination - coated and uncoated. The things being tested were germination percentage and germinating rate

Reasons why they planted mango

Source of income

4.4.4.2. Tree Establishment and Management

The main activities in tree establishment are;

- ❖ Land preparation
- ❖ Plot design
- ❖ Pitting
- ❖ Mixing soil manure
- ❖ Refilling
- ❖ Macro-catchment
- ❖ Protecting (fencing)
- ❖ Weeding
- ❖ Pruning
- ❖ Thinning

a) Land preparation

Before planting seedlings the site should be clear of weeds and other competing vegetation.

- ❖ This also eases the digging process; however salted indigenous may be left for future use.
- ❖ Cultivation of the site is an advantage as the water is able to penetrate in the soil.

b) Spacing / Staking

- ❖ Spacing between seedlings will depend on the species, type of planting and what is for e.g. for hedges, close spacing (03-06ft) is desirable.
- ❖ For firewood and timber, wider spacing (3.5-4m)
- ❖ For fruit trees especially mangoes (improved varieties) wider spacing (5-8m) is recommended

c) Hole size /pitting

- ❖ Holes should be pitted before rainy season
- ❖ Well prepared holes ease root penetration of the newly planted seedlings
- ❖ It also traps more rainy water and thus enables the soil to store more moisture within the root zone.
- ❖ Recommended hole sizes are 60x60 cm for fruit trees and 45x45 for other species.
- ❖ In Dryland larger holes are more effective for achieving higher survival and fast growth.

d) Refilling of holes

- ❖ Should be done before rainy season
- ❖ Un decomposed materials e.g. branches, grasses should not be mixed with the refilling soil because will interfere the root development as well as attack harmful insects e.g. terminal (Mudlua)
- ❖ The rich topsoil should not be mixed with sub soil.
- ❖ Top soil is filled back into the planting holes during their refilling process while the subsist is utilized for construction of micro-catchments

e) Micro Catchments

- ❖ The success of tree planting within the dry land region will depend on proper utilization of the limited water resource.
- ❖ Use of micro-catchments is very important which is normally constructed during the planting time.
- ❖ There are several types of micro-catchments and the most common ones are Circular, V shaped and W shaped.

f) Planting

- ❖ Done after enough moisture build up during the rainy season. How do you do it?
- ❖ Seedlings of good health and of plantable size (30cm)
 - (i) Make a hole in the middle of the refilled to ensure no roots are exposed
 - (ii) Affirm the soil around the seedling to ensure contact pot soil with surrounding soil.
 - (iii) Add more wet soil and step on the soil around the seedlings so as to improve the contact.
 - (iv) If it does not rain after 2 days of planting, water the seedlings.

g) Tree management

Weeding during the initial stages reduces competition for moisture, valuable minerals and improves survival and growth of trees.

h) Types of weeding include:

- ❖ Slashing, sport weeding and enable weeding
- ❖ Experience has shown that complete weeding give the best result especially when combined with cultivation.

i) Watering

- ❖ In order to utilize the limited quantity of water effectively.
- ❖ Both watering and other form of underground watering methods are preferable.

j) Protection (fencing)

Against livestock and the browsers

k) Shading

It is done when dry season sets in and the young trees start showing signs of moisture stress to avoid excessive evaporation of water from the soil and plant. Mulching can also be done to reduce water loss.

l) Pruning

Pollarding – e.g. Grevillia species

Coppicing – e.g. Eucalyptus species

m) Thinning

Is the removal of small crowded or badly sapped trees in a young woodlot to enable the remaining good trees to grow better.

Thinning is usually done in trees growing from timber or poles, which do not coppice, such as Grevillea, pine, and cypress.

4.4.4.3. Fruit orchard

What is a fruit Orchard?

A fruit orchard is one of the land practices whereby an area is set aside for planting of fruits trees. The fruit can be of local or improved varieties. In most cases fruit orchards are established using improved varieties because local varieties are slow growing, less productive and highly susceptible to diseases and pests.

During initial years the fruits trees can be intercropped with crops such as maize, beans, cowpeas, green grams and pigeon peas.

Several propagation methods have been used in the establishment of fruit orchards e.g.

- ❖ Use of seedlings (seeds)
- ❖ Grafting
- ❖ Cuttings
- ❖ Layering
- ❖ Budding

Why fruits are doing well in ASAL areas

- ❖ High temperatures
- ❖ Light intensity- improve quality sugar
- ❖ Less moisture
- ❖ Less humidity

Factors to consider in establishing a fruit orchard

- ❖ Land availability/current utilization /owner
- ❖ Accessibility to the farm (passable roads)
- ❖ Well drained soils (safe from water logging)
- ❖ Security against game and man
- ❖ Planting stock source (grafted)
- ❖ Markets channels (if no commercial basis)

Species for fruit orchard

- ❖ Mangoes
- ❖ Avocado on hilly masses
- ❖ Pawpaw (solos and mountain)
- ❖ Citrus species
- ❖ White sapote
- ❖ Bananas
- ❖ Passion fruits
- ❖ etc.

Benefits from fruit orchard

- ❖ Provision of fruits within 2 years if grafted
- ❖ Distribution of income throughout the year
- ❖ Provision of fruit nutrients to the households
- ❖ Acts as windbreak for food crops
- ❖ Provision of scions for grafting etc. learning site

Disadvantages of fruit orchard/limitations

- ❖ Needs intensive care (expensive)
- ❖ Competition for nutrient with crops
- ❖ Expensive farm inputs

EXAMPLE OF FRUIT ORCHARD

A) MANGO

Types - most popular for export

- ❖ Boribo
- ❖ Apple
- ❖ Kent
- ❖ Batawi
- ❖ Vandyke
- ❖ Tommy atkin
- ❖ Aden
- ❖ Ngowe - most popular but not classified for export market

Land preparation

- ❖ Land clearing, fencing, ploughing
- ❖ Staking/spacing 8m x 8m
- ❖ Pitting – holes 3'x3'x 3'
- ❖ Refilling of holes with soil mixture
- ❖ Manure + topsoil Ratio 1:3 then plant on onset of rains

Management

- ❖ 1st and 2nd year remove all the flowers.
- ❖ Pruning – so as to get strong branches
- ❖ Open the branches outwards

Propagation

This can be done through

- ❖ Sexually or asexually propagation
- ❖ Sexually - bear profusely and long lived late fruiting
- ❖ Asexually (grafted) - carry over inherent parental traits - uniformity and productivity.
- ❖ Vegetative propagated trees- produce earlier but small in size and easy to manage.
- ❖ Seeds viability - viable for about a month - test in water - sinking seeds fires high germination

Climate conditions

Temperature: Ranges 23 - 28⁰C. High temperatures improves fruit size

Rainfall: About 1000mm rainfall per annum and evenly distribute high humidity - increase pest/disease attack

Soils: Deep 92m medium texture and well drained. PH 5.5-7.5

Irrigation

Necessary when seedlings or trees are young or excessive dry spells.

Pruning:

Only formative punning needed.

Main shortcut - promote lateral branching

Subsequent - done to remove dead wood and overcrowding

PESTS AND DISEASES ON FRUIT TREE ORCHARD

Examples of mango diseases are

i. Anthrachase

- ❖ During wet seasons a lot of mango abort.
- ❖ Leaves - it attacks the leaves, wrinkles and start drying
- ❖ Tommy and Vandyke are prone to these kinds of disease.

ii. Powdery mil dew

- ❖ Occurs during flowering period. Flowers become yellow then turn white and later turn black. It takes one to two weeks and flowers drop.
- ❖ Symptoms - leaves curl and powdery, and the leaves die.

iii. **Phytophthora** - attacks the tender roots feeder and affects the growth.

iv. **Rust** - it affects the fruits and looks grey.

Chemicals used for controlling the above disease:

Disease		Chemical
1. Anthrachose	-	Benlate copper fungicide
2. Powdery mildew	-	Baylaton copper
3. Phytophthora	-	Anatona

Spray from August - Mid September (during flowering season) reapply after six months.

Mango Pests

- ❖ Mango weevils - enter into the fruit and lay eggs
- ❖ Mango scale - attacks the leaves, use chemicals such as marshal (during flowering) and Demethocte.

Other pests are:

- ❖ Mites – Feed on the leaves (controlled by miticides e.g. Felthane)
- ❖ Fruit fly – they deposit their eggs on fruits
- ❖ Termites – Controlled by Phyrinx use Regent, Termidole, Confidor

Fruit Orchard with Agricultural Practice:

- ❖ During establishment, the recommended spacing for mangoes is 7m x 7m n
- ❖ From the first hole from outside is supposed to be 3.5m then followed by 2.5m where the pigeon peas are planted while mangoes are intercropped with either maize or sorghum.
- ❖ When digging hole the required size is 3ft x3ft.
- ❖ Put the top soil separate from the sub soil
- ❖ If manure has to be used, it has to be prepared in advance.

1ST CYCLE

- ❖ The fruit trees can be intercropped with maize, sorghum.
- ❖ A farmer can either apply fertilizer of farm yard manure
- ❖ This trial can be done in three different ways.
 - 1st plot maize planted with fertilizer

- 2nd plot maize planted with farm yard manure
 - 3rd plot maize – without the above two treatments.
- ❖ With these PTDS the farmer will repeat them in the 2nd cycle and he/ she will be able to make final conclusions on the PTD.

FERTILIZER APPLICATION METHOD

- ❖ Fertilizer are usually applied to add inadequate nutrients which are essential to plant a majority NPK (Nitrogen, phosphorous and potassium)
- ❖ When sowing the crops fertilizer is normally drilled along the planting furrows and thoroughly mixed with the soil, the seeds are sown and then covered.
- ❖ Commonly used fertilizer are NPK (20:20:0) per acre at planting and top dress with CAN each 50kg per acre if the rainfall is sufficient after 1st weeding
- ❖ The fertilizers used for crops will also be utilized by fruit trees especially if leached to deeper soil layer beyond the crop roots
- ❖ But mostly manures are added to fruit trees especially farmyard manure.

MANURE

- ❖ Improves the organic matter content of the soil, retain soil moisture and improve soil structure
- ❖ Manure can be broadcasted in the field and mixed with soil during ploughing
- ❖ They can also be spread in bands along the planting furrows or mixed with soil before seeds are sown
- ❖ The standard farm wheelbarrow when full contains approximately 25kg of dry manure.
- ❖ At low rate, two wheelbarrows are enough for 10m x10m square. This translates to 200 wheelbarrows or 5 tonnes per hectare or 80 wheelbarrows per acre when applying high rate 400 wheelbarrows or 10 tonnes per hectare.

(B) PAWPAWS

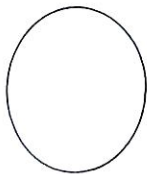
The main varieties are;

- | | |
|----------------|----------------|
| ❖ Solo sunrise | ❖ Local pawpaw |
| ❖ Solo kapoho | ❖ Honey dew |
| ❖ Montane | |

NB: Solo sunrise /kapoho varieties are for export. Because they are small in size therefore good for packaging

Selection of male / female seeds in paw paw;

It is good to look at the shape of the fruit produced example:



a) Circular fruit has
 33% female
 33% hermaphrodite
 33% male (can not produce)
 66% of the fruits can produce seeds



b) Oval shape
 33% female
 66% hermaphrodite
 0% male
 99% of the fruit can produce seed

Management

- ❖ Supplementary watering – 20l/seedling/week
- ❖ Losses occur in January –march – than August – September due to high heat intensity
- ❖ Potassium nitrate – 100gm /plant

NB stem rot disease is the commonest in paw paws

C) AVOCADO

Varieties of avocados

- ❖ Fuerte
- ❖ Hass
- ❖ Becon

D) BANANAS

Varieties of bananas

- ❖ Grand nein
- ❖ Dwarf Cavendish
- ❖ William hybrids
- ❖ Vallary etc

e) CITRUS

Varieties of citrus

- ❖ Washington naval
- ❖ Valencia etc

NB. Citrus are not exported due to green disease problem

NOTE. Ploughing in your orchard/ woodlot is recommended four times a year due to:-

- ❖ Zero competition – nutrients /water
- ❖ Improve infiltration
- ❖ Reduce trans-eyaporation by loosening hard crust on the surface
- ❖ Ploughing is mainly done mid March- May after rains
- ❖ October before rains mid December after rains

4.4.4.4. Woodlots

What is a woodlot?

- ❖ A piece of land planted with pure forest trees
- ❖ Intercropping can be done within the first two years
- ❖ Woodlots are established for several objectives
- ❖ Timber
- ❖ Poles, posts or firewood
- ❖ Fodder production for livestock

i. Woodlot for timber

Preferred tree species for timber

- ❖ *Mellia volkensis* (Mukau)
- ❖ Improved *Eucalyptus* breeds, clones
- ❖ *Eucalyptus camandulensis*
- ❖ *Grevillea robusta*
- ❖ *Senna siamea*
- ❖ *Acacia polycantha*

Factors considered when selecting timber species

- ❖ Fast growing
- ❖ Straight poles with few branches
- ❖ Drought resistant
- ❖ Marketable

Establishment

- ❖ Land preparation, site clearing/fencing
- ❖ Ploughing – oxen or hoeing
- ❖ Pitting – hole size 2'x2'x2'
- ❖ Refilling of holes with soil mixture of manure + top soil ration 1:3

NB. Planting of seedlings should be done on the onset of first rains to take advantage of all water available. Late planting reduces the survival of your seedlings

Spacing of 3m x3m giving 1111sp/ha

Benefits /advantages

- ❖ Provision of timber for more income
- ❖ Soil is protected against erosion
- ❖ Provision of firewood/poles after thinning /pruning
- ❖ Where crops and trees are intercropped trees are protected from animals
- ❖ Proper land use by both trees/crops

Disadvantages

- ❖ No income until the trees are mature/ harvested
- ❖ Intercropping is only for two to three years

Protection from termite attack

Application of insecticide is ideal e.g. Furadin 5g-33g per seedlin

(ii) Woodlots for poles/posts/firewood

Preferred species are:

- ❖ *Eucalyptus* spp- *camandulensis*
- ❖ *Eucalyptus* hybrid form Tree biotechnology
- ❖ *Acacia polycantha*
- ❖ *Senna siamea*

Establishment

- ❖ Land preparation, site clearing/fencing
- ❖ Ploughing – oxen or hoeing
- ❖ Pitting – hole size 2'x2'x2'

- ❖ Refilling of holes with soil mixture of manure + top soil ration 1:3

NB. Planting of seedlings should be done on the onset of first rains to take advantage of all water available. Late planting reduces the survival of you seedlings

Spacing 3m x3m giving 1111sp/ha

Advantages

- ❖ Provision of firewood, poles and posts
- ❖ Land rehabilitation in degraded areas
- ❖ Get income within a short period
- ❖ Save time used for search of firewood
- ❖ Farmers can intercrop for the first year
- ❖ First crop is an added value advantage

Disadvantages

No ore intercropping after year one

Protection

Application of regent plus or furadin at 33g/seedlings against termites is important

4.4.4.5. Fodder bank

Species mostly used for fodder bank are:

Sesbania sesban, Mulberry, *Gliricidia*, *Calliandra*, *Leucena leucocephala*

Indigenous fodder species include *Acacia tortilis*, *Acacia millifera*, *Acacia senegal*, *Acacia nilotica*

NB: Livestock are fed with the pods

Benefits (exotics)

- ❖ Provide fodder in a short time (one year) and fodder is also available in dry seasons
- ❖ Diversified nutrients are available in fodder
- ❖ Soil fertility- nitrogen fixation

Disadvantages

Protection from animals within the 1st year the branches will interfere with crops

Factors considered n fodder species selection

- ❖ Fast growing,
- ❖ Produces many branches
- ❖ Pods liked by animals
- ❖ Environmentally friendly- nitrogen fixer

Management

- ❖ Pruning
- ❖ Pollarding
- ❖ Thinning

Natural regeneration

- ❖ Application of simple management methods are ideal
- ❖ Thinning, pollarding, pruning

PART V. CROSS CUTTING TOPICS

5.1 Group Dynamics

What is group dynamics?

It is a variety of team building exercises employed during the conduct of FFS. Principle emphasis is on creating an environment in which individuals and the groups feel free to experience, reflect and change.

These games and exercises are valuable for:

- ❖ Relaxing the participants
- ❖ Illustrating a lesson
- ❖ Rejuvenating the group
- ❖ Making people alert
- ❖ Stimulating the flow of communication between strangers e.g. self introduction lowers tension
- ❖ Kill boredom
- ❖ Exploit talents
- ❖ To pass message to other community members
- ❖ To foster communication
- ❖ Bring private expectation and group reality closer
- ❖ Encourage full participation when clapping, singing
- ❖ Rounds off or introduces a lesson
- ❖ Help develop new skills
- ❖ Expose participants to new ways of judging their own action particularly in relation to the impact on the group work.
- ❖ Developing participants into a closer knit team
- ❖ Established a learning climate that is enjoyable as well as fruitful
- ❖ Helping participants experiences what can be accomplished e.g. working together as a team

Types of Group Dynamics

- | | |
|----------------|-------------|
| ❖ Songs | ❖ Tea / uji |
| ❖ Folk tales | ❖ Proverbs |
| ❖ Riddles | ❖ Dancing |
| ❖ Bible verses | ❖ Clapping |
| ❖ Poems | ❖ Drama |

Methods

- ❖ Put participants in a situation where:
- ❖ The behaviour of each participant is subject to examine and comment by each other i.e. trainers/learners
- ❖ The behaviour of the group(s) as it is examined

When to use dynamics

- ❖ To rejuvenate the group/team

- ❖ As energizer
- ❖ To internalize concept and lessons
- ❖ In conflict resolution

NB: Problem might arise if what participants learn about him is distasteful to him.

It is vital problems are shared problem Not particular individual problem.

For a group dynamic to be useful, it must be appropriate for the issue being addressed

5.2 Leadership

What is leadership?

- ❖ It is the process whereby an individual “directs”, guides, influences or controls thoughts, feeling of behaviour of other human beings
- ❖ Ability to guide and influence a group of people to achieve certain goal.
- ❖ Talent to steer a group of people towards a certain goal
- ❖ Art of guiding and directing a group of people towards achieving a certain goal.
- ❖ Art to mobilize, and organize people to utilize available resources.

Who is a leader?

This is one who has the ability to direct and motivate a group towards a specific goal.

How does a leader emerge?

Could be through:

- ❖ Imposition
- ❖ Inheritance
- ❖ Election
- ❖ Appointment

Types of leadership

1. Based on how one became a leader:
 - ❖ Formal official – elected or chosen.
 - ❖ Informal leader – has a symbol of leadership e.g. elder
 - ❖ Natural leader (evolves naturally due to certain skills/ ability)
2. Based on the focus of decision making
 - ❖ Autocratic leader – decision making lies with the appointment leader
 - ❖ Democratic decision making is done by the whole group
 - ❖ Laissez affair leader – decision making is done by some group
 - ❖ Flexible leader – can change from one style to another depending on the need of the group.
3. Based on orientation of the authority
 - ❖ Relationship oriented – more concerned with attaining and maintaining the group other than certain goal
 - ❖ Task oriented – Regardless of which will happen to the group, the leader is concerned with achieving certain mutually agreed goals.

Types of community leaders

Executive leaders:

- ❖ Chairperson
- ❖ Secretary
- ❖ Treasurer

Duties of a chairperson

- ❖ Chair meeting
- ❖ Call meeting
- ❖ Group leadership
- ❖ Solve dispute among members
- ❖ One of the signatories

Duties of secretary

- ❖ Records all the proceedings
- ❖ Keep records
- ❖ Public relation
- ❖ Communication through writing

Duties of treasurer

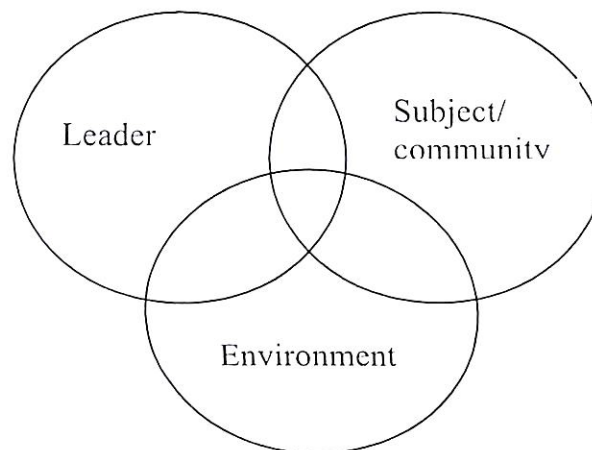
- ❖ Financial records
- ❖ Financial planning and budgeting
- ❖ Payment and purchases
- ❖ Advices on fund raising
- ❖ One of the signatories

Key leadership techniques

- ❖ Ensure you secure co-operation
- ❖ Use authority
- ❖ Use direct communication
- ❖ Maintain discipline among members
- ❖ Seek and develop group morale

Main elements of leadership

- ❖ The behaviour of leadership
- ❖ The behaviour of members
- ❖ The environment of the situation



Leadership influence is very high at the beginning but falls down as the community gets educated (drifts off) handling the stick.

Qualities of a good leader

- ❖ Accepts other people opinions
- ❖ Accepts criticism, patience, role model
- ❖ Good communication
- ❖ Innovate, good listener, good judgment
- ❖ Consult others, influence others, foresight
- ❖ Social
- ❖ Sound minded
- ❖ Active person
- ❖ Visionary
- ❖ Decision maker
- ❖ Creative
- ❖ Able to advice and be advised
- ❖ Unselfish
- ❖ Respectful person
- ❖ Patient person
- ❖ Devoted
- ❖ Faithful and transparent
- ❖ Cooperative
- ❖ Organised

5.3 Facilitation Skills

Facilitator

- ❖ Someone who guides a process. One who ensures effective flow of information within a group so that participants can share information and arrive at a decision
- ❖ A moderator of a participatory learning process
- ❖ Assist in sharing of information in a participatory way

Facilitate

- ❖ Make it easy

Skills

- ❖ Ability to perform a certain task
- ❖ Expertise, practiced ability, facility in doing something

Skilled

- ❖ Having enough ability i.e. experience and knowledge to do something well

Effective

- ❖ Ability to deliver desired output or results successfully

Facilitation skills are not in born they are acquired through training and practice. Research has shown that:

- ❖ Adults learn by hands on experience, things related to day to day life.
- ❖ Adults should be encouraged to discover for themselves
- ❖ Retention rate in adults is as below:
 - 20% when they hear
 - 40% when they see
 - 80% when they discover
- ❖ Child education is like filling an empty cup with tea while adult education is like stirring to blend the ingredients
- ❖ Experience has it that
 - When you hear you forget
 - When you see you remember
 - When you discover you own it for life

Therefore adult learning should be:

- ❖ Learner centred (participatory)
- ❖ Problem oriented (problem posing)
- ❖ Self discovery
- ❖ Action oriented approach

Thus “LePSA” learning approach

Learner centred	Problem posing	Self discovery	Action oriented
<ul style="list-style-type: none"> - Climate setting - Build relations - Promote equity - Use participants experiences - Vary presentation methods 	<ul style="list-style-type: none"> - Make use of questions - What was happening or what was the main problem 	<ul style="list-style-type: none"> - Problem analysis - Why does this happen 	<ul style="list-style-type: none"> - Solution - What can we do about it When Where How Why

Differences between facilitating and teaching

Facilitating	Teaching
❖ Involves discussion	❖ Little discussion
❖ Full participation	❖ Less participation
❖ Promotes existing and new ideas	❖ Introduces mainly new ideas
❖ Horizontal communication	❖ Vertical communication
❖ Informal learning	❖ Formal learning
❖ Collective decision making	❖ Partial decision making
❖ Shares ideas	❖ Directs
❖ Bottom up	❖ Top down
❖ Curriculum developed though need assessment	❖ Curriculum centralized
❖ Learning materials are learner generated	❖ Learning materials are teacher generated

Roles and duties of FFS facilitator

- ❖ Guide in decision making
- ❖ Team leader
- ❖ Links with external facilitator and collaborators
- ❖ Helps the group in achieving their objectives
- ❖ Helps in conflict management
- ❖ Initiates new FFS
- ❖ Explains the objectives and FFS process
- ❖ Should help with observations analysis
- ❖ Should start from simple to complex endeavours
- ❖ Keeps discussion lively
- ❖ Probe to help participants arrive at appropriate conclusions
- ❖ Help to smooth out domineering cases.
- ❖ Helps participants to reach an appropriate consensus
- ❖ Time management
- ❖ Show respect to all participants and their opinions
- ❖ Helps participants identify opportunities and potentials in their environment

Undesirable behaviour of FFS facilitator

- ❖ To be a teacher
- ❖ To be an instructor
- ❖ Commanding and arrogant
- ❖ Not transparent
- ❖ Lateness
- ❖ Non-tolerant and impatient
- ❖ Lateness
- ❖ Immoral behaviour
- ❖ Self pride
- ❖ Carelessness
- ❖ Assign unclear tasks
- ❖ Fail to admit where he doesn't know
- ❖ Be disorganized
- ❖ Lack of self confidence
- ❖ Be possessive

What does a good facilitator do?

- ❖ Creative
- ❖ Flexible
- ❖ Good listener
- ❖ Tactful
- ❖ Patient
- ❖ Transparent
- ❖ Consultative
- ❖ Tolerant
- ❖ Committed
- ❖ Trustworthy
- ❖ Social
- ❖ Accessible
- ❖ Explains situation before hand
- ❖ Act within capacities and emotion of the group
- ❖ Delegates tasks and responsibilities
- ❖ Put in special efforts
- ❖ Presentable
- ❖ Audible
- ❖ Confident
- ❖ Good collaborator
- ❖ Don't force participants to his plans
- ❖ Sensible
- ❖ Give timely explanations
- ❖ Don't hide constraints
- ❖ Show concerns

Skills of a facilitator;

- ❖ Listening
- ❖ Managing group dynamics
- ❖ Negotiating skills
- ❖ Good questioning techniques (probing)
- ❖ Good observation skills
- ❖ Feedback technologies
- ❖ Summary skills (take home messenger)
- ❖ Intellectual capacity
- ❖ Technical skills

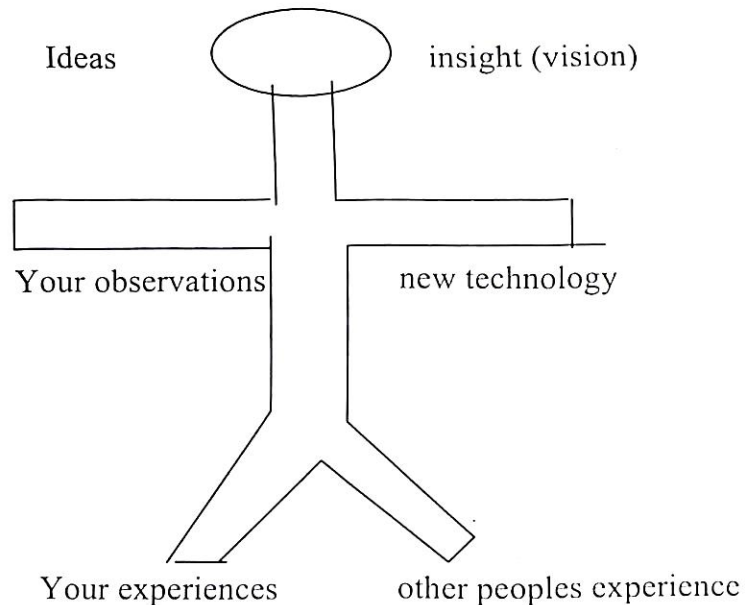
Facilitator can improve poor facilitation through:

- ❖ Get to know your participants well (create rapport)
- ❖ Use the appropriate language
- ❖ Use appropriate teaching aids
- ❖ Invite other facilitators and observe what they are doing
- ❖ Allow active participation
- ❖ Share workload
- ❖ Identify and improve weak teaching areas
- ❖ Being a role model
- ❖ Know priority of the participants
- ❖ Be regular and consistent
- ❖ Keep up breast with new technologies
- ❖ Be assertive but not controlling
- ❖ Be willing to change or adopt tools, methods and question to suit local gender and social situations.

In summary therefore a facilitator should secure 3 major issues

- ❖ Should not change or ignore any decision made reached by participants through consensus
- ❖ Should be sensitive both to verbal and no-verbal communication in the group
- ❖ Should be sensitive to the feelings, attitudes, hidden agenda culture and interests in a group

Facilitators' behaviour/actions should be like a sponge to absorb



5.4 Report Writing

What is a report?

- ❖ A report is a data that has been collected, analyzed and presented in an organized form to a person or organization requesting that information.
- ❖ Report helps to clarify or answer the questions or compile problems and verifying data
- ❖ They are summaries of what was been done

Why do we make reports?

- ❖ For monitoring and evaluation
- ❖ For the purpose of presentation of information for future reference
- ❖ To pass information to others
- ❖ Utilization of given resources
- ❖ To appraise relevant authorities on ongoing activities
- ❖ To verify data information
- ❖ To involve action as demanded necessary to parties concerned

Types of reports

(i) Based on time

- ❖ Daily report
- ❖ Weekly reports
- ❖ Monthly reports
- ❖ Quarterly reports
- ❖ Progress report
- ❖ Annual report

(ii) Based on content

- ❖ Baseline report
- ❖ Project report
- ❖ Evaluation report

Characteristics of a reliable report

i) Objective and Accurate

- ❖ Fact must be presented objectively and not exaggerated or under stated if data are inclusive, tentative, insufficient or conflicting, the report must say these clearly so that management can take appropriate action.
- ❖ Objectively must be backed by accuracy. Wrong data may lead to wrong conclusion and errors in decision-making.
- ❖ Even using harmless typographical data may cause doubt on the credibility of the report

ii) Non-Emotional

- ❖ Report should not appeal to the emotion as a vehicle for persuasion.
- ❖ It must stand on its own merit and is accepted because of its data
- ❖ Simple and straight forward
- ❖ Report must use formal language and standard format
- ❖ Being forth right does not mean being blunt or impolite
- ❖ No beating around the bush or vagueness in presentation of facts
- ❖ Use formal language

iii) Well organized

- ❖ Facts must be logically arranged

Qualities of a good report

- ❖ Relevant
- ❖ Reliable
- ❖ Reflective
- ❖ Complete
- ❖ Systematic
- ❖ Indicate time frame
- ❖ Clear understanding

Six rules to help you to write a report

- ❖ Be precise
- ❖ Add details
- ❖ Use words that readers can understand
- ❖ Be direct
- ❖ Be timely
- ❖ Begin from general to specific

5.5 Record Keeping

This is taking of notes /accounts of activities or happenings and keeping them in self custody for future use. It is recording all the work and progress in any enterprise and this is essential for enterprise management i.e. management of daily operation, labour, cost equipments, meeting etc.

Reasons for record keeping

- ❖ For future reference
- ❖ To keep track of all happenings
- ❖ Adjustments
- ❖ For labour management
- ❖ To ensure transparency in group activities
- ❖ Consistence and easy management
- ❖ Book balancing

Good records should be:

- ❖ Very simple
- ❖ Easy to use
- ❖ Must be reliable
- ❖ Must be accurate – no alteration/ cancellations
- ❖ Timely information

Types of records

(i) Official records

- ❖ Members register
- ❖ Visitors book
- ❖ Cash book (Financial records)
- ❖ Receipt book
- ❖ Minutes book
- ❖ Correspondence file
- ❖ Reports
- ❖ Project plans
- ❖ Constitution (group norms)

(ii) Other records

- ❖ Farm records
- ❖ Growth records (AESA; IGA)
- ❖ Inventory records
- ❖ Bank statement/ vouchers

(iii) Financial record

- ❖ Counter book
- ❖ Invoice
- ❖ Cheque books
- ❖ Delivery books
- ❖ Bank slips
- ❖ Vouchers
- ❖ Sales records
- ❖ Expenditure records

(iv) Common records in FFS

- ❖ Reports
- ❖ Nursery Records
 - Nursery dairy-all operations and observation of the day should be mentioned in this book.
 - Nursery register – it is the record on individual nursery bed basis.
 - Nursery delivery- showing how seedlings are distributed
- ❖ Master roll (register)
 - Daily attendance of all members is recorded in this book.
- ❖ Visitors book
 - For visitors who visit the group activities to sign and if possible comment on group work.
- ❖ Special topic records
- ❖ AESA records
- ❖ Financial records – transaction, receipt book
- ❖ Group meeting records
- ❖ List of equipments and tools records
- ❖ Group by-laws record

- ❖ Group enterprise records- cropping books
- ❖ Duty rooster

Example of nursery records:

Nursery diary

Date	Work done	Remarks
23.5.05	4 people pricked out seedlings 1 person attending training at KEFRI	4000 Eucalyptus seedlings transplanted into bags Termite damage was observed in bed No.3 but not serious

Nursery Register

Activities Bed No. 1	Neem
Sowing	8/4/05
Germination	22/4-6/5/05
Pricking out	15/5/05
Root pruning	3/8, 10/9, 11/10

Nursery delivery

Date	Species	No.	Bed No	Name and address
19/11/04	Neem	30	2	Musyoki M. from Chuluni

5.6 Field Day

What is a Field Day?

An occasion when farmers and facilitator show other people or the community what they have learned and the results from their PTD activities.

When is it best to hold it?

- ❖ When there is still a standing crop, nearing maturity.
- ❖ Sometimes combined with graduation (If two)

List activities carried out during the field day

FFS perspective

- ❖ Assembling of field day attendants
- ❖ Registration
- ❖ Objectives of both the group and FFS
- ❖ Problems being addressed by FFS

- ❖ Layout – flow of PTD plots
- ❖ Visitations to various plots/stations
- ❖ Gathering /Baraza
 - prayer
 - introduction
 - folk media
 - farmer impressions
 - speeches
 - guest of honour
 - disperse

N.B. FFS farmers are the facilitators for the day.

5.7 Graduation

It is an activity which marks the end of an FFS

Who organizes it?

- ❖ Farmers, facilitators and the coordinating office.
- ❖ It is an occasion used to recognize the TIME PUT in the FFS by the farmers and facilitators.
- ❖ Forum to pass on the lessons learnt at the FFS to the public, administrators and create interest to more farmers to join the next planned FFS in the locality.

How it is done?

- ❖ Harvest results of the field PTD, are displayed in stations as per materials.
- ❖ FFS participants dramatise (using folk media) all the lessons learnt at the FFS
- ❖ Certificates are awarded same day to;
 - Farmers /participants of FFS
 - Facilitators

There are several issues that need to be addressed before and during graduation:

- ❖ List of graduands to be submitted on time to enable preparation of the certificate
- ❖ Preparation for the venue
- ❖ Displays presentation for the venue
- ❖ Displays presentations and other logistics
- ❖ Publicity
- ❖ Guest of honours
- ❖ Refreshments
- ❖ Duty allocation
- ❖ Programme

Example of a graduation day programme:

Time	Activity	Responsible
10.00am	Registration	
	Demonstration/ displays	
	Baraza	
	Entertainments	
	Speeches	
	Awarding / giving certificates	

	Refreshments	
	Closing	

5.8 Networking

What is networking?

It is the process of creating linkages between people with common:

- Interests
- Pursuits and goals.

It can also be said to be a pattern of communications or interactions

1. Interest: What is our interest?

An interest group is a group of people who exchange information, contacts and experiences for professional, social and or business purposes.

2. Forging partnership with individuals and institutions. For network to exist there must be a commonality e.g.

- ❖ Interests
- ❖ Goals
- ❖ Pursuits

Networks assist in binding together alike minded people for

- ❖ Contacts
- ❖ Friendship
- ❖ Support – forming “Support systems”

Types of Networks

1. Formal networks

- i. Regulative networks
- ii. Innovative network
- iii. Informative network
- iv. Integrative network

2. Informal Network

3. Systematic (Targeting) Network

4. Haphazard Networking.

1. Formal Network

Formed deliberately e.g. through seminars, training, workshops, meetings etc which are attended in official capacity.

Types of Formal networks

i. Regulative Network

This is found in formal communication and consists of the channels used to disseminate organizations:

- ❖ Regulations

- ❖ Project/company policies
- ❖ Practices
- ❖ Procedures

ii. Innovative Network:

Purpose - make organization flexible and adaptive to changes, demands, environment etc. It developed as a result of participatory management theory

- ❖ Creative ideas from employees accepted e.g. - TQM (Total Quality Management)
- ❖ Systematic planning/development Approaches.

iii. Informative/Instructive network:

Training for productivity: Furthers an organizations need for adaptive ness leading to productivity. e.g. - T.O.Ts, P.R.A.

iv. Integrative network

Focuses on employee morale e.g. a reward system - rise in pay. A pat on the back or the grapevine.

- ❖ Scholarship
- ❖ Commissions (Cash)

2. Informal network:

Unofficial links. We interact with people we meet at:

- ❖ Churches
- ❖ Market places
- ❖ Weddings
- ❖ Clubs
- ❖ Clinics
- ❖ Friends homes

They form part of our friends (network). It is Important to identify various people holding different roles who can help.

3. Systematic (Targeting) Network

Involves one going directly to people he/she wants to network and have similar interest through individual choice and initiative. For example, business venture such as, Honey Care Africa, Heifer International Project, etc

4. Haphazard

People meet through circumstances rather than selection e.g. travelling. One here requires courage to initiate a discussion.

Why do we Network?

- | | |
|-------------------------------------|--------------------------------------|
| ❖ To have common interest and voice | ❖ Comparative advantage |
| ❖ Farmers strength | ❖ Address farmers/community problems |
| ❖ Bargaining power | ❖ Sourcing for extension services |
| ❖ Marketing/timing/control | |

Benefits of Networking

- ❖ Creates mean of becoming visible
- ❖ Fosters self help
- ❖ Makes new friends
- ❖ Information exchange
- ❖ Enhance sharing experience with experts
- ❖ Enhances career development
- ❖ High experience with experts
- ❖ High bargaining power
- ❖ Cost sharing/ saving
- ❖ Bigger investments
- ❖ Sense of belonging
- ❖ Knowing where to seek help

5.9 Groups

Kinds of groups

- ❖ Formal- highly structured and registered
- ❖ Informal- non structured and unregistered groups e.g. wedding/burial groups

Why do people form groups

- ❖ To generate income
- ❖ Environmental conservation
- ❖ Survival (Self help groups)
- ❖ Pooling resources together
- ❖ Addressing common problems (water)
- ❖ Social groups

Reasons why groups fail

- ❖ Due to lack of confidence
- ❖ Group members do not see benefits from the group
- ❖ Unfaithfulness
- ❖ Disagreement among members
- ❖ Lack of transparency and accountability
- ❖ Poor leadership
- ❖ Farmers are not patient i.e. high expectations which are not met immediately
- ❖ Dependency syndrome
- ❖ Dishonest
- ❖ Disrespect
- ❖ Domestic problems
- ❖ Lack of vision/ Goals/ Interest
- ❖ Illiteracy

5.10 Income Generating Activities (IGA)

Definition:

An Income Generating Activities (IGA) is an activity or a project, which brings some money/cash to the group.

Importance of IGA to the group

- ❖ It keeps the group together
- ❖ It helps in sustainability of the group
- ❖ It generates cash
- ❖ It empowers households
- ❖ It earns the group security for loans/credit
- ❖ It reduces dependency syndrome
- ❖ It creates employment
- ❖ Solve a problem
- ❖ Improves living standard of the group members

Examples of IGA

- | | |
|--|--------------------------|
| ❖ Rearing goats | ❖ Brick making |
| ❖ Poultry | ❖ Selling firewood (dry) |
| ❖ Commercial tree nurseries | ❖ Selling hardcore |
| ❖ Vegetable growing/horticulture | ❖ Bee keeping |
| ❖ Commercial insects-bees, silk worms etc. | |

Factors to consider in choosing IGA

- | | |
|---|--|
| ❖ Market | ❖ Water availability |
| ❖ Magnitude of the risk | ❖ Security |
| ❖ Capital | ❖ Group organization e.g. labour, by laws etc |
| ❖ Land | ❖ Technical skills |
| ❖ Demand | ❖ Cultural factors |
| ❖ Gender consideration (youth, men and women) | ❖ Infrastructure – roads, means of communication etc |
| ❖ Relevance of the IGA | |
| ❖ Site / structure | |

Why the IGAs fail?

- ❖ Lack of transparency and accountability
- ❖ Natural calamities
- ❖ Poor management
- ❖ Weak by-laws
- ❖ External forces e.g. local politics
- ❖ Market conditions
- ❖ Poor planning
- ❖ Gender imbalance

5.11 Result Analysis / Cost Benefit Analysis (CBA)

This is the analysis of the enterprise to find out the yield and the cost of production. Sometimes the cost might exceed the returns. The point at which the returns start to exceed the cost is said to be the break-even point.

CBA is done in two stages

(i) Middle stage

A farmer should recognize the following at this stage

- ❖ How is the germination?
- ❖ How is the growth after germination?
- ❖ Was it fast or slow?
- ❖ How is the general health of the crop? E.g. strength, colour, vigour, insect pest attack etc.

From the above consideration, the farmer can be at a position to realize the best though at middle stage.

(ii) End stage

- ❖ This is after getting the fruits cobs, wood or fodder
- ❖ It is the product stage
- ❖ The results is in terms of:
 1. Production
 2. Environmental perseverance/ adoption
 3. Insect pest resistance
 4. Input verses out put

Comparison

- ❖ Size of products
- ❖ Quantity of products

Example of Result analysis/Cost benefits analysis of TWONE MBEE FFS in Kitui District (MAIZE ENTERPRISE)

Inputs	Cost (Ksh)	Returns / Product
Digging	600	Katamani - 1/2 kg
Sowing	300	Kikamba - 1/2 kg
Apply manure	100	DH01 - 3/4
Apply seed	100	This is due to drought
Gapping	50	Expected out put when weather is favourable:
1 st weeding	300	Katamani - 3 bags
2 nd weeding	150	Kikamba - 3 bags
Harvesting	200	After PTD DH01 gave best result
Threshing	120	Expected return from DH01 in similar plot is 4 bags.
Storage	127	Price per 1 bag = Ksh.1080.00
Seeds	190	Price of 4 bags = 1080 x 4 = 4,320.00
Manure	180	Profit = 4320-2417.50 = 1902/50
Total	2417.50	

REMARKS: The profit attained during the bumper harvest should be the one to compensate the losses incurred when there is crop failure. For the farmer who has planted trees like Mukau will have more profit in the long run

Remarks

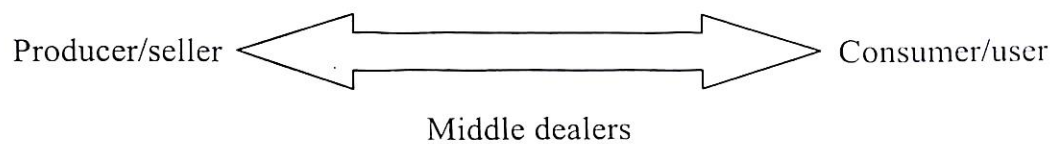
- ❖ Profits during bumper harvest should compensate losses during drought/crop failure
- ❖ For a farmer who has planted Mukau will have more profit in long run
- ❖ Profits can be increased by:
 - a) Selling maize stovers Ksh. 400
 - b) Growing maize with other crops (pulses)
 - c) Tending Mukau as a result of tending the intercrop

5.12 Market Experience Sharing

What is marketing?

In simple language marketing is the process of buying and selling of commodities

Players in marketing



What are the most common challenges in marketing agricultural produce?

- ❖ Many producers/sellers and few buyers
- ❖ Inappropriate storage facilities coupled with perish ability
- ❖ Uncoordinated farming (farm enterprises)
- ❖ Market leaders lack the right information
- ❖ Mistrust amongst the farmers and their organizations
- ❖ Price liberalization
- ❖ Most farmers are generally “price takers” who are exploited by middlemen (dealers) and market intermediaries
- ❖ Traders and processors are constrained by low quality products, inadequate supply and high cleaning costs.
- ❖ Market intermediaries also face high assembly costs, high level of market risks and cash flow problems.

What opportunities exist to address the challenges?

- ❖ Planned production (coordinated production/producing for the market)
- ❖ Collective bulking and marketing
- ❖ Utilization of existing storage facilities
- ❖ Participation in local markets
- ❖ Use of available market information (quantities, farmers have, what buyers need – quality, prices, packaging)

What are possible ways (technologies) of adding value to agricultural produce?

Value adding does not have to be very sophisticated simple techniques like:

- ❖ Sorting, winnowing
- ❖ Grading
- ❖ Packaging e.g. Kitui honey

- ❖ Processing e.g. Muthokoi
- ❖ Bulking e.g. collection as a group
- ❖ Drying and preserving e.g. dried vegetables

How can farmers facilitate or participate in local markets?

- ❖ Establishing markets within society premises or strategic points within the society area of operation e.g. fruits selling by the road side e.g. Wamunyu, Iviaii etc
- ❖ Discourage selling of produce at farm gate individually
- ❖ Fixing of market day and place

What are sources of market information?

- ❖ Newspapers
- ❖ Radio,
- ❖ Television
- ❖ Visiting markets (market survey) etc

Problems faced by farmers in marketing their produce

- | | |
|---|--|
| <ul style="list-style-type: none"> ❖ Poor means of transportation and communication ❖ Lack of market ❖ Poor buying prices of produce ❖ Lack of trustworthy from businessmen and middlemen ❖ Lack of cooperation ❖ Competition ❖ Poor quality of products ❖ External markets ❖ Poor roads | <ul style="list-style-type: none"> ❖ Low bargaining power ❖ Too many brokers ❖ Inadequate market information ❖ Poor methods of packing ❖ Too high cess ❖ Low volume of products ❖ Long distances to the markets ❖ Insecurity ❖ Poor facilities – heavy loss for perishables |
|---|--|

Means of addressing the above problems

- ❖ Improving our roads to the standard style
- ❖ Searching for markets outside the local area
- ❖ Forming of farm societies to set out buying prices
- ❖ Forming of societies / Networks
- ❖ Linkers
- ❖ Good storage systems
- ❖ Formation of marketing societies- introduction of boards

WAY FORWARD

- ❖ Formation of commodity based marketing groups
- ❖ Network with marketing bodies (local, national, regional) e.g. Kenya Agricultural Commodity Exchange (KACE)

5.13 Grant Proposal

It is a letter requesting assistance from external source by group, association; Community Based Organization (CBO), FFS etc. to solve a given problem(s) and constraints.

It has to be specific in implementation (period) and should reflect group cost sharing.

Example of Grant Proposal form

1. General Proposal

a. Title page

- ❖ Title of targeted project
- ❖ Group name, physical location
- ❖ Address

b. Introduction

- ❖ Name of group/ FFS /CBO
- ❖ Group membership by gender
- ❖ Physical Location - Province, District, Division, Location, Sub-location
- ❖ Address
 - Telephone
 - Physical address
 - Contact persons
- ❖ Registration number and year
- ❖ Bank account
 - Bank name, branch
 - Account number
 - Account name

c. Broad Objectives

d. Specific Objectives - Outline specific activities

e. Implementation schedule (Activity Plan)

Time (Month/ week)	Activity description	Responsible
e.g. July 2005	Mobilization sensitization for farmer-led FFS	DFEO, Assistant Chief

f. Benefits

- ❖ Short term
- ❖ Long term

g. Collaborators/ supervisors referee

h. Detail Budget

Budget Items

a. Inputs and equipment

Item	Quantity	Unit Cost (Ksh)	Total Cost (Kshs)

b. Training materials/ stationery

Item	Quantity	Unit Cost	Total Cost

c. Advice / Training/ Visits (Education)

No of sessions Total Cost

d. Other cost (Fares, Bank Charges etc.)

- ❖ Total Project Cost Kshs.-----
- ❖ Group cash Contribution Kshs.-----
- ❖ Total grant requested Kshs.-----

e. Community Contribution

- ❖ Unskilled labour
- ❖ Land
- ❖ Local materials
- ❖ Cash Contribution

f. Assumptions of Project success

g. Conclusion

ANNEXES

- ❖ List of participants (members)
- ❖ Certificate of registration
- ❖ Copy of bank Account
 - Pass book
 - Bank statement
- ❖ Certified list of contact person with postal Address, Telephone mobiles.

(ii) ISFP group activity proposal

Group Activity Proposal

Name of the Group	Mwenge	Division	Umoja
-------------------	--------	----------	-------

Enterprise 1

Fruit Tree Nursery

Purpose of this activity

Improved Mango Production

Material	Quantity	Unit Price	Total
Scions	150	5	750 Ksh
Graft tape	1 roll	200	200 Ksh
Surgical blade	30pcs	15	450 Ksh
Top cover	50		50 Ksh
			Ksh
			Ksh
			Ksh
Total Cost			1,450 Ksh

Learning Plan and PTD Setup (Trial type, Target Species, Measuring parameters for AESA)

Example:

GRAFTING TECHNIQUES
Comparing grafting response of Top cover, joint winding and complete winding
AESA parameter: Success percentage

Target Species: local mango root stock 150
Scions - Apple - 50pcs
Kent - 50pcs
Van dyke - 50pcs

Group Account Balance

Previous Balance	Total amount for this proposal	Balance
5,995 Ksh	1,450 Ksh	4,545 Ksh

Name and signature of the Chairperson

Date

Comments from DFEO

Signature of DFO

Date

PART VI. GENERAL EXPERIENCE SHARING FROM DIFFERENT DIVISIONS IN THE THREE DISTRICTS

6.1 Tharaka District

Achievements

- ❖ Most of the farmers have gained experience in tree planting. They have learnt different methods of planting Mukau by either pre-treating seeds or planting directly and how to improve those they have planted.
- ❖ Spacing of maize and other food crops by dividing their farms into different plots and planting varieties of maize in different PTDs therefore increase in yields in some and others low yields
- ❖ Time taken after planting of maize or other crops by taking of AESA in order to monitor the growth.
- ❖ Varieties of crops planted during long and short rains.
- ❖ Most of the farmers did not know whether intercropping would help them – planting of trees with agricultural crops but this they are learning in the FFS
- ❖ Some of the members never used to interact with others but after they have seen the output though the field days they have started moving into the FFS.
- ❖ They will be able to educate and bring many farmers to the FFS by field visits for example when the mangoes are ready, they will have something to show the rest so as to recruit more members to their FFS.

Challenges

- ❖ Challenge of grafted mangoes- no ready markets for the fruits, expensive to maintain
- ❖ Challenge- how to bring back the farmers who moved out of the groups

6.2 Mbeere District

Achievements

- ❖ Most of the farmers have gained experience in tree planting. They have learnt different methods of planting Mukau by either pre-treating seeds or planting directly and how to improve those they have planted.
- ❖ Mangoes planting – farmers have learnt how to prepare the holes for planting mangoes i.e. 3 by 3 by 3 ft and how to plant and to manage the mango seedlings at that stage.
- ❖ They have learnt how to establish tree nurseries and did mango grafting.
- ❖ Spacing of maize and other food crops by dividing their farms into different plots and planting varieties of maize in different PTDs therefore increase in yields in some and others low yields.
- ❖ Time taken after planting of maize or other crops by taking of AESA in order to monitor the growth.
- ❖ Most of the farmers did not know whether intercropping would help them – planting of trees with agricultural crops but this they are learning in the FFS.
- ❖ Some of the members never used to interact with others but after they have seen the output though the field days they have started moving into the FFS.
- ❖ Others have learnt about fodder banks and their importance.

Challenges

- ❖ Wild animals
- ❖ Insects, termites and other pests
- ❖ Lack of commitment by some FFS members
- ❖ Some FFS members are old

6.3 Kitui District

Achievements

- ❖ Most of the Mukau planted are surviving and healthy and every member learnt on how to plant them and take care of them
- ❖ Mangoes planting – learnt how to prepare the holes for planting mangoes i.e. 3by 3 by3ft and how to plant and to manage the mango seedlings at that stage
- ❖ Learnt how to establish tree nurseries and did mango grafting
- ❖ Farmers now know how to sow Mukau using hot ash pre-treatment
- ❖ We have discovered there are potential resources within our community
- ❖ Known how to cultivate crops together with trees
- ❖ Better way of utilizing land.
- ❖ Best time for planting mixing of soil/manure for planting
- ❖ We have known that grafted mangoes can also grow in lowlands
- ❖ Best sowing pre-treatment of mangoes seeds

Challenges

- ❖ Salty water
- ❖ Wild animals e.g. monkeys destroying paw paws
- ❖ Insects , termites
- ❖ Many FFS members are old

ANNEX I. LIST OF PARTICIPANTS

No.	Name	Name of FFS (Group)	District
1	Brigid Kathini Kinyungu	Ekuwa Women	Kitui
2	Christine K. Nzuki	Ekuwa Women	Kitui
3	Elizabeth Munyithya	Ekuwa Women	Kitui
4	Bentetah K. Masoso	Kalia Kithito	Kitui
5	Hellen Ikui	Kalia Kithito	Kitui
6	Jackline M. Makau	Kalia Kithito	Kitui
7	Samwel N. Nguli	Kalia Kithito	Kitui
8	Agnes M. Mulatya	Kilumu	Kitui
9	Joel Muosya Mulu	Kilumu	Kitui
10	Rose Titus	Kithambangii	Kitui
11	Shem M. Ndumbu	Kithambangii	Kitui
12	Benedetta W. Muthami	Koma	Kitui
13	Judith Mwatha Nzuku	Koma	Kitui
14	Mary N. Mwendwa	Kwiliwa Nokwo Kumanya	Kitui
15	Taabu Musya	Kwiliwa Nokwo Kumanya	Kitui
16	Juliana K. Mwaka	Kyemea	Kitui
17	Mary M. Ngala	Kyemea	Kitui
18	Monicah K. Mbiwa	Kyemea	Kitui
19	Telesia Kiteme	Kyemea	Kitui
20	J. Monicah Mutisya	Kyeni	Kitui
21	Joseph M. Masilli	Kyeni	Kitui
22	Mellicah Matheela	Kyeni	Kitui
23	Serah Bernard	Kyeni	Kitui
24	Evah M. Charles Mutuku	Kyeni kya iveti	Kitui
25	Helena M. Mutua	Kyeni kya Iveti	Kitui
26	Jacinta Munini Nashon	Kyeni kya iveti	Kitui
27	Kalevu Musyoka	Kyeni kya Iveti	Kitui
28	Boniffice Kavisi Syengo	Kyeni kya kunikila	Kitui
29	Stephen Katundu Mbuvi	Kyeni kya kunikila	Kitui
30	Gideon Ndunda Nzilu	Manyaa	Kitui
31	Jane Stephen Mutua	Manyaa	Kitui
32	Esther M. Musyimi	Miti ni Thayu	Kitui
33	Nicholas Ndunda Miluu	Miti ni Thayu	Kitui

34	Mary Kasyoki	Mukilye	Kitui
35	Tabitha Kilonzi	Mukilye	Kitui
36	Constance K. Mwendwa	Mukuyuni	Kitui
37	Sospeter M. Milai	Mukuyuni	Kitui
38	Benedict David Maithya	Mutethya (Kauma)	Kitui
39	Peter Nzingii	Mutethya (Kauma)	Kitui
40	Christine T. Tito	Mutethya wa Kitumbi	Kitui
41	Winfred Alice John	Mutethya wa Kitumbi	Kitui
42	Joseph Kisangau Nyumbu	Mwinzi	Kitui
43	Tabitha Mavisa Matuku	Mwinzi	Kitui
44	Bonny M. Kithome	Ngenda	Kitui
45	Jackson Kilatya Musyoki	Ngenda	Kitui
46	Olivia Syonga Kavii	Ngenda	Kitui
47	Sita J. Mwandu	Ngenda	Kitui
48	Jidida Mbwang'a	Tui Tuke	Kitui
49	Josphine T. Mwinzai	Tui Tuke	Kitui
50	Lucy Mwanthi	Tui Tuke	Kitui
51	Mukala Musini	Tui Tuke	Kitui
52	Christine M. Sammy	Twone Mbee	Kitui
53	Christine N. Katungate	Twone Mbee	Kitui
54	Jeniffer W. Mutua	Twone Mbee	Kitui
55	Salome Mwikali Kyaluma	Twone Mbee	Kitui
56	Benitia K. Mutua	Uthasyo	Kitui
57	Fred K. Makanda	Uthasyo	Kitui
58	Rose Meki Mumo	Uthasyo	Kitui
59	Samuel Kaesa Mutie	Uthasyo	Kitui
60	Anna Malonza	Wasya wa Iveti	Kitui
61	Mutheu John	Wasya wa Iveti	Kitui
62	Mutua Ndunga	Wasya wa Iveti	Kitui
63	Tabitha Mbaluka	Wasya wa Iveti	Kitui
64	Kyalo Makau	Wikwatyo wa Miambani	Kitui
65	Titus Makali	Wikwatyo wa Miambani	Kitui
66	Annah S. Mutisya	Woni wa Aka	Kitui
67	Elizabeth M. Mutunga	Woni wa Aka	Kitui
68	Christopher K. Mwonga	Wumiisyo	Kitui
69	John Kananah Mutui	Wumiisyo	Kitui

70	Catherine Musango	Wuumisyo wa aka	Kitui
71	Janet M. David	Wuumisyo wa aka	Kitui
72	Cyril Katunga	Zombe Women	Kitui
73	Eliud Luvi Baraka	Zombe Women	Kitui
74	Judy Wanjiru Muchiri	Gacegethiuri	Mbeere
75	Peter M. Nyaga	Gacegethiuri	Mbeere
76	Jackson Mugo	Kabuguri	Mbeere
77	Lydia Ndegi Njue	Kabuguri	Mbeere
78	Michael Nguru Kivuti	Kabuguri	Mbeere
79	Peter Ngugi Mugo	Kabuguri	Mbeere
80	Angelina Nzyoki	Kalumaita	Mbeere
81	Catherine Kaluki	Kalumaita	Mbeere
82	David M. Mutiso	Kalumaita	Mbeere
83	Peter M. Muas	Kalumaita	Mbeere
84	Isaiah Mutunga	Kalumaita FFS	Mbeere
85	Flaciah Wanjiku	Kambaru	Mbeere
86	Jane Muthoni Ileri	Kambaru	Mbeere
87	David Muriithi Nthuraku	Kanyonga	Mbeere
88	John Mutuku Nthiga	Kanyonga	Mbeere
89	Justar Mbuya	Karimambai	Mbeere
90	Venzania Karithi Ngari	Karimambai	Mbeere
91	Kambu Ileri	Kariru	Mbeere
92	Margaret Wanjiru	Kariru	Mbeere
93	Gaudesiah Mbuya Njuki	Kwamachembe	Mbeere
94	Margret Wanjiku Kimiru	Kwamachembe	Mbeere
95	Beth Macharia	Kwirutira	Mbeere
96	Irene Mucia Njiru	Kwirutira	Mbeere
97	Rosemary Mbuya Nyaga	Kwirutira	Mbeere
98	Virginia Wangari	Kwirutira	Mbeere
99	Tarascia Mwitia	Kwirutira	Mbeere
100	Catherine Mbuya	Mutethania	Mbeere
101	Catherine N. Nyaga	Mutethania	Mbeere
102	Eunice Wanjiru Njagi	Mutethania	Mbeere
103	Nancy K. Kaumbuthu	Mutethania	Mbeere
104	Abraham Mwose	Ndia Ndaasa	Mbeere
105	Bonface Maingi	Ndia-ndaasa	Mbeere

106	David Musyimi Nzau	Ndia-ndaasa	Mbeere
107	Martha Ngaanga	Ndia-ndaasa	Mbeere
108	Millicent Kaari Kioko	Ndia-ndaasa	Mbeere
109	Milliam Makena	Thara-mbeere	Mbeere
110	Jacob N. Kamwende	Tharambere	Mbeere
111	Peter M. Nyamu	Tharambere	Mbeere
112	Samuel N. Kinyua	Karangi	Tharaka
113	Zippora Karimi	Karangi	Tharaka
114	Janet Kamene Silas	Kiriti	Tharaka
115	Jeniffer Karimi John	Kiriti	Tharaka
116	Mary Kaindi	Kiriti	Tharaka
117	Catherine Mukami Kirema	Kuugia kwa Nthaka	Tharaka
118	Jacob M. Njeru	Kuugia kwa Nthaka	Tharaka
119	Moses Mutegi Mitambo	Kuugia kwa Nthaka	Tharaka
120	John King'ang'i	Mukothima Kagunda	Tharaka
121	Nathan Gitonga Nthiga	Mukothima Kagunda	Tharaka
122	George Nyamu	Muungano Youth	Tharaka
123	Susan Gakii Matutta	Muungano Youth	Tharaka
124	Peninah M. Njeru	Muungano Youth	Tharaka
125	Cecilia Kamunda Muchege	Mwenda-antu FFS	Tharaka
126	Japhet Muriungi	Mwenda-antu FFS	Tharaka
127	Catherine Karimi	Ntithini Soil Conservation	Tharaka
128	Joyce M. Mati	Ntithini Soil Conservation	Tharaka
129	Loise Kareandigu Cesare	Ntithini Soil Conservation	Tharaka
130	Valerio Gitonga Murige	Ntithini Soil Conservation	Tharaka
131	Peter Mpanda Mburio	Nturubani Men	Tharaka
132	Rufo Muthomi Safari	Nturubani Men	Tharaka
133	Stephen Simba Njagi Mainda	Nturubani Men	Tharaka
134	Elizabeth Cikuthi	Utumi Women	Tharaka
135	John Musyoka Kamanga	Utumi Women	Tharaka
136	Julia G. Njagi	Utumi Women	Tharaka
137	Mary Kabiru M.	Utumi Women	Tharaka
138	Naomi Kaguna	Utumi Women	Tharaka

ANNEX II. TOT PROGRAMME OF ACTIVITIES

DAY	TIMES	TOPIC	FACILITATOR
MONDAY 6 TH June	8:00-10:00	Opening Program Welcome address/ Opening Participatory introduction of participants Leveling of expectation Setting of learning norms Groupings Function of Host Team	HQs District team Titus team District team District team Titus team
	10:00-10:30	BREAK	HOST TEAM
	10:30-13:00	Overview of the FFS Approach Organization and management of FFS Ground working Existing Groups New Groups Site Selection/ Host farmer Selection of Participants Field school schedule	Titus Team District team Titus team District team Titus team Titus Team
	13:00-14:00	LUNCH	HOST TEAM
	14:00-17:00	Participatory Discussion on: Key non – formal Education Methods Concept of What is this what is that? Concept /Importance of AESA	Titus team Titus team District Team
TUESDAY 7 TH June	8:00-8:30	RECAPITULATION	HOST TEAM
	8:30-10:00	Participatory discussion on Agricultural/ Livestock Enterprises	Titus team
	10:00-10:30	BREAK	HOST TEAM
	10:30-13:00	Participatory discussion on Agricultural/ Livestock Enterprises cont'	Titus Team
	13:00-14:00	LUNCH	HOST TEAM
	14:00 -17:00	Participatory Discussion on Forestry Technical Enterprises	District Team

DAY	TIMES	TOPIC	FACILITATOR
WEDNESDAY 8 th June	7:30-8:00	RECAPITULATION	HOST TEAM
	8:00-13:00	FFS field activities Visit FFS Group	HQs/District team
	13:00-14:00	LUNCH	HOST TEAM
	14:00-17:00	Feed back of FFS activities Experience sharing	District team District team
THURSDAY 9 th JUNE	8:00-8:30	RECAPITULATION	HOST TEAM
	8:30-10:00	Participatory discussion on: Group dynamics Facilitation skills and Leadership	District team Titus Team Titus team
	10:00-10:20	TEA BREAK	HOST TEAM
	10:00-13:00	Participatory discussion on: Result Analysis/ Cost Benefit Analysis Income Generating Activities Record keeping	District/Titus team Titus team District Team
	13:00-14:00	LUNCH	HOST TEAM
	14:00-17:00	Marketing Experience sharing Participatory discussion on: Grant proposal/ Activity proposal Report writing Field day Graduation Networking	Titus team Titus/District team District team District team Titus team Titus team
FRIDAY 10 th June	8:00-8:30	RECAPITULATION	HOST TEAM
	8:30-10:00	Matters arising from the workshop Farmers action plan (FAP) – What next after TOT	HQs/District team HQs/District team
	10:00-10:20	BREAK	HOST TEAM
	10:20-13:00	Course evaluation/ Official closing	District/HQs team

ANNEX III. FARMER FACILITATORS ACTION PLAN (FFAP)

JULY, 2005

- ❖ Farmer facilitators take over the facilitation of their own groups.
- ❖ DFEOs do back stopping of the farmer facilitators as they get started.

AUGUST, 2005

- ❖ Farmer facilitators start planning for new PTDs in their own groups for the October - November rains.
- ❖ If the group has money remaining in their account i.e. the Ksh.10,000 they can start a new enterprise depending on their needs.
- ❖ Farmer facilitator to promote group enterprise establishment on individual member farms

SEPTEMBER, 2005

- ❖ Each group to plan to implement Field day for the tree nursery enterprise.
- ❖ This will be a very crucial time since the members will have the opportunity of explaining to the neighbours what they have learned in the nursery enterprise.
- ❖ They will also have the opportunity of selling the seedlings they had raised for purpose of IGA

OCTOBER, 2005

- ❖ Preparation of Host farm in readiness for planting in the October – November rains

NOVEMBER, 2005

- ❖ Establishment of the planned PTDs in the host farm.

DECEMBER, 2005

EXCHANGE VISITS

- ❖ The groups will visit other groups probably in other divisions but within the district to see what other groups have been doing.
- ❖ The set PTDs will be easily seen in the host farms.
- ❖ Plan for Field days which will be held the month that will follow (January)

JANUARY, 2006

FIELD DAY

- ❖ The groups will organise a field day to show the neighbours the things they have learned through the FFS process.

JANUARY, 2006

- ❖ Evaluation of Farmer Facilitator
- ❖ The Farmer facilitators will also be evaluated the same time.
- ❖ Facilitator performance will be determined whether they facilitated their group well or not (Level of participation of all members, Number of graduates, level of adoption of what learnt through FFS, level of empowerment, etc.)
- ❖ NETWORK Activities

- ❖ FFS network forum

FEBRUARY, 2006

GRADUATION

- ❖ Graduation of farmers will be done for the farmers who have been attending FFS sessions.
- ❖ The ones who have adapted the activities they learned from FFS.

FEBRUARY, 2006

- ❖ Ground working for NEW groups

ANNEX IV. KANUNI ZA MKULIMA / FFS

KANUNI ZA MKULIMA

KANUNI ZA MKULIMA SIKO NNE TUNAZIJUA
KUZALISHA MIMEA, NA MITI WENYE AFYA
KUTEMBELEA SHAMBA LAKE MARA KWA MARA
KUHIFADHI WADUDU, MARAFIKI WA MKULIMA
ATIMAYE MKULIMA, KUWA NDIYE MTAALAMU

ANNEX V. CLOSING CEREMONY

To the farmers before I make remarks, its important to understand what FFS is. FFS for our purpose is an extension methodology based on learning by doing through discovery. FFS is chosen because it will not only be used for extension but also produce trainers or paraprofessionals, who will partner with extension staff (who are very far) and reach more farmers. The approach will also build capacity with the farmers

In Kitui the FFS started in 2001 under support from UNDP and later through DANIDA in the Ministry of Agriculture. Through the approach we have generated technologies for soil fertility, soil and water conservation/harvesting, crop varieties, crop protection (especially poultry and goats). We have noted a higher level of adoption (about 30%). This is because of farmers' participation in technology development and also seeing for themselves.

The FFS groups have tried to form network to share information e.g. Control of larger grain borer with controlled experimentation done by Mwingi FFS and shared this with other farmers. Technologies generated by forest department in nurseries can be shared to agriculture farmers for fruits production since they are same farmers. FFS groups have gotten access to other services e.g. credit. Some groups qualified for Njaa Marufuku grants.

Areas of emphasis as you become facilitators

- ❖ Remember to apply the qualities of a good facilitator – e.g. be a good listener and moderator.
- ❖ Ensure group cohesiveness and continuity of activities especially trees which take long to recap benefits.
- ❖ Avoid biasness in defining the problem at ground working stage. Emphasis crop and livestock activities at their right place.
- ❖ Choose enterprise depending on seasons and their reliability for example if the October – November rains are more reliable for crops and trees in that season go for such activities and livestock at the second season of month April – July if it is less reliable.
- ❖ Have viable activities during ground working stage

Since we have learnt cost benefit analysis lets have activities that will boost our income and build food security. For example in Mbeere farmers raise seedlings of high value and according to demand e.g. mango seedlings etc.

- ❖ We can use special topics to cover other extensions issues related to our problems for boosting or supplementing the activities in the FFS.
- ❖ Resource mobilization or support for farmer led schools. FFS group may be called to cost share in the FFS activities and therefore we need to be ready for this.

So as you graduate, which is expected of you is to implement your action plans using skills impacted to you during the training.

Be also model farmers in your area, and also do not be scared, the extension staff will be there and with all these challenges note we are in partnership and backstopping will be here to ensure success with these remarks I declare our training officially closed.

